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ABSTRACTS

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ABSTRACTS

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1A - Kansei Information Design 1

ITEM RESPONSE THEORY APPROACH TO KANSEI DESIGN: BASIC CONCEPT (25)

Shuichi Fukuda *

This paper points out that Kansei Design needs a good match between the customer and the producer. Recently, in the field of educational testing, Item Response Theory is drawing attention. In classical test theory, tests were given to examinees without considering any individual characteristics. The same tests were given to all examinees. But everybody knows that we have strong points and weak points. Some are good at sports. Others are good at arts. If a test is about sports, then those who are good or who like sports make a good score. And the score will be better, if the examiner likes sports. Now, it is found out that if an examiner and an examinee have more in common, then the examinee makes a better score. This is considered to be because an examinee understands the question better. And the examinees are more motivated and their scores keep going up question after question. Many people emphasize the importance of considering personalities of customers in Kansei Design. But very few discuss how it is important to find a good match of Kansei between the customer and the designer. If their intersection is small, the product would not appeal to the customer. A designer should know who will be his or her customer and should make efforts to increase the size of intersection. It would not work if they do not share intersection at all or would not work effectively if the intersection is small.

Keywords: Kansei Design, Intersection, Matching, Item Response Theory, Lifetime Value.

KANSEI-RELATED DESIGN INFORMATION EXCHANGE DURING EARLY CONCEPT CREATION PHASES (47)

Alexandre Gentner *, Carole Bouchard, Carole Favart

In this paper the authors will investigate early experience-centred design activities. Twenty-seven past industrial design projects were analysed. Information was gathered from interviews with former project team members and from an analysis of the projects' final reports. All of the projects involved the Toyota Motor Europe – Kansei Design (TME-KD) division. Three types of projects were identified: "exploratory concept," "product lining strategy," and "pre-development direction." The analysis will show that these project groups not only each have a specific context (purpose, design team members, audience) but that their outputs are also different regarding the type of design information they convey. This will lead to a comparison of the different typologies of projects and a discussion about the kansei-related design information exchange in early design stages. A model of kansei-related design information based on these discussions will be presented.

Keywords: kansei design, design information, early design stage, industrial context.

KANSEI CARDS: A VISUAL TOOL SUPPORTING THE INVESTIGATION, DISCUSSION, AND REPRESENTATION OF THE KANSEI-RELATED INTENTIONS OF A PRODUCT TO BE DESIGNED (48)

Alexandre Gentner *, Carole Bouchard, Aurelien Badoil, Carole Favart

In order to strengthen communication efficiency between different functional teams and discuss the experience potential users could have with products, a tool composed of various sets of cards was created: the kansei cards. The pictures and keywords represented allow, according to the situation, for an investigation, discussion, and representation of intentional kansei qualities. Over the last three years, this tool has been used in various industrial design projects. In this paper, we will first detail the state of the art that will set the frame for our research and introduce the key notions related to the creation of the tool and related methodologies. After having detailed our research question and hypothesis, we will present the creation of the kansei cards and two experimentations making use of them. The first methodology involves "users" in participatory design sessions to test if the cards permit an identification and communication of the directions of kansei-related design information. The second explores the impact that the cards have on discussions related to intentional experiences occurring within design team prior to idea-generation activities. To conclude, we will discuss the added value and limits of the tool and, more generally, the representation of kansei-related design information.

Keywords: collaborative design tool, kansei design, kansei-related design information, new concept development, picture-based early representation

AN APPROACH FOR EMOTION RECOGNITION USING PURELY SEGMENT-LEVEL ACOUSTIC FEATURES (37)

Hao Zhang *, Shin'ichi Warisawa, Ichiro Yamada

A purely segment-level approach is proposed in this paper that entirely abandons the utterance-level features. We focus on better extracting the emotional information from a number of selected segments within utterances. We designed two segment selection approaches (miSATIR and crSATIR) for selecting utterance segments for use in extracting features that are based on information theory and correlation coefficients to create the purely segment-level concept of the model. We established a model using these selected segment-level speech frames after clarifying the time interval for the segments. Testing has been carried out on a 50-person emotional speech database that was specifically designed for this research, and we found that there were significant improvements in the average level of accuracy (more than 20%) compared to that using the existing approaches for all the utterances' information. The test results that were based on the speech signals stimulated by the International Affective Picture System (IAPS) database showed that the proposed method could be used in emotion strength analyses.

Keywords: emotion recognition, human-computer interface (HCI), segment-level features, probabilistic neural network (PNN), emotion strength analysis

EMOTION AND INTERFACE DESIGN - HOW TO MEASURE INTERFACE DESIGN EMOTIONAL EFFECT? (126)

Damien Lockner *, Nathalie Bonnardel

Traditionally, human-computer interaction is conceived and assessed through the restrictive scope of usability. Although this approach has led to an overall improvement of the interfaces ease-of-use, it should now be overstepped. The question of the positive affect of users has become crucial for the interface project stakeholders. Our research is mostly turned towards applied perspectives. Our general hypothesis is that design strategies may affect positively the user, and influence a better attractiveness of the interface. In this paper, our objective is to present and discuss a method to measure user's emotion during an interface interaction experience. The experimental setup gathers screen records, face recognition, galvanic skin response, and questionnaires. These complementary sources bring forward the behavioral, physiological, and subjective emotional responses of the user. We discuss how these resources can be used in order to measure the emotional effect of a specific user interface.

Keywords: Emotion assessment, interface-design, cognitive psychology.

1B - Kansei Design in Taiwan 1

NEW LOVE IN HOMES: EXPLORING THE ATTITUDES OF NEW YOUNG-OLDS IN TAIWAN TOWARDS ELECTRONIC PETS (39)

*Kim C. K. Lee **

Similar to many developed countries; Taiwan has its problem of ageing populations also. According to statistics released by the Taiwan government, the population that aged 65 or more has reached 11.3% in Taiwan by the end of June 2013. This figure has far exceeded the threshold of being an ageing society, which is 7% according to the UN. In addition, the average retirement age in Taiwan has also dropped to 57.1 in 2011. These retiring elders who currently aged 49 to 67 are "Baby Boomers". People of this age group were much better educated and wealthier than their previous generations. In order to distinguish them from their previous generations, they were defined as "New Young-Olds" in this research. For the purpose of facilitating a smoother transformation into retirement life for the New Young-Olds, this study initiated an exploration on their attitudes and needs towards electronic pets. It is hope that new possibilities for a happier retirement of the New Young-Olds and new opportunities for the electronic industry in Taiwan might be found here. Therefore, a questionnaire survey was conducted during August to September in 2013; with 396 valid respondents, the survey result showed that the respondents can accept electronic pets much better than their previous generation. Further explorations for the specific needs of the New Young-Olds towards electronic pets were also done to find out suggestions of product development strategies for the electronic industry in Taiwan.

Keywords: ageing society, Baby Boomers, New Young-Olds, electronic pets, happier retirement.

AN INVESTIGATION OF WASHING AND DRESSING BEHAVIORS IN BATHROOMS IN TAIWAN (73)

Ming-Shih Chen, Iu-Ru Lai *

Bathrooms are generally shared among family members of different generations in Taiwanese households. According to statistics, 85.8% of bathrooms in Taiwan are shared among more than two people (Taiwan Design Center, 2006). However, the internal size of a bathroom in Taiwan is normally 5 square meters and contains general fixtures such as a washbasin, a toilet, and a bathtub. Considering that a washbasin, in which users can wash their faces or assorted items, might be the most frequently used fixture in a bathroom, this study chose it as the research target. As most bathrooms in typical households are considered communal spaces, the different habits of bathroom users and the similarities or variations in their physical conditions present a challenging issue for designers, who must consider individual user needs during design. This study conducted on-site observations of the washing and dressing behaviors of bathroom users in different groups, and interviewed users concerning their bathroom usage experience. The specific morning bathroom usage procedures of 15 users were recorded. The users consisted of adults, children, and elderly people. The time allocated for each bathroom user was approximately 10 minutes, which began with observing the usage procedures and then subsequently transcribing these procedures into texts. After analyzing the same behaviors of different bathroom users, a conclusion was drawn about similar problems that occurred to general bathroom users. Finally, new indexes were designed to address those problems, as well as similar problems, were analyzed, consolidated, and summarized into four categories: water volume and temperature adjustment, face-washing and cleaning method, handrail setting and height, and storage space. Through the case study, this research aimed to define the problems encountered by users while washing and dressing in a bathroom, further discuss these problems, and seek for solutions.

Keywords: Bathroom Space; Washing and dressing behaviors; Observation method

THE IMPACT OF RELEVANCY AND UNEXPECTEDNESS ON THE COMMUNICATION EFFECT OF DESIGN (90)

Yu-Chia Chen, Iu-Ru Lai *

When the human brain receives information that contradicts preconceived ideas and concepts, the new information would be compared with the preconceived knowledge, during which a schema would be used as a framework to determine the relevancy of the new information. Based on the cognitive framework schema, Stafford and Walker (1996) conducted a study on the interplay between schema and consistently inconsistent information. They found that information of moderate inconsistency tends to trigger the interest of information receivers, and in turn, has better communication effect. The definition of moderate inconsistency is that the overall representation of a design is inconsistent with the receiver's schema or unexpected to the receiver, yet the constituent elements of the design are relevant. In the pursuit of a design that has good communication effect, this study first conducted a "preliminary survey", which required 11 subjects to determine moderately inconsistent design samples that possessed the characteristics of "unexpectedness" and "relevancy" from some award-winning design artworks. Afterwards, these sample artworks were placed into three categories: high, medium, and low groups of relevancy, as based on the relevancy of these artworks' design elements (products, graphics, verbal descriptions, etc.). Then, a survey on communication effect was conducted to probe into the impact of relevancy on communication effect. A total of 120 subjects participated. The questionnaire content included five scales: comprehension, interest, impression, affection, and novelty. The measurement was based on a 5-point Likert scale (Likert, 1932). The results indicated that there is a corresponding relationship between the unexpectedness of the overall design that constitutes moderate inconsistency and relevancy, which is a constituent element of designs. Moreover, a higher relevancy of constituent elements, such as graphics, verbal descriptions, and products, means a better effect in enhancing a design's comprehensibility. Meanwhile, a comprehensible design can better facilitate the design's communication effects. In brief, emphasizing on the unexpectedness of a design and having a good command of the relevancy between a design's constituent elements helps to produce a comprehensible, interesting, and memorable communication effect.

Keywords: relevancy, communication effect, graphic design

ANALYZING AUTOMOTIVE INTERIOR IMAGES AND THEIR PERCEIVED-VALUE WITH KANSEI ENGINEERING (120)

Ching-Chien Liang *, Wei-Ping Pu, Hung-Yu Chang, Kuo-Hsiang Chen

Automotive interior design plays a very important determinant when people purchase a car. Therefore, an automotive with interior design satisfying drivers emotional needs will outshine the others without one. This study applying Kansei engineering approach, tried to find key elements of car interior that influence the drivers emotion most. The study consists of four stages: (1) Interviews with marketing experts: divided cars into high-class, middle-class and entry-class three categories under European, American and Asian three regions using car pictures available on the market. (2) Design elements extracting by design experts: disassembled car interior into 17 design items and 55 categories. (3) Kansei evaluation experiments: eight most meaningful vocabularies to drivers were extracted to evaluate the image of car interiors. They were: luxury, interesting, stylish, casual, dynamic, precise, technological and lively. (4) Perceived value constructing with questionnaire survey: using the four dimensions proposed by Sweeney and Soutar as the basis to measure and construct the perceived value for the eight adjectives extracted previously. The study explored the weights for design elements of car interiors using Kansei Engineering technique and quantification type I, and further measured the perceived value for the eight adjectives. It was hoped to provide effective guidelines for car interior designers in the future.

Keywords: Kansei Engineering, Kansei Image, Auto Interior Design, Perceived Value

THE COST-EFFECTIVE APPEAL OF CROSSOVER B-CAR INTERIORS TO CONSUMERS (147)

Kai-Shuan Shen *, Kuo-Hsiang Chen

The design of a crossover B-car interior was used to explore the relationship between marketing considerations, survey participants' emotional responses, and product design. Research methodology was based on Kansei Engineering. Seventeen experts with professional automotive knowledge, including editors of car magazines and experienced car users were interviewed using the Evaluation Grid Method (EGM) about their preferences and reactions to interior design schemes of crossover B-cars. Additionally, automobile consumers were surveyed through a questionnaire used to ascertain participants' participants' preferences for pictures depicting design elements of crossover B-car interiors. The results of the questionnaire were analyzed using Quantification Theory Type I. According to the interviews of the experts, the tow cost-effective, more appealing items relating to crossover B-car interior, as determined by the semantic structure of EGM, were "economical and practical" and "customized for consumers needs". In addition, the two interior items were related to particular reasons and detail design elements found in the analysis of the questionnaire using Quantification Theory Type I. The current study suggests that specific products in this case car interiors,and their design are related to consumers' motivations about cost-effectiveness, functionality, and form. Additionally, the study demonstrates that consumer preferences and motivations influence their responses to specific design schemes.

Keywords: Cost-effectiveness, Appeal, Car Interior Design, Consumer Psychology, Kansei Engineering, EGM, Quantification Theory Type I

1C - Transportation

EXPLORING THE COGNITIVE STRUCTURE OF AIRCRAFT PASSENGERS' EMOTIONS IN RELATION TO THEIR COMFORT EXPERIENCE (58)

Naseem Ahmadpour *, Jean-Marc Robert, Gitte Lindgaard

Emotion descriptions were elicited from participants' written accounts of their comfort experience and grouped according to the emotion model by Ortony, Clore, and Collins (OCC). The cognitive structure and specific appraisal patterns of passengers were explored on three levels of passenger's concerns (goals, standards, and aspects), their focus during the flight (including the mediating cabin elements) and the resulting emotions. Four emotion groups were highlighted as relevant to flight comfort. Wellbeing (e.g., joy, distress) emotions were the most frequently mentioned group by participants when focused on the consequences of interaction with cabin features such as seat, IFE and service, pertaining to participants' personal goals (e.g., security, calmness). The cognitive underpinning of prospect-based (e.g., satisfied) emotions included similar goals except that participants evaluated the consequences of their interaction with the seat, legroom, IFE and service relevant to their expectations and anticipations. The emotions in wellbeing/attribution compound group were elicited upon evaluating the consequences of the actions of agents (e.g., service, neighbors). Thus emotions anger and gratitude emerged when those actions yielded pleasing or unpleasing consequences for participants. Attraction (e.g., liking) emotions were generated once passengers developed liking or disliking for certain aspects (e.g., aesthetics, physical fitting) of the seat and legroom. Subsequently, a model of cognitive structure of passengers' emotions was constructed for the flight context highlighting the seat and services as the central (most frequently regarded) features to passengers' emotional experiences. The proposed model enables designers to recognize the types of experiences that should be delivered to ensure that passengers feel comfortable.

Keywords: Comfort, Emotion, Experience, Aircraft, Passenger

THE FUTURE PASSENGER EXPERIENCE: A SHIFT FROM PHYSICAL TO VIRTUAL DESIGN (65)

Anna Harrison *, Vesna Popovic, Ben Kraal

The "Airport Terminal of the Future" has been an important topic of discussion at aviation industry conferences in the last few years. Most recently, there has been a convergence of ideas regarding what the future passenger experience will be like. This convergence of stakeholder viewpoints can be attributed to several key trends, including: (a) the maturation and accessibility of technologies, (b) a shared need to reduce the cost and time associated with processing passengers through terminal buildings, and (c) a growth in the number of passengers travelling by air each year. In this paper, we present an example of what the future passenger experience will look like. The example represents a consolidation of industry perspectives and research in the field. By looking at the problem of future travel from the perspective of an instantiated example, we highlight two of the key data integration components that need to be addressed before the vision of seamless travel can become a reality: (1) data formatting and (2) data ownership. Resolving both formatting and data sharing issues is necessary in order to integrate data from various underlying data sources. This in turn is critical to providing the seamless future travel experience. We propose an approach to resolving the data integration issues identified. The data formatting issues can largely be resolved through the development of global aviation data standards. An approach based on data validation, rather than physical data integration, is proposed to overcome the issues associated with data ownership. By looking at the passenger experience from this data centric perspective, we identify a potential shift in the way that future passenger terminals will be designed. Whereas currently the design of terminals is largely an architectural practice, in the near future, the design of the terminal building may become more of a virtual technology practice. This naturally has significant implications for the way in which the design of these environments is approached in the future

Keywords: Passenger Experience, Future, Vision, Travel, Design, Data, Airport, Architecture

AN INVESTIGATION ON THE GENDER DIFFERENCES OF TAIWANESE YOUTHS AND MIDDLE AGES IN EVALUATING MOTORCYCLE APPEARANCE AND USE (78)

Ching Yang *, Chia-Sheng Chen

This study mainly used viewpoint of Kansei engineering to conduct survey of motorcycle shape cognition and usage evaluation among young (20-35 years) and middle-aged (35-55 years) males and females in Taiwan. Firstly, field observations and interviews were adopted to perform on-site shooting and recording of brand, model, purchase motivation, intended use, males and females' dressing style, etc. of 96 samples of 100-150CC motorcycle so as to know popularity of motorcycle in Taiwan and differences between generations and genders. Then, 10 representative motorcycle samples were selected. SD (Method of Semantic Differential) was used for shape cognition and usage evaluation survey among 114 interviewees and SPSS statistical software was used for factor analysis in order to understand young and middle-aged groups' relevance and gender difference in terms of motorcycle shape and usage evaluation. Results of this study show young and middle-aged generations mainly consider factors such as brand, appearance, lightness, convenience and price when choosing motorcycle. Males and females purchase suitable brand and model as per personal height, body size, preference for shape, etc. Females mostly select light model of 100~115c.c and are in favor of relatively low horsepower and compact shape; males prefer to choose 125-150c.c sport motorcycle with strong horsepower and huge size. Factor analysis results of shape cognition and usage evaluation can be divided into three factors: (1) appearance, (2) sense of design, (3) operability. 125c.c models generally show a huge and steady sense while 100c.c ones feel small and light. Simple arc appearance looks natural while complex and sharp appearances makes people feel unique. Curved design and small volume are suitable for females. These findings can provide a reference for subsequent relevant research development and future design development.

Keywords: Motorcycle, Generation Difference, Gender Difference, Semantic Differential method, Usage Evaluation

CONSIDERATION OF THE FREQUENCY CHARACTERISTICS OF A SOUND SYSTEM IN A TRAVELING VEHICLE (83)

Tomoaki Hidaka *, Kyosuke Ochiai, Yamato Makoto, Toshiyuki Kageyama, Hiroshi Hasegawa

We conducted a subjective evaluation experiment to determine the optimal frequency characteristics for a car audio system during vehicle travel . In this experiment, the car interior noise typically generated when a vehicle travels at a speed of 60 km/h was added to the experimental sound sources, and subjective evaluation was made of the sound passed through filters modifying the frequency characteristics. A total of 10 types of sound sources were used in the evaluation (narration, fusion, classic, J-pop, vocal, healing, nature, jazz, rock, and pop). Five levels of frequency characteristic filter (-5 to -9 dB/oct.), which augmented the bass in response to car interior noise, were used. The evaluation terms were 12 pairs of words related to sound quality, comfort, added value, and safety. Higher evaluation scores were given to items of palatability and safety in the vicinity of the -6 dB/oct. filter level, which augmented the bass to a level slightly below the frequency characteristic curve of the car interior noise (~ -7dB/oct.), and to items of sound quality and added value at the -9 dB/oct. filter level. Factor analysis was also conducted, to identify comfort, sound field, and clarity factors. Based on these factors, the filter results were compared. Higher comfort and clarity factor scores were obtained in the vicinity of the -6 dB/oct. characteristics versus those of other filters. These results confirmed that taking frequency characteristics into account in the performance of a car audio system during travel is effective in improving car interior comfort.

Keywords: car audio system, comfort, car interior noise, subjective evaluation

1D - Senses

THE DIFFERENCE OF IMAGERY PERCEPTION BETWEEN VISUAL AND TACTILE SENSATION (135)

Yung-Ting Chen *, Ming-Chuen Chuang

Images aroused by sensory faculties, especially that of touch and vision, play a very important role in human-product interaction. Most studies tackled sensory modalities in isolation, which is somewhat insufficient, as cross-talks among sensory channels would be unduly overlooked. In this study we compared visual and tactile images at the same time, trying to reveal the correlations and distinctiveness of these two primary modalities. In the first stage of the study, we obtained 35 pieces of modern design works as the visual stimuli according to the opinion of interviewed experts. The material compositions of these works were then analyzed and 37 materials were abstracted for tactile evaluation. The vocabularies used by the experts to describe their feelings on evaluating the design works and the materials were grouped into 21 adjective pairs with KJ method. Thirty five subjects were then recruited to give semantic differential evaluation with the scale of the 21 adjective pairs on the 35 visual and 37 tactile stimuli. Through factor analysis, we found four principle factors of image for both of the two modalities. However, the components of adjective pairs in each factor of the two modalities are slightly different. This variation may imply that although tactile and visual sensation often function cooperatively to enhance the perception of each other, they sometime work competitively; the dominant modality will suppress the other one especially for some imagery perception. Finally, this study found that the tactile oriented feeling of roughness may influence visual images. The result of the investigation can help researchers to further understand the influence between multisensory images and to treat it as a useful reference for relative studies, while it can help designers to design products with demanded tactile and visual feeling.

Keywords: Kansei engineering, Imagery difference between sensations, Semantic differential method, Factor analysis

CHARACTERIZING PERCEPTIONS OF MATERIAL SUSTAINABILITY THROUGH DRINKING VESSELS (62)

Kiersten Muenchinger *

Our perceptions of the environmental impacts that materials have tend to be formed by vernacular knowledge and experience. We are familiar with recycling aluminum cans, so aluminum must be sustainable because it is so recyclable. We bring our own mugs to the coffee shop because we see ceramic mugs as more durable than disposable paper cups. Images of plastic bottles littering our landscapes lead us to believe that polymers are harmful because they don't degrade. Our perceptions of the sustainability characteristics of these materials – aluminum, ceramic, and polymer – are influenced by our experience with products made from these materials. To date, Kansei engineering studies to assess perceptions of the sustainabilities of materials have been conducted with materials samples. The goal of this study is to see how people perceive the sustainability of a material used to make a specific product. For the study, a series of seven drinking vessels, each made of a different material, was fabricated. Each vessel was designed to have the same environmental impact as its companions, as calculated based on the 2007 Okala single-figure Life Cycle Assessment (LCA). This paper examines how people perceived ten unique sustainability attributes of these drinking vessels, and which of these attributes may have a dominant effect on the product's overall perceived sustainability. Clarifying which attributes of sustainability influence peoples' understanding of a product's overall sustainability will help product designers and engineers select materials for products that consumers will accept, understand, and champion for their reduced environmental impacts.

Keywords: Materials Selection, Sustainability, Product Development, Life Cycle Assessment, Kansei Engineering

INFLUENCE OF VISUAL AND PRESSURE INFORMATION ON CLOTHING PRESSURE SENSATION (67)

Mayumi UEMAE, Tomohiro UEMAE, Masayoshi KAMIJO *

Clothing comfort sensation is composed of multisensory processes and involves complex processes, in which a large number of stimuli from clothing and external environments are communicated to the brain through multiple channels of sensory responses to form subject perceptions. We get much information through visual sensation, so studies on the influences of visual information on clothing pressure sensation is very important. The purpose of this study is to investigate the effect of clothing pressure on physiological and psychological responses in order to create a method for evaluation of clothing comfort. We have measured physiological and psychological responses in the clothing pressure sensation under 3 visual conditions; Condition 1 was that the subjects had their eyes open and looked forward, Condition 2 was that the subjects looked at themselves in a mirror, and Condition 3 was that the subjects without a waist belt look at other subjects who wore a fastened waist belt. Consequently, in all three conditions, the sympathetic nerve activity decreased. The sympathetic nerve activity decreased also in Condition 3 in which the information of clothing pressure was added through only visual sensation. In the re-rest period, the response in Condition 2 was significantly larger than that in Condition 1 and Condition 3. We concluded that it is important to consider the effects of visual information as well as the effect of clothing pressure sensation in the evaluation of clothing comfort sensation.

Keywords: Clothing pressure sensation, Visual sensation, Multisensory, Physiological responses, Psychological responses

HARDNESS EVALUATION FOR SILICONE RUBBER BUTTON ON THE BASIS OF TACTILE AND VISUAL INFORMATION (89)

Takayuki Kayawari *, Zhang Jue, Noboru Sugamura

Information about the product value acquired through the five senses is important and if a new factor can be added to a product, it would lead to the differentiation of such a product from other similar products, as well as would improve the value of such a product. This research was aimed at investigating how the evaluation of objects is impacted by the hardness of an object as determined by the tactile sense. This investigation was carried out using silicone rubber and involved examining how the findings can be applied to the differentiation of product values. The investigation indicated that the results of sensitivity evaluation of a product depend on the hardness of silicone rubber and that the hardness values can be distinguished if they vary by at least five degrees. However, it was also found that once the hardness exceeds 60 degrees, it becomes harder to distinguish between the hardness values. Furthermore, when experiments on the application of silicone rubber to push switches were performed, sensitivity evaluation for the products was simultaneously performed, and the evaluation results indicated that the distinction between hardness values became more sensitive by the use of silicone rubber.

Keywords: HardnessEvaluation KanseiEvaluation TactileInformation VisualInformation PairedComparisonMethod

THE WAITING ROOM. IMPROVING SPACE THROUGH SMELL (21)

Alejandra Vilaplana *, Toshimasa Yamanaka

Waiting is an inevitable part of life and the spaces in which we wait can contribute to either improve or worsen the experience. This paper covers the process and results of "The waiting room", analyzing if the presence of specific smells has a significant impact in how the room and the waiting experience are perceived. Two different odorants were selected, lavender (relaxing) and orange (stimulating); 63 participants from 32 different countries were assigned into three groups (between-groups approach): Control (unscented), Orange and Lavender. Results show that both scents affected the room and waiting experience evaluation in different ways and overall increased the surrounding space perception compared to the unscented condition. Participants exposed to lavender scent were inclined to rate as higher the 'psychological' properties of the room such as pleasantness and warmth; in addition the scent-evoked memories were emotion based. Participants exposed to orange scent tended to rate as higher the 'physical' properties of the room such as brightness and height; scent-evoked memories were object based. Lavender scent had a stronger influence in space perception than orange, suggesting the relevance of congruency and coherence between scent and physical environment when incorporating scent as a valid design tool in architecture.

Keywords: Kansei Architecture, Space Perception, Smell, Waiting experience

2A - Kansei Information Design 2

ABOUT THE NATURE OF KANSEI INFORMATION, FROM ABSTRACT TO CONCRETE. (155)

Carole Bouchard *, Alexandre Gentner, Daniel Esquivel

Designer's expertise refers to the scientific fields of emotional design and kansei information. This paper aims to answer to a scientific major issue which is, how to formalize designer's knowledge, rules, skills into kansei information systems. Kansei can be considered as a psycho-physiologic, perceptive, cognitive and affective process through a particular experience. Kansei oriented methods include various approaches which deal with semantics and emotions, and show the correlation with some design properties. Kansei words may include semantic, sensory, emotional descriptors, and also objects names and product attributes. Kansei levels of information can be seen on an axis going from abstract to concrete dimensions. Sociological value is the most abstract information positioned on this axis. Previous studies demonstrate the values the people aspire to drive their emotional reactions in front of particular semantics. This means that the value dimension should be considered in kansei studies. Through a chain of value-function-product attributes it is possible to enrich design generation and design evaluation processes. This paper describes some knowledge structures and formalisms we established according to this chain, which can be further used for implementing computer aided design tools dedicated to early design. These structures open to new formalisms which enable to integrate design information in a non-hierarchical way. The foreseen algorithmic implementation may be based on the association of ontologies and bag-of-words.

Keywords: Kansei information, Abstract-Concrete, Formalisms, Early design

PERCEPTION THEORIES AND KANSEI DESIGN (157)

Pierre Lévy *

Approaches to create artifacts taking kansei into consideration are multiple and are shared among various disciplines, such as kansei engineering, kansei science, and kansei design. In this paper, I focus on the discipline of kansei design and show that various approaches exist within this discipline. These can be characterized based on their focus: either the physical or the interactive materiality of the artifact. Indirect kansei design, mostly focusing on the physical materiality, is based on indirect (or mediated) perception theories. It often relies on representations, models, and metaphors to provide meaningful input to the design. Direct kansei design, mostly focusing on the interactive materiality, is based on direct (or ecological) perception theories. It mainly relies on the designerly attitude of the designer in the process, and apprehend design meaning to emerge from the reflection upon design exploration within the process. Describing and differentiating these two approaches show how kansei is considered differently by different approaches of kansei deign, looking forward a dialogue between these approaches in order to obtain a greater insight on kansei and on its consideration for designing.

Keywords: perception, interaction, perception theory, kansei design, direct kansei design

COMMUNICATING EMOTION THROUGH HAPTIC DESIGN: A STUDY USING PHYSICAL KEYS (150)

Marie Kjær Kjellerup *, Anne Cathrine Larsen, Anja Maier

This paper explores how designers may communicate with the users of their products through haptic design. More specifically, how tactile properties of materials evoke emotions such as satisfaction, joy, or disgust. A research through design approach has been followed; mood- and material boards and prototypes of four 'haptically enhanced' (physical) keys were created. Types of keys selected include home, bicycle, hobby, and basement. An experiment with ten participants was conducted, using word association and a software to elicit product emotions (PrEmo). Results show a mapping between the designer's intent and the user's inference. We conclude that it is thus viable to communicate emotions using haptic design. Moreover, we found that when using their sense of touch, participants' previous positive or negative memories and experiences were projected onto the objects.

Keywords: Affective Engineering, Design Communication, Emotional Design, Haptic Perception, Rapid Prototyping

DIFFRACT ME! – USING A SKILLS-BASED APPROACH IN DESIGN PRACTICE (149)

Jeroen Peeters *, Stoffel Kuenen, Ambra Trotto, Caroline Hummels

The potential of skills in design is intriguing; as skills open up new perceptions of the world they allow meaning to arise as we engage with the world. Several skills-based techniques that leverage this potential have been developed, and integrated into the Designing in Skills framework. The framework builds on personal engagement of designers in their practice, and promotes them to take a first-person perspective, enabling designs to be enriched with meaning. In this paper, we present the most recent workshop based on this approach, which specifically focuses on employing the Designing in Skills framework as a starting point and catalyst for design practice. We briefly introduce the Designing in Skills framework and present the DiffractMe! project in which we built on this approach to explore its potential for design practice. We conclude with reflections on the process and result by the involved designers. These reflections offer insights into the value of this approach for enriching interactive design with experiential qualities.

Keywords: Interaction Design, Engagement, Skills, First-Person Perspective, Design Process.

MESSAGE IN A BOTTLE: THE USE OF INTERMEDIARY OBJECTS TO CONVEY FUTURE EMOTIONAL INTENTIONS DURING A MULTI-DISCIPLINARY DESIGN PROJECT (156)

G. Arno Verhoeven *, Claudia Eckert

In this paper we describe a recent design research investigation, highlighting ways in which a designer attempts to communicate to others their intentions regarding users' emotional responses to future artefacts through the use of intermediary objects during design activity. We follow the interactions of a jewellery designer engaged in a project in partnership with an electrical engineer, a software developer, and museum curators. The overall design goal is to create an aesthetically desirable electronic object for use in a specific museum context, allowing the generation of personalized labels. This paper embraces an ethnomethodological approach to uncover ways the jewellery designer attempts to translate an intended emotional state (appeal and desire) towards the designed artefact in the future context, through intermediary objects, which are interpreted differently by different people across the trajectory of design activity. The use of intermediary objects during sociotechnical interactions in engineering design activity is well documented (Vinck and Jeantet, 1995, Boujut and Blanco, 2003, Eckert and Boujut, 2003) but our research suggests more work is required to understand the role that these types of devices play in intending and interpreting future emotional content, which is seen as a significant goal within product design disciplines. We discuss the concept of difference, and how it is managed during design activity involving various actors and actants, leading towards a better understanding of intention and interpretation during design.

Keywords: design activity, design process, affective design, design intention, designer interaction

2B - Kansei Design in Taiwan 2

APPLYING FUZZY LINGUISTIC PREFERENCES TO KANSEI EVALUATION (158)

Jyh-Rong Chou *

Kansei engineering has been developed as an effective methodology to deal with customers' feeling and demands and further translate them into the design elements of a product. It is very important to determine and substantiate the measure of Kansei preferences before its utilization and performance. Kansei evaluation plays a vital role in the implementation of Kansei engineering; however, it is difficult to quantitatively evaluate customers' preferences on Kansei attributes of products as such preferences involve the human perceptual interpretation with certain subjectivity, uncertainty, and imprecision. This study presents a fuzzy linguistic preference approach for Kansei evaluation. The proposed approach is based on fuzzy linguistic variables associated with the fuzzy weighted average techniques for aggregating Kansei preference information. A case study was conducted to illustrate the implementation of the proposed approach.

Keywords: Kansei Evaluation, Fuzzy Linguistic Variables, Kansei Preferences, Aggregation, Fuzzy Weighted Average

UNDERSTAND USER-DEVICE RELATIONSHIP IN MULTISCREEN EXERCISE ACTIVITY (32)

In-Chu Liao *, Yi-Shin Deng

The emergence of a variety of different technical devices has changed the ways we manage things, live our lives, gain new knowledge, or maintain a healthy lifestyle. According to Manhattan Research (2012) multiscreen health activities are on the rise. More and more exercise related equipment or gadgets are being adopted for the purposes of tracking, enhancing or facilitating our physiological state. Research in this field have addressed issues in the type of interaction, usage pattern and information perspectives, to explore the mechanisms between intrinsic issues (individual differences, content and device), and extrinsic issues (environmental context and culture implications). Less attention has been paid to deal with the relationships between the users and their devices during exercise activities. Some reports have shown why and how people utilize multiple devices in their daily lives, as well as what those devices mean to them in general, but it may not be the same while applying to the context and purpose in the domain of physical health. Mobile devices like smartphone, tablet or exercise gadgets provide specific functions and convey different messages when used in the context of exercise. The goal of this study is to explore the kind of devices people use during exercise, the usage context, and the emotional reaction derived from multiple devices by understanding the role of each device and how it can affect users' perception to the content and the motivation to the goal from a user-centered point of view. The findings of my study ascribed roles to the investigated devices through in-depth interviews. This study is to propose a conceptual structure of the user-device relationships in exercise activities, and provide a basic understanding on how we could map out the content, strategies or different ways of interaction with the characteristics of devices to maximize the effectiveness of the outcome.

Keywords: exercise, user-device relationship, multiscreen, product attachment, motivation

PRODUCTS AS POETRY: A CASE STUDY OF THE SUN-CROW TEAPOT DESIGN BASED ON TRADITIONAL CHINESE POETIC AESTHETICS (85)

Chi-Chang Lu *, Po-Hsien Lin

The concept of emotional design has become the main focus in the current trend of perceptual consumption. After reviewing the historical development of Eastern and Western art, we determined that traditional Chinese art emphasizes subjective expression. Moreover, classical Chinese aesthetics favor poetics, whereas classical Western aesthetics focus on rationalism. Poetics are image based, and personal perceptions are used to analyze and understand external objects. These perceptions are expressed implicitly through symbols or metaphors. Classical Chinese poetic aesthetic theory is based on nearly 2,000 years of history and, thus, comprises a myriad of valuable ideas. The artist of the sun-crow teapot has extensive experience researching and creating Chinese art, and drew on these experiences and knowledge to craft the teapot. However, the purpose of the design was to achieve Donald A. Norman's reflective level of emotional design. In addition, the teapot was designed to exhibit traditional Oriental charm while conforming to modern style aesthetics. Design strategies inspired by traditional Chinese aesthetics include the concept that humans are an integral part of nature, wonder derived from opposing similarities and dissimilarities, the theory of the emptiness-solidity relationship, the concept of meaning that is retained when images are forgotten. To modernize the teapot, the design strategy was derived from the theories of Cezanne. Thus, the teapot was crafted using both spherical and cylindrical shapes to create a contemporary and fashionable abstract minimalist style. Case evaluation results indicate that a poetic design based on traditional Chinese artistic techniques can be implemented.

Keywords: Chinese Classical Aesthetics, Emotional Design, Poetic Design, Bionic Design, Product Design.

A KANSEI DESIGN COLLABORATION PLATFORM IN TAIWAN (31)

Stanley Huang *, Jui Jan Chan, Hsing-Hsuan Wu, Chun-Wen Tang

Taiwanese researchers began research on Kansei design in 1999. Until now, there was no comprehensive study regarding the industrial needs for Kansei design. The first part of this paper summarizes the survey results from 86 companies, including design studios and domestic product manufacturers. These companies need support from Taiwan's research organizations in the following fields: trend and lifestyle research, design and market databases, rapid prototyping services, design talents, business matchmaking, etc. Industrial Technology Research Institute (ITRI), a major non-profit research organization in Taiwan, established the ITRI Emotional Design Office (EDO) in 2013 at its new campus in Central Taiwan. EDO started their emotional design program to develop advanced emotional design methodologies and to provide assistance and services to companies in central Taiwan. It provides an open lab and functions as a collaboration platform that fosters collaboration between academia and industry. The second part of this paper covers the strategy plan to support industry.

Keywords:Kansei design, emotional design, industrial survey, collaboration platform

2C - Architecture and Urbanism

PROPOSAL FOR URBAN ENVIRONMENT USING ICONS WITH FIFTH YEAR ELEMENTARY STUDENTS (142)

Shoichiro Sendai *

This paper presents discussion of environmental proposals by children related to the change of the expression of map from the third to the fifth year students, based on the fieldwork and the workshop on "Good Place". According to the analysis of data, a child passing from the third to the fifth year estimates urban spaces more objectively. However, for iconic expression, the place diversity and the five senses are more closely interrelated.

Keywords: Proposal, Urban space, Icon, Five senses

THE ROOF GARDEN IN JAPANESE MODERN ARCHITECTURE -FROM THE END OF WORLD WAR II UNTIL 1966- (33)

Michiya Tsukano *

The purpose of this paper is to clarify the architectural Kansei (sensibility) in Japan since World War II until 1966. Therefore, the authors discuss how the "roof garden," which did not exist in Japan before then, was transplanted from European Modern to Japanese Modern architecture and how it was applied. In this paper, we adopt the following five indexes: "use," "building type," "material," "structure," and "location," using several architectural journals. We have concentrated on the great change in roof gardens in Japanese Modern since 1954 due to the economic growth caused by exceptional procurement during the Korean War, We divided the 1945-1966 period into two parts and analyzed the change in roof gardens by comparing the gardens of each period. As a result, the transitions in the five indexes have become apparent. The roof garden after World War II has been expanding to a range from an international-style architecture seeking the universal rationality to architecture that exceeds rationality and the utilitarian. Moreover, diminishing of the "view," which had been the subject of roof gardens in the pre-war period due to the high economic growth, has led to fumbling for new functions of the roof garden. In other words, a roof garden in Japan after World War II has been changing in various ways while being involved in the attenuation of architectural kansei (sensibility) of "view."

Keywords: Architectural Kansei, Japanese Modern Architecture, Roof Garden, Economic Growth.

DESIGN URBAN AREA TOWARD AGING SUCCESSFULLY; BASED ON KANSEI METHODOLOGY (95)

Mohsen Ahi Andy, Negin Yashmi *

As globally demographic changes because of increasing life expectancy, concern about prompting greater health in old age is becoming more important. Trend shows by next three decades about 25 percent of living people are age 65 or older. Different researches has tried to define healthy aging factors objectively like 'successful aging' which divided aging well into three different components; physical health, social engagement and psychological health but when we look at this criteria subjectively there is no specific method to discover elder's psychological desires. In this paper we used Kansei theory as method to define elder's psychological needs to design built-in urban environment. As with the case for this study we choose a group of old male and female Iranian elders as participant in to understand their aesthetic, emotional, and other experiential factors which leads to design facilities and surrounding toward aging successfully and offer a framework about our target group needs, based on Kansei methodology.

Keywords: Kansei, Successful aging, urban design, Iranian elders

DESIRE, SPACE AND TECHNOLOGY: COMMUNICATIONS TECHNOLOGIES AS ARTICULATORS OF DESIGN FOR URBAN SPACE (145)

Awoniyi Stephen *

The current paper presents design of urban public space as a problem framed by experience affordance. We proceed analytically. First, we note that people harbor and approach desires. Next, we observe that people inhabit space and their desires are enacted in space. We claim that urban public spaces are sites that afford realization of desires. Urban spaces, however, do present their own contradictions. In particular, we identify walls as capable of fragmenting space and the experience of space. We partially deconstruct walls and look for points of rupture, penetration and transcendence. Then we seek strategies for exploiting these in affordances of transcendence prompted by communications technologies. Our objective is to contribute to discourses surrounding human inhabitation of urban spaces and those concerned with adding value to the experience of inhabitation.

Keywords: Desire, boundaries/limits , communications technologies, public space, urban space

USER EXPERIENCE IN THE THRESHOLD MATRIX OF PUBLIC SPACE: DESIGN INTERVENTION IN A COMPLEX ENVIRONMENT (146)

Awoniyi Stephen *

Designers seek to create environments that offer their inhabitants comfortable, desirable, meaningful or other qualified positive forms of experience. In some successful models, solutions involve a synthesis of space and person, such that they are mutually constitutive. Often as well, models involve an understanding of space, person and their union as dynamic. Models of space design which recognize such a dynamic relationship are said to view space as relational. In this paper, we claim space as relational. We also present the case that emergent in actualizing the relational idiom is the idea of threshold. Threshold is many things and complex. It symbolizes crossing but also pause, end but also beginning, a brief moment but also extended duration. In the paper, we explore the concept of threshold within physical, perceptual and rational frames. We attempt to foster a rich awareness of threshold, link it to a fertile, generative picture of public space, connect it to enrichment of inhabitants' experience of the city and articulate roles for the designer. City and cultural spaces have pleasures embedded in the idea of threshold. Through analysis and intervention the designer can tap into those pleasures for the benefit of the user.

Keywords: Threshold, affect, complexity, public space

UTILIZING REAL-TIME HUMAN-ASSISTED VIRTUAL HUMANS TO INCREASE REAL-WORLD INTERACTION EMPATHY (26)

Michael Borish *, Andrew Cordar, Adriana Foster, Thomas Kim, James Murphy, Neelam Chaudhary, Benjamin Lok

Empathy is an important aspect of interpersonal communication skills. These skills are emphasized in medical education. The standard source of training is interviews with standardized patients. Standardized patients are trained actors who evaluate students on the effectiveness of their interviews and diagnosis. One source of additional training is interviews with virtual humans. Virtual humans can be used in conjunction with standardized patients to help train medical students with empathy. In this case, empathy training took place as part of a virtual human interaction that represented a patient suffering from depression. However, computers cannot accurately rate empathy, and we thus propose a hybrid experience. We propose a hybrid virtual human approach where hidden workers assist the virtual human. Hidden workers provide real-time empathetic feedback that is shown to the students after their interaction with the virtual human. The students then interview a standardized patient. All empathetic feedback and ratings are based on the Empathic Communication and Coding System (ECCS) as developed for medical student interviews. Fifty-two students took part in the study. The results suggest that students who received feedback after their virtual patient interview did provide more empathetic statements, were more likely to develop good rapport, and did act more warm and caring as compared to the control group that did not receive feedback.

Keywords: Virtual, human, empathy

A PERCEPTUAL STUDY ON FACE DESIGN FOR "MOE" CHARACTERS IN "COOL JAPAN" CONTENTS (35)

Yuki Wada *, Ryo Yoneda, Shinya Kanamori, Masashi Yamada

Animated movies (anime), video games and cartoons have been highly developed in Japan as a kind of subculture. However, in recent years, these contents are called "Cool Japan" and they are recognized as an export-oriented manufacture of Japan. "Moe" is one of the most important keywords in the Cool Japan contents. Moe characters play important roles in most of the contents of Japanese anime, video games and cartoons. Most of the Moe characters are pretty girls and they evoke Moe emotion in viewers of the contents. Sometimes Moe is misunderstood as a kind of immoral sexual emotion like paedophilia. However, Moe does not include direct sexual emotion. Moe has been discussed from the viewpoint of philosophy, aesthetics or literature. However, no experimental study has been carried out for Moe design. In the present study, a perceptual experiment was conducted using semantic differential (SD) method to reveal the way of designate a Moe character. To construct faces, the character create system in the PC game "PHANTASY STAR ONLINE 2" were used. Using this system, various components of face (e.g. hair style, face shape, distance between eyes, eye opening and nose length) can be manipulated. In this system, hair style, type of pupilla and type of makeup can be chosen from several alternatives. Except for these three components, each parameter can be varied from -100 to 100 degrees. Using this system, a professional character designer created a typical Moe character and a typical Beautiful character. Arranging these two faces, 83 faces were provided as stimuli. Eight participants watched each of the 83 characters and then they were requested to rate the emotional features of it, using 19 seven-step bipolar semantic differential (SD) scales. They were also requested to rate the degrees of Moe and beauty for each face. Factor analysis was performed for the rated SD scores with the principal factor method and varimax rotation. The results showed that the four-dimensional space, spanned by "evaluation", "showiness", "potency" and "adulthood", accounted for 85% of data variance. Moreover, multiple-regression analyses were applied, using factor scores of the "evaluation", "showiness", "potency", and "adulthood" as explanation variables, and each of the degree of Moe and beauty as a criterion variable in each analysis. The results showed that a cute, gentle and adult character is recognized as beautiful woman but does not evoke Moe emotion. Moreover, the results suggested a process to design a Moe character.

Keywords: Moe, Anime, Video game, Face design, Semantic differential method

INVESTIGATION OF KANSEI ADDED VALUE IN BOOK PUBLISHING FILED BY USING AR CONTENTS (92)

Jue ZHANG *, Yu SASAKI, Takeshi TSURUNO, Yuko MATSUURA, Noriko UTSUNOMIYA, Haruaki YAMAMOTO

Many practices about using AR (augmented reality) contents have been reported in education fields, and the usefulness of teaching materials made by AR technology was verified. However, the study cases about using AR contents for book publishing are still scarce. With the publication of eBook, the possibility of AR contents increases and the synergistic effect could be expected. This study introduced the AR contents into book publishing field, gives three-dimensional depth to the visual information of two-dimensional original that in order to create multimedia pleasure. We targeted parent and child as our custom, and developed character AR contents to the picture-book. Readers can acquire the 3D data and of characters and compounds on the picture-book by using iPhone or iPad. We made comparative experiments by using manufactured AR contents. As the results, there was a tendency that the story in picture-book forms and with AR contents increased the understanding than the story written only in the text. Moreover, by adding AR contents to the 2D picture-book form, pleasure, fun and unpredictability can be improved.

Keywords: AR contents, Book Publishing, Application, 3D contents.

IMPLEMENTATION OF THE HEALTHY EATING HABITS SUPPORT SYSTEM BASED ON USER TASTE PREFERENCES AND NUTRITIONAL BALANCE (66)

Masataka Tokumaru *

This paper proposes a healthy eating habits support system that recommends menu selections based on a user's taste preferences and the requirements of long term nutritional balance. This system is comprises a nutritional management system (NMS) and a Kansei retrieval system (KRS). NMS adopts a tabu search method to generate a large number of nutritionally balanced menus by combining multiple recipes from a recipe database and stores these menus in a "candidate list." From this candidate list, KRS retrieves menus that are compatible with a user's taste preferences and presents these menus to the user. KRS utilizes Kansei retrieval agents that represent a user's taste preferences and impressions that, subject to a user's evaluation of the presented menus, evolve based on a hybrid model composed of a genetic algorithm and simulated evolution. A simulation using 7,260 actual recipes incorporating 13 types of nutrients demonstrated that the system presented a large number of menus nutritionally balanced over the long term, and predicted a user's taste preferences with more than 80% accuracy after continuous use for eight weeks.

Keywords:Eating Habits Support, User's Taste Preference, Nutritional Balance, Interactive Evolutionary Computation.

3A - Evaluation 1

A THEORY-BASED FRAMEWORK OF BRANDED PRODUCT EMOTIONS (117)

Golnoosh Rasoulifar, Claudia Eckert *

Design of a branded product requires an effective understanding of how the consumers perceive and make sense of products and the brand. Kansei Engineering is an approach that takes the consumers perception and emotions into account through the Kansei words and provides information about the relation between perceptual concepts and physical properties of the product. However, the consumer perception related to non-physical aspect of the products (such as brand association) is not considered in the KE approach. This paper introduces the "branded product emotion framework" to help an understanding of the relation between brand image and Kansei concepts. According to this framework the consumer emotional responses to a new branded product can be evoked by consumers' perception of the physical properties of that specific product (Kansei), by the associations to the brand and by the association to the product class. The objective of the framework is helping to achieve a better analysis of the factors that are contributing to generate or affect the emotions and evaluations that consumers make of a branded product and reduce the risk of overlooking those emotions that brand elicits without the intermediation of the product. The frameworks is helpful in the design process of branded product in which the members of the design team, especially product designers and engineering designers, should collaborate and communicate around the brand value and the Kansei concepts to justify the design decisions and implement these concepts into a new product.

Keywords: Branded products, Kansei Engineering

THREE HEURISTIC APPROACHES FOR PREDICTING FUTURE LIFESTYLES (131)

Chun-Juei Chou *

For innovation, sometimes it is necessary to imagine future lifestyles in order to design corresponding products, services, or systems. However, it is very difficult for design students to characterize the future and there is no such simple method to help them to do so reasonably. This paper hypothesizes that future is predictable based on historical contexts and any future lifestyle is the extension or the contrary of the current one. For easily predicting future lifestyles, this paper proposes three heuristic ways. They are Analogical Reasoning (AR), Timeframe Reasoning (TR), and Causal Relationship Reasoning (CRR). Each of the reasoning approaches provides a simple way of imagining a specific future lifestyle. The formula of AR is "A1 : B1 :: A2 : B2". The formula of TR is "Now > Next > Future > Ideal". In addition, the formula of CRR is "Cause 1 > Effect 1 = Cause 2 > Effect 2". Obviously, they help to infer future lifestyles in different ways of thinking. There are four items in each of the three approaches. The designer who applies any of the three approaches must define the first three items and then infer the last one as a particular future lifestyle. These three heuristic approaches are taught in several courses including Sensational Product Engineering, Form Design, and Color Design. This research finds that both graduate and undergraduate students in Industrial Design can apply AR, TR and CRR to efficiently generate uncommon but reasonable ideas of vivid future lifestyles.

Keywords: Future Lifestyle, Future Trend, Future Reasoning, Future Prediction

PRODUCT NOVELTY IMPACT ON USER KANSEI (91)

Marcos Mendoza Vazquez, Toshimasa Yamanaka *

This paper presents an experimental study that assesses the impact of novelty appraisal on user´s emotional feelings and in their evaluation of user experience with commercial products. After actual interaction with 4 products differing in two levels of design typicality of design in two categories of products (cameras and highlighters) participants used a SD method for the evaluation of user experience quality, and a two-dimensional mood scale survey for assessing their own emotional feeling. Likewise, participants were asked if they had seen and if they had used the products before, obtaining three cases: 1. who had already used it before (no novelty), 2. who had seen it but not used it (relative novelty) and 3. who had not seen it before (absolute novelty).
The previous experience of participants with the particular product defined the degree of novelty appraisal, confirming that typical products were more likely to be appraised as known and atypical ones as novel. Results on emotional feeling measures showed slightly higher pleasure levels for the not novel cases and significantly higher arousal for the relative novelty cases. For the quality of experience evaluation, the highest scores for the no novelty cases were "practical", "useful", "predictable" and "easy to understand"; the relative novelty cases were "interesting", "creative", "satisfying" and "like"; and the absolute novelty cases were for "interesting", "creative", "new" and "innovative". These findings suggest that visual stimulation prior the first use interaction has an arousal enhancing effect in the experience of use, accompanied by qualities related to novelty.

Keywords: Novelty, Typicality, User Experience, Emotion.

A STUDY OF RATIONAL AND EMOTIONAL PRODUCT PROPERTIES (18)

Chiu-Wei Chien *, Chih-Long Lin, Rung-Tai Lin

This study is about understanding the factors affecting how designers recognize rational and emotional product properties based on variation of product properties. The target sample of this study is the electronic fan which is categorized into five different styles: Function, Friendly, Fun, Fancy, and Feeling. Two experiments have been carried out to examine the differences and relationship of the rational and emotional product properties. Experiment one is for the purpose of selecting the representative products of rationality, neutrality, and emotion. In experiment two, products which are most frequently selected in experiment one are regarded as reference indicators, and the remaining samples are arranged in the order of rationality, emotion, and impact factor. The expectation is to acquire different design inspirations from the result of this study based on different characteristics and control variables of these products of five different styles. The two main purposes of this study are: (1) to explore how these five kinds of product design styles affect the perception of rationality and emotion, and (2) to explore the differences in impact factors of five kinds of product design styles on the perception of rationality and emotion, and to infer future product design trend based on the found differences from the era of five product design styles. The distinction between the form characteristics of rationality and emotion has been found in this study, and the Feeling style has indicated the design trend beyond traditional fan structure. Another finding is that, there is the perception of rationality in the technological sense, and the perception of emotion will appear after the addition of feeling.

Keywords: Product Property, Rationality and Emotion, Product Style, 5F

DESIGNING WATCH BY USING SEMIOTICS APPROACHES (152)

Nasser Koleini Mamaghani *, Azadeh Dalir, Behzad Soleimani

Today industrial design is one of the most important pervasive components of design which covers many various field of activity. In the process of product design, understanding the impression of a whole design target is an essential issue. When a consumer is faced with an interactive product or interface, the designer need to have a thorough knowledge of the use of semiotics when attempting to convey feeling and emotions to the consumer. Designer work towards a product to be achieved with the help of representations of semiotic means, used according to identifiable aesthetic, criteria and cultural factors. In this area, Kansei engineering technique are being successfully applies in consumer product design. A Kansei engineering study applied to watch (as a case study) with especial attention in the selection of semiotics is presented. This study used most frequently selected kind of watch (from view point of shapes, sizes, colors, and material) which has been chosen by customers. Ten type of watches and total of twenty opposite Kansei words were used in the experiments. One hundred participants were asked to measure the intensity level of feeling using semantic differential method, toward Kansei words. Participant ask them about each watch if it's kind or rough, reliable or unreliable, positive or negative and etc. This step specified which signs refer to which result in user mind. In a reverse process this study could find for a specific judgment which signs are needed and which signs are more interest than the others.

Keywords: Semiotics, Kansei Engineering, Watch, Meaning, Cognition Science.

3B - Textile 1

INVESTIGATION OF APPEARANCE AND TACTILE SENSATION SCALES FOR EVALUATING CLOTHES IN ONLINE SHOPPING (20)

Tomoharu Ishikawa *, Shunsuke Nakamori, Kazuya Sasaki, Keiko Miyatake, Miyoshi Ayama

The purpose of this study was to develop scales to evaluate the appearance and tactile sensation of clothes in online shopping. First, 170 descriptive words were extracted from the existing literature on these areas. Then three groups of participants evaluated these words in terms of their appropriateness in describing the appearance and tactile sensation of clothes. These groups consisted of thirteen male students majoring in engineering (EMS), thirteen female students majoring in fashion design (FFS), and thirteen female students majoring in subjects other than fashion design (OFFS), respectively. Sixty-six appearance words and seventy-six tactile sensation words were selected by comparing the results of the three groups. We then carried out a cluster analysis based on the Kawakita Jiro (KJ) method, using appearance and tactile sensation words for the EMS, the FFS and the OFFS groups. Approximately about ten appearance-representative words and about ten tactile sensation-representative words were obtained for each group. The results of the appearance- and tactile sensation-representative words obtained from the EMS, the FFS, and the OFFS groups were compared, and common evaluation scales for the appearance and tactile nature of clothes were explored. Thus, eight common words indicating appearance, and nine indicating tactile sensation, were obtained as common evaluation scales.

Keywords: Evaluation Scale, Clothes, Online Shopping, Appearance, Tactile sensation.

COMPARISON OF CLOTHING EVALUATIONS BY JAPANESE AND CHINESE EXPERTS (68)

KyoungOk Kim *, Masayuki Takatera, Chunhong Zhu, Tsuyoshi Otani

The salability in Japan of clothes designed and sold in China was evaluated by experts from both countries. The salability of clothes designed and sold in Japan was also investigated. Five Japanese jackets were purchased for evaluation from a department store in Tokyo, and 10 items of Chinese clothing (two dresses and eight jackets) were purchased for evaluation from a department store in Beijing. Seven Japanese apparel experts (two university professors, two designers, a pattern maker, and two merchandisers) and 10 Chinese apparel experts (eight university professors, an art director, and a designer) evaluated the clothing items. The experts were not informed of the item specifications, including price, brand, materials, and country of manufacture. The sample items were evaluated on the basis of their 1) materials, 2) colors, 3) silhouette, 4) design emphasis points, 5) designer ability, 6) pattern maker ability, and 7) sewing finish. Each point of evaluation was scored on a 0–2 or 0–3-point scale. Evaluators were required to specify the reason for each score they gave. Points were accumulated to give a general score. We found that Japanese experts focused on general design and sewing finish, while Chinese experts considered more general design points. Materials and sewing finish were evaluated independently of general design points. Thus, our results indicate that clothing is evaluated differently in Japan and China. We conclude that it is necessary to consider the respective evaluation points used in each country as we pursue globalization.

Keywords: Chinese Apparel, Japanese Apparel, Clothing Evaluation, Apparel Expert.

SALABILITY OF CHINESE APPAREL IN JAPANESE DEPARTMENT STORES (69)

Masayuki Takatera *, KyoungOk Kim, Chunhong Zhu, Tsuyoshi Otani

To better understand the reasons for the salability of clothing now designed and sold in China and Japan, we asked Japanese experts to evaluate Chinese and Japanese brands of clothing currently for sale in the Japanese market. Ten items of Chinese brand clothing (two dresses, eight jackets) were purchased for evaluation from a department store in Beijing, and five Japanese brand jackets were purchased for evaluation from a department store in Tokyo. Seven Japanese apparel experts then evaluated all of the items; the experts were not informed of the clothing specifications. The items were evaluated on the basis of 1) material(s), 2) color(s), 3) silhouette, 4) design emphasis point(s), 5) designer ability, 6) pattern maker ability, and 7) sewing finish. Five of the Chinese clothing samples were judged as impossible to sell in Japanese department stores primarily because the sewing quality was incompatible with Japanese requirements, the designs were outdated, and the materials were of low quality. However, the other five Chinese clothing samples received high evaluations of salability in Japan on the basis of design and sewing quality. However, even for those samples evaluated as well designed, it was found that their salability in Japan could be improved through increased cooperation among designers, pattern makers, and production factories, and additionally, through improved sewing skills. The results of this study will help Chinese and Japanese apparel makers improve the salability of their clothing in both of those countries.

Keywords: Chinese Apparel, Japanese Apparel, Clothing Evaluation, Salability.

TEXTILE SELECTION FOR CLOTHING DESIGN BY VISUAL INFORMATION (77)

shigeru inui *, nobuyuki ishiodori, keiko miyatake, tomoharu ishikawa, yosuke horiba

Clothing designers select textiles for clothes in the process of clothing design. The experiments are conducted to find out how far clothing designers can select textiles for clothes only by the visual information. Textiles for the experiment were selected in the condition that those are used for jackets, long pants and skirts sold in Japanese department stores. Eight chemical crape georgette textiles were selected. The images or movies to show visual information of the textiles were discussed with some experienced clothing designers and determined seven kinds of images such as a close up of cloth or gather. The images were taken in a dark room and the textiles are well-illuminated. The subjects were told the guideline of clothing design and asked to draw a clothing design picture. The subjects were asked to watch the visual images of the eight textiles on the computer screen, and to rate each textile if it is suitable to their clothing design on a scale of one to ten. After that, the textiles were handed to the subjects, and then they were asked to rate in the same manner. The method to transfer information of textile is verified to compare the rate in the case of textile images and in the case of sight and haptic of real textile. It is suggested that textiles for clothes can be selected to some extent only by visual information.

Keywords: clothing design, textile selection, visual information, online.

OBJECTIVE EVALUATION OF BABY'S UNDERWEAR MATERIALS FOR COMFORT CLOTHING LIFE (80)

Aya Ukegawa *, Takako Fujimoto, Yoshimi Okamura

This study aims to estimate the properties of baby's clothes materials and consider the applicability to Baby's underwear. Observing styles appeared in our daily clothing lives, the underwear which should be put on inside is important to form comfort clothing macroclimate under layers of clothing from the inside to the outside. Under wear materials are required to play roles as materials worn next to skin. The underwear requires the movable design, materials with tender touch feeling and good moisture transport from the previous study. Especially for baby's underwear materials, the fabrics must be selected carefully since the heat capacity of their body is small and the skin epidermis is thin. In this study typical materials worn next to skin are collected among cover-all wears on the market. Twenty kinds of samples are selected. Cotton and cotton blend fabrics are mainly used for the baby and lady's underwear. Samples are measured for their physical properties and the transfer properties of air, heat and water. From the results of low specific density value and compression property, underwear of pile fabrics is suitable in winter. Underwear of 1x1 interlock knitted fabrics can be napped easily and produced various fabrics adopted widely use. They are suitable in all seasons from the thermal and air permeation property, and shows smoothest and softest touch feeling among sample groups in this study.

Keywords: baby's underwear, comfort, physical property, air/water transport

3C - Measurement 1

ESTABLISHING METRICS FOR KANSEI RESPONSES: AN APPROACH USING THE RASCH MODEL (50)

Fabio Camargo *, Brian Henson

Although qualitative comparisons are necessarily part of the process to elicit users' kansei responses to products, they are insufficient to provide a more fine-grained interpretation of users' interaction, which can require a measurement system. However, kansei variables cannot be measured directly. Data obtained from kansei responses need to be transformed by statistical methods and meet measurement assumptions. An approach to validate the quantitative structure of kansei scales is the application of Rasch measurement theory. The Rasch model, which is referred to as a family of probabilistic models, provides mechanisms to test the hypothesis that the observations meet the assumptions for establishing a quantitative structure. In this paper a number of procedures in Rasch modelling are outlined. Different examples from empirical applications using some techniques of kansei engineering show that the establishment of measures for comparisons between individuals and between stimulus objects is not a trivial matter.

Keywords: Kansei Engineering, Kansei Measurement, Rasch Model, Validation

APPLYING THE RASCH MODEL TO MEASURE KANSEI RESPONSES TO FABRIC SEATS (51)

Fabio Camargo *, Kenji Kawano, Kazuyuki Motohata, Kazuki Hayashi, Brian Henson, Tatsuo Kawai

This paper is concerned with the empirical development of a scale to measure tactile interaction based on users' experience with fabric seats. Volunteers slid their fingertips over samples of fabric, giving their ratings against kansei statements. Physical interaction was established by the friction coefficient of the contact measured through two different devices. Firstly, a commercially available metallic probe was used. The mechanism is designed to collect data within the frequency range that can be perceived by humans. Secondly, a tactile tribometer using a multiple layer model to mimic human characteristics was used. Scales of measurement were established through the Rasch model. As a result, a linear metric was obtained for samples of fabric, which allowed the alignment of the responses with the physical properties associated with the materials' roughness and coefficient of friction.

Keywords: Kansei Measurement, Evaluation, Rasch Model, Fabric Seats, Friction.

OCC MODEL: APPLICATION AND COMPARISON TO THE DIMENSIONAL MODEL OF EMOTION (59)

Naseem Ahmadpour *

This paper presents a review and comparison between the model of cognitive structure of emotions (also known as OCC) and the dimensional circumplex of core affect for consumer products. The numbers of emotion types in each emotion group of OCC is compared and associated to those of circumplex of product emotion. Prospect-based group represents the highest number of emotions in the circumplex followed by well-being, Fortune-of-others, and well-being/attribution-compound group. Considering that the addressed circumplex originally targeted emotions generated by products' appearances and the prominent presence of prospect-based and well-being emotions on the circumplex, it is concluded that people judge the personal benefits of using products (consequences of events for self, in OCC terms) by their appearance. That is also confirmed by the eminent representation of attraction emotions on the circumplex, demonstrating the effect of visual aesthetics (as a product aspect) on attraction. Some of the differences between the two models were also established. It is asserted that OCC model uncovers the antecedents of emotions subscribing to the adapting function of emotions as a coping mechanism with the world while dimensional model is concerned with describing the nature of emotions and their dimensions. The significance of each model for the design practice is therefore determined by the design purpose in addressing emotions and the context of use.

Keywords: Emotion, OCC model, Circumplex of core affect, dimensional model

FLOW KANSEI ENGINEERING /QUALIFYING CONSCIOUS AND UNCONSCIOUS BEHAVIOR TO GAIN OPTIMAL EXPERIENCE IN KANSEI ENGINEERING (118)

Zhabiz Shafieyoun *, Marco Maiocchi

The general tendency of design is that being based on human and the aim of Kansei engineering is to follow the structure of emotions based on human behaviors. As we know, Kansei appears in individual emotions and is able to create different feelings in human mind (Nagamachi, 2010) where Flow is a teleonomy of the self (Csikzentmihaly, 1992). However, Design has a convergent and divergent relation with needs and desires. Accordingly, designers are obliged to meet user's desires but the implicit needs of such an emotional experience are difficult, partly because people express their emotions both consciously and unconsciously. Analyzing the relationship between Kansei and Flow, activities can have optimal behavior output. This article provides a new approach, which can be applied to capture the emotions of users and proposes a new framework of Kansei Engineering (KE) to handle the optimal experience of people besides their needs in a various tangible fields such as interior and product design. In this study we use the KE Model of Schütte because it is understandable and compatible with new tools. We use Flow in semantic and properties space and we created a Flow space during the synthesis step of this level.

Keywords: Kansei Engineering, Flow, Optimal Experience, Product Design, Neuroscience, Positive Psychology, Healthcare Design

AFFECTIVE ENGINEERING FOR MUD WALL TEXTURE USING SELF-ORGANIZING MAPS (128)

Toshio Tsuchiya *

Affective/Kansei engineering is used to analyze subjective responses to a streetscape plan for a historic townscape. The Chofu area in Shimonoseki was chosen for the research. The appearance of the streetscape is evaluated based on actual photographs using a traditional semantic differential method. Guidelines are often formulated to promote landscaping plans in historic towns; it is especially important to formulate color guidelines so as to unify the colors in an area undergoing change. The guidelines must be formulated according to regional requirements since color planning is strongly influenced by the local identity or brand. The affective engineering proposed in this study reveals representative design elements arising from the regional characteristics of the area and its people. The Chofu area is famous for its streetscapes of mud walls. The pilot investigation using a self-organizing map validated the evaluation of mud wall colors.

Keywords: Affective engineering, SOM, Mud wall, Texture

3D - Screens 1

APPLYING KANSEI ENGINEERING METHOD ON INVESTIGATING MOBILE PHONE'S BRAND IMAGE AMONGST IRANIAN YOUNG DESIGNERS (2)

Mehdi Aslefallah *, Nasser Koleini Mamaghani, Sina Khalkhali

As Walter Landor declared "Products are made in the factory, but brands are created in the mind", brand image in the customer's mind, plays an important role in success of products in today's high-competitive market. With this in mind, the aim of this research is to investigate the brand image of top-selling mobile phone manufacturers amongst a group of young design students in the telecommunication sector of Iranian local market. Iranian population constitutes one of the youngest countries in the world; on the other hand the young designers are generally considered as ICT-savvy individuals that steer the market inclinations. Therefore, this segment of users has been selected as the target group. To achieve the aim of this study, the Kansei Engineering method is utilized for verbalizing the associated qualities of the brand images. To find customer's perception of brand images, 6 brands were chosen respectively as followed in alphabetical order: Apple, HTC, LG, Nokia, Samsung and Sony. According to their relevance for brand characteristics, 30 Kansei pair-words have been selected. In order to analyze the obtained data, one way analysis of variance and factor analysis methods has been used to find the internal relation between the image and the aforementioned Kansei words which are corresponding to psychological mapping of the subject mindset towards these brands. Finally the results of this study can contribute to the market performance of these brands as well as developing a more realistic picture of demographic data of the Iranian young designers.

Keywords: Kansei Engineering, Brand Image, Customer perception, Mobile Phone Market

THE DIGITAL BOOK DESIGN FROM A POINT OF VIEW OF THE UNIVERSAL DESIGN (43)

Won-Seok YANG *, Yurie Takahashi, Wang-Mi SEOK

The average life expectancy extends, independence spiritual not only physically has also become important for the elderly. E-books can be easily adapted for increased visual acuity in the elderly by adjusting the brightness of the font size, font, spacing, screen, etc. In the future, more effort should be applied to improving the applications of E-books for more than just the average person who likes to read. Considering the needs of the elderly in the continued design of the E-book, will greatly add to the value of this device. E-books can make reading more enjoyable for the elderly if they can take advantage of digital device reading. However, the needs of the elderly are not met sufficiently in the existing E-book. This study proposes a design for the E-book that the elderly can easily use and clarifies the elements that affect operability. It is hoped that designing the E-book in consideration for the elderly and further development of the E-book market will lead to an increase in the elderly population taking advantage of this digital device.

Keywords: Elderly people, E-book, Interface Design, Universal Design

CONSUMERS' EMOTIONAL RESPONSES TO PRODUCT'S COLOR AND TEXTURE BY USING LCD BACK COVER AS AN EXAMPLE (93)

Yu-Ting Sung *, Chun-Heng Ho

Because the living standard is improving gradually, the consumers' demand has changed from the satisfaction of product function to the satisfaction of product image. And the purchase intention has also changed from "needs" to "wants". In addition, previous research suggests that the consumer's emotion would guide them to make a choice among many products (Helander and Khalid, 2006). Moreover, Norman (2004) particularly illustrates the importance of the "emotion" in his book Emotional Design that consumers' emotion has been affected by the product appearance when the first time they see it. Previous researchers concluded that the important features of the product appearance are Color, Material, and Finishing (King, Yu, Lee, & Jiang, 2011). Thus, this study will discuss how these product features, on laptop LCD back cover as an example, would affect the emotion when consumers see them. Since the LCD back cover is the most important part to demonstrate the product and brand images, this research would use Laptop LCD Back Cover as example to discuss about it. However, considering that the selections of material are mostly limited to aluminum and ABS plastic when manufacturing the back cover since the company has to consider about the processing cost of the chosen material and the cooling of the LCD module. Moreover, the use of the material will directly affect the color that consumer see. Thus, in the discussing of visual perception, this study merges the features of material with color and discusses the color and surface texture issues only. In this study we used in-depth interview visit six subjects, 3males and 3 females. After the visit would generalize the interactions between textures and colors.

Keywords: Emotion, Color, Texture, laptop, LCD back cover

EVALUATION FOR ATTRACTIVENESS OF ANIMATED PAGE TRANSITIONS ON SMARTPHONES (42)

Chih-Hsuan Yu *, Chun-Heng Ho

Nowadays, advances in technology have made smartphones equipped with high performance chips and high resolution displays. The overloaded data displays are increasingly complex in user interface and exceed human perceptual capacity to efficiently interpret them. Consequently, animated transitions in user interface play a fundamental role of supporting the user in integrating and relating information across displays and representations. In fact, judiciously applying animated transitions can make the user interface easier to understand, feel smoother, more natural, and be more appealing. In general, animated transitions are frequently and broadly applied in reader applications on smartphones, because the screen size of smartphones is limited so that users have to frequently switch different contents and categories between screens. In this way, the form of animated page transitions crucially affects the reading experience, and helps to create the uniqueness and appealing of reader applications. This paper describes how the constituent elements of animated page transitions affect user emotions, and clarifies the relationships between different types of page transitions and users reactions. The goal of this paper is to build an interface design principle of animated page transitions on smartphone for helping mobile application developers to select the suitable page transitions according to user emotions. This study applied Evaluation Grid Method and Quantification theory type I to figure out the attractiveness of various types of animated page transitions.

Keywords: Animated Page Transitions, Attractive Factors, EGM, Quantification Theory Type I, Interaction Design

CONSIDERATION ON ENGLISH LEARNING FOR UNDERGRADUATES USING A PORTABLE GAME MACHINE (107)

Hiromi Ban *

The Nintendo DS handheld game console, which was developed by Nintendo and has been sold worldwide since 2004, is a game console which features/incorporates dual touch screens, voice-recognition features and innovative controls, and has been used not only as a video game device but also in the fields of education and as an education tool. In this study, I conducted research regarding Nintendo DS software for learning English with the objective of exploring the possibility of introducing and utilizing such software as an education tool in universities. The result was that when not only the students who were proficient in English, but also the students who initially displayed little interest in learning English using the Nintendo DS, actually started using it, they began to realize that it was fun and helpful to work with.

Keywords: e-Learning, Nintendo DS, English education, Educational technology, Educational psychology

4A - Evaluation 2

SURFACE DESIGN METHODOLOGY – THE CLEANABILITY INVESTIGATION (141)

Martin Bergman *, Bengt-Göran Rosén, Lars Eriksson, Cecilia Anderberg

A conservative culture and a robust material with a genuine past is probably the best way of describing the medical healthcare environments around the country. Stainless steel has dominated for decades, and it is not only because of its technical properties. The feeling of a clean surrounding and sterile equipment are high rated within this culture, you have to trust the material and its surface. However, what will happen when stainless steel is replaced with another material, still meeting the same (or higher) technical requirements? Is it possible to challenge the steel and its robust and hygienic experience? Will the users of the equipment have fate in the new material and its surface? The purpose of this paper is to link the technical- and customer requirements of current materials to surface textures in medical environments. By focusing on parts of the theory of Kansei Engineering, improvements of products are possible. In collaboration with the topical company for this project, three new materials that fulfil the technical requirements –easy to clean and anti-bacterial came to be in focus for further investigation in regard to a new design of the steriliser for medical equipment using the Kansei based Clean ability approach CAA. Focusing on the correlation between the cleaning, the surface design parameters and the experience of the new materials/surfaces; discussions regarding the optimal material/surface design of the product and the challenging of the stainless steel are initiated. The results of this study show that materials with similar or better cleanability properties very well can exchange the traditional brushed stainless steel materials. Also, the optimal wipe material and cleaning agents system can be developed using the modified Kansei Engineering method. The continuation of this study will be to further include surface properties to influence on bacterial growth to complete the CAA.

Keywords: Cleanability, material design, functional surfaces, Kansei Design, stainless steel.

SENSORY, SEMANTICS AND EMOTIONAL RELATIONSHIP IN TACTILE MACROTEXTURES SELECTION OF INDUSTRIAL PRODUCTS (144)

Everton Sidnei AMARAL DA SILVA *, Carole Bouchard, Jean-François Omhover, Wilson KINDLEIN JUNIOR

The main purpose of this research consists in developing a pragmatic method, allowing the evaluation and selection of tactile macrotextures associated to subjective user interactions. So, this paper introduces an approach to formalize the relation between emotional values and textures, it is applied in the context of kitchen utensils. At this point we emphasize the importance of the identification and application of the subjective values during the product development by designers, guided by Kansei Engineering process [1]. Indeed, with the evolution of the global industrial sector, many alternatives of materials have been developed throughout decades. It is estimated that there are at least 160.000 different materials available in the world [2]. The development of such a variety has been led for the most diverse products, following the evolution of emerging consumer needs. At the strategic level of the production system, the research and industrial development stand out mainly in a functional context to add technical value to the efficacy of innovative products [3] [4]. However, there are still specific gaps in the usual methodological bases for the conception of new 'affective products', endowed with emotional value (as fits the consumer demand). We identified in the literature that there are difficulties in weighting subjective attributes [5] [6], such as sensory, semantic and emotional aspects, in association with the identification and selection of materials for the design of industrial products. In the process, these aspects are not handled with a scientific method, but mainly empirically. However, these aspects are crucial to fully meet consumer demands. This limitation led our research to an initial experiment aiming at identifying relationships between 15 different tactile macrotextures present in 4 classes of materials and a selection of 212 descriptors [7] [8] [9], classified in sensory, semantic and emotional dimensions. A protocol was conceived and implemented between two culturally distinct nations, France and Brazil, defining a total population of 60 participants including Designers and Engineers. A descriptive statistical method was adopted to assist in handling the quantitative and qualitative variables at this stage. The preliminary findings enable us to characterize key parameters for the validation of the LdSM, Federal University of Rio Grande do Sul, Porto Alegre, Brazil descriptors associated with the tactile macro textures. Thus, we considered the relevance of multiple factors, such as sub classifications of the adopted descriptors, the presented materials and textures and sampling profile of the participating groups. The synthesis of these results will be used in the next experiments to analyse the tactile perception.

Keywords: textures selection, emotion, affective products

EXPERIMENTAL VERIFICATION FOR SUBJECTIVE SENSE OF OBJECT WEIGHT - PROPOSED USER CATEGORY BASED ON THE INDIVIDUAL KANSEI BY SUBJECTIVE WEIGHT (148)

Miyong Lee *, Kazuhiro Nishida, Yoshihiro Narita

Weight is frequently used in product information and the design process. However, the perceived weight is greatly influenced by individual subjectivity. Guessing the exact weight using only numerical information and visual estimation is not easy. Therefore, this study focused on the relationship between the perceived weight and actual weight, and verified the difference between the subjective and physical senses of weight. In other words, we aimed to explore the error range, and to reveal the characteristics of the subjective sense of weight. We performed two experiments. Experiment A is for the 'subjective sense of weight due to the difference in weigh' using models with differing weights but the same size, and Experiment B is for the 'subjective sense of weight by size' using models with differing sizes but the same weight. In the results, the average subjective weight of the 170 g model was 223 g for an error rate of approximately 31%. On the other hand, the average subjective weight of the 100 g model was 103 g. Therefore, the error between the subjective and physical weights was greatest at 100–170 g in Experiment A. In Experiment B, the average subjective weight of the 170 g model with a diameter of 75 mm was 298 g, which is 75% greater than the physical weight. The error for the 170 g model was smallest at -4% when the diameter was 120 mm. In other words, the error decreased with increasing model size in Experiment B.

Keywords: Kansei Evaluation, Subjective Weight, Perceived Weight, Recognition Model, Sensory Measurement.

IMPACT OF CURVATURE OF PRODUCT SHAPE ON AESTHETIC JUDGMENTS (27)

Yen-nien Lu, Chun-heng Ho *

Competing products in the market are not widely different in terms of technical levels. Instead, their major difference lies in aesthetics and design, which are also the decisive factors of purchase decisions. Therefore, understanding consumers' aesthetic appreciation of industrial products is an important issue in the field of aesthetics and its application to consumption-related affairs. Former research indicated that people choose to stay away from sharp products and prefer curvilinear products. But what if the products under comparison are all curvilinear? Will people's preference for the same product vary with different curvatures? Do individual differences exist between people? Through this study, it has been discovered that people indeed have a preference for curvilinear products. However, regarding preference for a product with different curvatures, it does not follow that preference increases with the continued increase of curvature. At the peak, the rising trend will start to fall down. In addition, after the peak of preference appears, there is a significant difference in the major curvature between the participants with a design background and the ordinary participants. While the ordinary participants' preference for curvilinear products does decline, preference of the participants with a design background declines sharply. The above finding may serve as a reference for designers who may consider the application and timing of curves in designing product shapes in the future.

Keywords: curvilinear preference, aesthetics appreciation, product design

AN ASSOCIATE MODEL BETWEEN INTERFACE COLOR DESIGN, USER'S EMOTION AND OPERATION (105)

Patchanee Patitad *, Hidetsugu Suto, Suguru Hanita

Color information is one of influential factors which affects human behaviors. Relationships between coloration of interface and operational performance are well known, and many previous researches have shown evidences of relationships between coloration and users' emotion. Consequently, it is expected that there are important effects between interface color design, emotion and operation. Nevertheless, almost of the previous researches were done in which impact of color on emotion or task performances were investigated independently. In this paper, a novel model which represents relationships between color design, emotion and operation is proposed. Structural Equation Modeling (SEM) has been employed as the method for generating representative models. Users' performance and their impression for the interfaces are used for the data to generate SEM models.
To obtain users' performance data, experiments have been conducted with simple computer software of arithmetical calculation in which touch panel interface is used. Furthermore, questionnaire approach has been used to obtain users' impressions for interfaces. By using the proposed scheme, we can verify the effects of touch panel coloration on operator's feeling, and clarify how the feelings affect the operations. To verify the efficiency of the proposed scheme, two representation models, one is based on the proposed scheme and the other is based on the traditional scheme, have been generated and analyzed. As a result, the former model can illustrate the relationships between color design and the operational performances better than the latter one.

Keywords: Interface color design, touch panel, usability

4B - Textile 2

CLOTH MODEL HANDLING BY THE COMBINATION OF SOME MANIPULATIONS FOR DRAPING (10)

Yuko Mesuda *, Shigeru Inui, Yosuke Horiba

In this study, manipulation of a cloth model for virtual draping in real-time is performed using hand gesture. The manipulations are holding, releasing, attaching and mapping. And, the cloth model is manipulated by using the manipulations in combination. A cloth model and an object model consist of particles. The holding is performed by fixing the particle nearest to the hand in the loth model to the hand. This manipulation is started if a distance between the particle and the hand is shorter than a threshold. The releasing is demonstrated by releasing a fixed particle. The attaching is performed after the cloth model is held, and the held particle is fixed to the particle nearest to hand in the object model. These manipulations except the holding are performed by pressing keys on the keyboard. The manipulations are combined by pressing the execution keys. As the results, we succeeded in performing each manipulation and using the manipulations in combination. The results suggest the possibility of performing virtual draping by using this algorithm.

Keywords: virtual draping, real-time, hand gesture, cloth manipulation, combination of manipulation.

RELATIONSHIP BETWEEN JACKET COMFORT AND STIFFNESS OF ADHESIVE INTERLINING (70)

KyoungOk Kim *, Masayuki Takatera, Chihiro Sugiyama

We investigated the effects of adhesive interlining on wearing and moving comfort and garment pressure exerted on the body. Scheffe's paired comparison test was performed for sensory evaluation of four jackets of the same pattern: one without interlining and three with different adhesive interlinings (soft, normal, hard). The bonded fabrics have different shear and bending rigidities. Nineteen subjects performed a series of postures and movements while wearing the jackets: (1) standing, (2) moving arms forward, (3) raising arms overhead, and (4) moving arms horizontally to the side. They compared wearing and moving comfort, and the feeling of garment pressure on designated parts of the body on a seven-point scale. Analysis of variance revealed significant differences in preference scores between jacket types. A jacket with lower stiffness was evaluated as more comfortable and as placing less pressure on the body. There were significant differences in wearing comfort between jackets even when subjects were standing. We conclude that adhesive interlinings affect wearing and moving comfort of jackets and the pressure exerted by a jacket on the body, especially in the shoulder, back, forearm, under the arm and bust areas. The use of lower-rigidity interlining, especially for the shoulder, back, under the arm and bust, will result in a more comfortable jacket, although the interlining must be sufficiently rigid to maintain the desired shape and appearance of the jacket.

Keywords: Jacket, Comfort, Stiffness, Adhesive, Interlining

INFLUENCE OF FIBER'S SURFACE MORPHOLOGY CHANGE ON ANTI-PILLING PERFORMANCE OF WOOLEN KNITTED FABRIC (72)

Masukuni Mori *, Takako Fujimoto, Machiko Murakami

Although the main factor controlling pill generation at the time of wearing wool knitted articles is the knitting structure of the raw material; the strength of yarn, the number of twist of yarn, the fabric design, the gauge number and so on, it is influenced also by the dyeing / finishing method of the knitted fabric after knitting as well. In this paper, the influence of change in surface morphology of raw material fiber on pill generation is investigated (along with mechanical and physical properties of fabrics). Fabric samples are treated with several physicochemical processing. The difference in condition of scales and the relation with pill generation were discussed and clarified. The plain knit wear is widely used for sportswear and child's underwear subjected to high activity. Such clothing necessitates comfortable and soft touch and besides the surface of the clothing must be kept smooth and anti-pilling condition. These requirements are hopeful for comfortable clothing life. Thus, the present paper is believed to be a suitable topic relevant to Kansei Engineering.

Keywords: Pilling, Surface morphology, Wool-Knit, Physicochemical treat

OBJECTIVE EVALUATION OF THE SHARPNESS AND STABILITY OF DELIBERATE CREASE LINES AND PLEATS IN APPAREL PRODUCTS (98)

Rino Ouchi *, Takako Fujimoto, Surinder Tandon, Machiko Murakami, Masukuni Mori

This paper describes the behaviour of deliberate creasing or pleating of apparel fabrics formed, for example, in skirts and trousers. In this study, woven fabric samples of two fibre groups were prepared. One is pure wool and woolblend-based group, and the other is vegetable and protein fibre-based fabric group (cotton, ramie etc.). The beauty or quality as measured in terms of the sharpness of creases of different fabric groups was evaluated.

Keywords: quality of creases and pleats, mechanical properties, sensory test, wool

A NEW ANALYSIS METHOD FOR THE DRAPE SHAPE OF FABRIC (119)

Chie Muraki Asano *, Akira Asano, Mitsuji Muneyasu, Takako Fujimoto

A new method of the analysis of drape-ability of fabrics using Fourier descriptor is proposed. Drape-ability is conventionally evaluated by measuring the drape coefficient related to mechanical property of fabrics. However, it was pointed out that the visual appearance of drapes was not always related to the drape coefficient. Recently, a method of the direct characterization of the visual appearance of drapes using Fourier power spectrum was proposed. In this paper, it is proposed that the G-type Fourier descriptor, which is an expansion of a closed curve to a Fourier series, is employed for drape analysis. The proposed method achieves not only the characterization of drapes but also the circular abbreviation of drape shapes and selective reconstruction of vibrations based on their frequencies.

Keywords: drape analysis, image processing, Fourier descriptor

4C - Measurement 2

ENVIRONMENTAL EFFECT ON EMOTION IN WAITING AREAS BASED ON KANSEI ENGINEERING AND AFFECTIVE NEUROSCIENCE (4)

Zhabiz Shafieyoun *, Marko Radeta, Marco Maiocchi

In general, for health care centers it is vital to know the kind and the intensity of emotions felt by its patients and how to influence their quality of life and their response to therapies. In particular, waiting areas in which patients spend a lot of time without significant interactions is an important focus of this study. Recent studies suggest that a quality in fact and in perception is two significant parts, which affect and play a powerful role in an overall satisfaction in health care. The aim of this study is to understand how to increase positive and decrease negative emotions by a re-design of waiting areas inside health care centers where patients spend a considerable amount of time without any significant interactions. To measure the quality of satisfaction felt by patients inside of such an environment we refer to their emotions that we model basing on Affective Neuroscience. According to Panksepp, we have a categorized and unambiguous number of emotions, precisely defined from a neuroscientific and physiologic point of view: SEEKING, PLAY, CARE, FEAR, GRIEF, RAGE and LUST. We collect Kansei words and structure them with these emotions. We perform 600 surveys on 200 patients in 4 different waiting areas found in 2 hospitals to reveal differences in perceptions. We conduct experiments and our results lead us to several considerations about how to design desirable emotional characteristics of a waiting area.

Keywords: Waiting Areas, Health Care, User Experience, Primary-Process Emotions, Kansei Engineering.

APPLYING EYE-TRACKING IN KANSEI ENGINEERING METHODOLOGY FOR DESIGN EVALUATIONS IN PRODUCT DEVELOPMENT (125)

Markus Köhler *, Björn Falk, Robert Schmitt

Customers base their emotional quality judgments on their product perception. Therefore, the aim of customer-centric product development should be to satisfy needs and requirements of the specific target group and to develop products that attract user attention and evoke positive emotions. Since visual impressions are crucial for the evaluation of the Perceived Product Quality, the ascertainment of data about visual impressions should be of high importance. To use Perceived Quality data of visual impression there is a need to investigate how latent needs and requirements are influencing the conscious and unconscious visual perception. This paper presents a methodology that extends the traditional Kansei Engineering methodology for gathering customers' requirements and evaluations (e.g. questionnaires) by using Eye-Tracking. The elicitation of visual impressions with Eye-Tracking means to derive objective data of customers' product perception and evaluation. The methodology uses comparisons of design alternatives on a general as well as on an even more detailed level of product perception based on a structured approach. The paper also presents precisely a study design for applying the developed methodology and shows valid results of a conducted Eye-Tracking study by using descriptive (e.g. Pareto-analysis) and statistical analysis procedures (e.g. repeated-measures ANOVA). In conclusion, knowledge about and interpretations of the customer product evaluation and about latent and implicit requirements can be derived from the parameters ascertained with Eye-Tracking (e.g. fixations). By gradually integrating the methodology into the product development process, it can be applied by product designers for evaluating product design concepts from the customer's perspective.

Keywords: Kansei Engineering, Eye-Tracking, Perceived Quality, Design Evaluation, Product Development.

THE RELATIONSHIP BETWEEN NAGARA ACTION AND WORKING MEMORY (129)

Ryohei Iijima, Toshimasa Yamanaka *

In Japan, multi-tasking action is commonly referred as Nagara action. Nowadays, it is important that to think about relationship between Nagara action and products because of pursuing the convenience. On the other hand, inspite of difficulty of doing Nagara action in cognitive process, people can do Nagara action. The back of this topic, we think Working Memory is related. Working memory is a kind of short term memory, but it is not static but active and has important roll to support cognition. We think that when people do Nagara action, they use working memory for one task. So in this paper we aim to reveal the relationship between Nagara action and working memory, and experiment on like below with Picture Span Test. -1.Subjects is tested Picture Span Test(PST) for measuring capacity of working memory. 2.After testing PST, they answer the questionnaire about "How many Nagara action do you do in daily life". 3.We analyze correlation between capacity of working memory and the frequency of Nagara action in daily life. From the above, we find the correlation between Nagara action and working memory and people whose capacity of working memory is higher tend to do Nagara action.

Keywords: behavior, interaction, kansei process, parallel attention, working memory

EYE TRACKING BASED ANALYSIS OF EFFECTS OF MOTIF COMPOSITION ON IMPRESSIONS OF PAINTINGS (97)

Yuka Nojo *

The presence of pictures that people recognize as great beyond the borders of cultural differences over 100 years could suggest that such paintings would have certain aesthetic elements in common, and if people are able to recognize them through a shared sense of beauty, it might be able to study what kinds of properties influence people's evaluation of paintings. This paper investigates influences of motif compositions on impressions of pictures. In the first experiment, participants were asked to answer their impressions of the printings using two kinds of rating scales: information rate scale and semantic differential scale, where "symmetry", "complexity" and "order" are defined as the elements of "beauty". Results showed that these three perceptual features influence strongly on people's impressions. However, this experiment poses some questions. Do participants sense the existence of the golden ratio from motif composition? In recognizing that the ratio had been broken, did their impressions change as a result? Do their impressions change according to degrees of symmetries of motif, no matter if the golden ratio exists? To find answers to these questions, we conduct the second experiment to analyze the relationship between motif compositions and gaze movements detected by an eye-tracking system.

Keywords: Beauty of Paintings, Motif Composition, Golden Ratio, Eye-tracking

ANALYZING KANSEI FROM FACIAL EXPRESSIONS BY CSRBF MAPPING (7)

Luis Ariel Diago Marquez *, Ichiro Hagiwara

This paper describes an application where a new Kansei/Affective Engineering (KAE) system was applied to define the properties of the facial images perceived as Iyashi. Iyashi is a Japanese word used to describe a peculiar phenomenon that is mentally soothing, but is yet to be clearly defined. Instead of analyzing facial expressions of an individual to determine his emotional state, the proposed system introduces a fuzzy-quantized holographic neural network (FQHNN) to find the rules involved in the Kansei evaluation provided by the subjects about the limited dataset of 20 facial images. In order to validate and gain a clear insight into the rules involved in the Kansei evaluation process, Procrustes analysis and Compactly-Supported Radial Basis Functions (CSRBF) are combined to generate new facial images. Procrustes analysis is used to find the minimal dissimilarity measure between two facial images with opposite classification (i.e. Iyashi and Non-Iyashi). CSRBFs are proposed for tuning of 17 facial parameters and mapping between facial images within opposite classes. The experiments with two subjects demonstrate that if only two from the five most important parameters of the face are changed then the Kansei evaluation can change to the opposite class. This paper shows that a continuous and efficient tuning of the design space can be achieved by introducing CSRBF mapping into the new KAE system

Keywords: Kansei evaluation, Iyashi expressions, neuro-fuzzy classifiers, radial basis functions

4D - Screens 2

AN ANALYSIS OF EFFECTS PROVIDED BY HIGH-GRADATION DISPLAYS BASED ON IMPRESSION ASSESSMENTS (46)

Michimi Inoue *, Takumi Sotome, Naoki Hashimoto, Miyoshi Ayama, Mie Sato

Recently, even though the use of high-gradation display devices in medical and other specialized fields has become essential, most devices in general field usage are still typically 8 bits luminance level displays. However, since it can be presumed that image quality improves when high-gradation display devices are used, we investigated the results obtained by increasing luminance gradation levels and found that image impressions improved as the number increased. In addition, the results indicated that the impression improvement peaked at just less than 9 bits.

Keywords: High-gradation display, Gradation number, Impressions.

IMMERSION LEVELS IN DIGITAL INTERACTIVE ENVIRONEMNTS (103)

Michael Brandse *, Kiyoshi Tomimatsu

When discussing narrative in games, game designers and academics alike often ignore a very potent narrative component in favor of more traditional literary devices. The narrative component in question is the game world itself. Doug Church argued that the narrative within games refers to any narrative thread that binds events together and drives the player to complete the game. With this in mind, the game world is a very important part of the game narrative, as the player will be exposed to the game world for the duration of the entire game. It is for this reason that this paper aims to look at the narrative components of the game world. In the past, two definitions were established to describe the game world as a narrative component, namely narrative spaces and narrative descriptors. However, these two definitions prove to be insufficient for the scope of game worlds found in current day game. With this in mind, this paper aims to expand on those two definitions, by analyzing game worlds and deriving new definitions from those worlds and forming models based on those. On top of that, this paper seeks to validate these newfound definitions through the use of the Game Experience Questionnaire (QED).

Keywords: Game design, Interactive Design, Narrative Design, User Experience (UX)

COLOR SCHEME SEARCH: A STATISTICS-BASED IEC METHOD (9)

Ken Ishibashi *, Kazunori Miyata

This paper presents a statistics-based interactive evolutionary computation (IEC) method for color scheme search. Color schemes are utilized in an enormous range of items such as websites, clothing, advertising media, and housewares. However, people who do not have sufficient skill or knowledge of colors need to devote considerable time and effort to a creating color scheme. Currently, artists' color schemes are freely available from websites. However, obtaining an appropriate color scheme from a large data set is difficult for novice users. To overcome this problem, we rely on a statistics-based interactive genetic algorithm (IGA). Use of this IGA is expected to reduce computing costs compared with conventional IEC approaches and to take overall color scheme impressions into account. These contributions enable to realization of the kansei-based color search system in real time. In addition, we introduce four similarity search (SS) functions (hue, saturation, brightness, and color differences) to facilitate the convergence of a color scheme search. The combination of a statistics-based IGA and four SS functions allows users to easily and effectively find their desired color schemes. To investigate the performance of the proposed method, we conducted two experiments and confirmed that the implemented application allows users to obtain a desired color scheme in less than 48 s. In addition, we also confirmed that the proposed method can provide some favorable recolored illustrations in less than 52 s.

Keywords: Color Scheme Search, Interactive Evolutionary Computation, Statistics, Color Transfer

CHANGES OF IMPRESSION IN THE ANIMATION CHARACTERS WITH THE DIFFERENT COLOR AND THICKNESS IN OUTLINES (64)

Haruna Izumi *, Masato Sakurai, Ryo Yoneda, Masashi Yamada

Recently the several colors such as brown and reddish brown are used as the outlines in animation characters in some TV animation. To examine the effects on impression in the animation characters by the differences of color and thickness in outlines, the impression in the original animation characters was measured using SD method with varying the colors and thickness in outlines. In the results, the effects with the outlines can be represented by the impression to "naturalness", "potency", and "activity" of three dimensions in the animation characters from factor analysis based on the subjects' evaluation. It is found that the colors and thickness of outlines affect the impression to naturalness and potency in the animation characters.

Keywords: Animation character, outline, color, thickness, impression

ANALYSES OF LOCAL MASCOT CHARACTERS AND PROPOSAL OF AUTOMATIC CREATION SYSTEM USING KANSEI-WORDS (94)

Maho Hotogi *, Masafumi Hagiwara

In this paper, first, analyses of local community mascot characters are carried out to obtain knowledge to be the popular ones. Next a mascot characters automatic creation system is proposed using these findings. As for the analyses, we used 200 (top 100 and low 100) local community mascot characters selected from 2,258 characters. Many interesting findings could be obtained such that short limbs or dark-round eyes tend to contribute to be popular as a mascot character . The proposed system utilizing these findings can create a mascot character reflecting a user's image inputted by Kansei-words. Many parts having degrees of Kansei images are prepared in the proposed system and are combined to form a character using Rough Sets Theory and an Interactive Genetic Algorithm framework. We performed evaluation experiments. Many mascot characters satisfying user's image were created and remarkable results were obtained through subjective evaluations. For example, by using the extracted rules from the analyses and Interactive Genetic Algorithm, the proposed system can create much favorable mascot characters. Moreover, we found some interesting tendencies of the color used to paint characters. One of them is that the cheerful characters are often painted in warm colors with high saturation.

Keywords: local mascot characters, automatic creation, Interactive Genetic Algorithm, Rough Sets Theory

5A - Evaluation 3

INVESTIGATING THE ROLE OF KANSEI ENGINEERING FOR AFFECTIVE ASPECTS OF EMPATHIC DESIGN, A REPORT OF A CASE STUDY (143)

Alireza Ajdari, Parisa Katouzian, Nasser Koleini Mamaghani *

This paper tries to seek possibilities and challenges of applying Kansei Engineering method as a tool to investigate affective aspects of Empathic Design. This trend has been introduced strongly as a holistic approach in Design Studies and there were some proposals for Functional Aspects of This trend, such as activity theory. However design researchers claim that affective aspects are not well considered in this new approach and tools and techniques are needed. In this paper the case study was chosen from children for blood sampling test procedure in the medical centers. The emotional aspect was assessed through Kansei Engineering. Four series of questionnaires were distributed toward them. Their choice and their emotional reactions were gathered and recorded. In one of them, Likert rating was also used for assessing the role. Based on such data gathering procedure, some precious verbal protocols could be generated from users .Also some cartoon characters were more inspiring for children. The results were applied in designing a new service experience for blood sampling procedure for children, and some preliminary responses are included for further investigation. The value of this paper would be helpful for researchers in Empathic design approach, for emotional aspects of such a trend.

Keywords: Kansei Engineering, Activity Theory, Empathic Design, Affective Aspects

MOOD CHANGE CAUSED BY 'ACTIVE ART' THAT ENCOURAGES TOUCHING AND GRASPING MOVEMENTS (19)

Kiyomi Yoshioka *

The objectives of this study are to practice and evaluate a program that can be brought about through touching and grasping, with a focus on the psychological effect of 'Active Art'. For the purposes of this study, 'Active Art' is defined as art works and art creations that encourage the movement to touch. The work program with 'Active Art' we created is 'Let's draw fireworks!', by touching an electronic panel and squeezing a rubber air pump to create art works which can then be printed on postcards. The work brings about a desire to do more, and induces movement of touching, grasping and squeezing. I analysed ratings of the subjects' mood by using a shortened version of POMS. The POMS measure of mood after 'Let's draw fireworks!' stimulation revealed a reduction of 'Tension – Anxiety', 'Depression – Dejection', 'Anger – Hostility', 'Fatigue', and 'Confusion', and a maintenance of 'Vigor'. Subjects' mood after the program was confirmed to have improved significantly in comparison with their mood before the program.

Keywords: Active Art, Touching, Grasping, Mood, POMS

A STUDY OF THE ATTRACTIVE FACTORS FOR THE KIDULT FURNITURE (24)

Yi-Ning Lee *, Chun-Heng Ho

With the changing times, people not only concern about the functions of a product but also focus on the emotional connection with a product. Taking furniture, for example, it is a part of our life because we use and rely on it every day. When people interact with it, an emotional connection is then built up. As a result, it is particularly important that new furniture design can satisfy the emerging needs in emotion. In this study, the authors would catch the idea of 'kidult', which combines the two words 'kid' and 'adult'. It means a person who continues to participate in and enjoy youth culture (McFedries, 2002). Nowadays, the 'kidult furniture' already exists in the market, whereas the definition and the features of this kind of furniture are not clear. Therefore, in this study, the authors used 'Evaluation Grid Method' to explore the attractive factors of kidult furniture. Then the factors were justified by the discussion of the existing design projects. As a result, this study proposed some important abstract and concrete features for kidult furniture which can be categorized into four categories, i.e. shape, material, multifunction, and interaction. In the future, this finding would help designers to design kidult furniture better.

Keywords:Emotion, Furniture, Kidult, Evaluation Grid Method, Miryoku Engineering

FEATURE ANALYSIS FOR THE DESIGN OF ARTIFACTS WITH GROWING PRACTICAL VALUES AND SPIRITUAL VALUES (75)

Shotaro Asai *, Yu Hirata, Koichiro Sato, Yoshiyuki Matsuoka

Value Growth Design is a design based on a new design paradigm, Timeaxis Design, which incorporates the viewpoint of the time axis into the theory and methodology of design. Value Growth Design enables an object to increase in its practical value, such as its usability, and in its spiritual value, such as affection, the more it is used. This is antithetical to value decay design, seen in artifacts of mass production and mass consumption, which show a decrease in value over time. If such artifacts were able to adapt to the change of environment and the change of value based on the theory of Timeaxis Design, it is expected that their practical values and spiritual values would increase. This can enable artifacts to become appealing to human Kansei and allow users to possess a single artifact over a long range of time with strong affection. However, there are only few studies which have considered the application of Value Growth Design to actual design. Thus, in this research, a case study of existing value growing cases is carried out, followed by a cluster analysis and a discussion of the results which produce nine factors of value growth.

Keywords: Timeaxis Design, Value Growth Design, Multispace Design Model, design science

A STUDY ON THE IMAGE OF WEDDING GIFT FORTUNE CHICKEN (14)

Ming-Chyuan Ho, Shi-Mei Huang *

In the wedding ritual of Chinese culture, "Fortune Chicken" plays a major role in Han Ethnicity. As the time passes, the old way of wedding practices have evolved into a sign which is more visual based in order to be utilized as a means to disperse knowledge and here comes the ultimate product of "Fortune Chicken". By using the homophone of the word "chicken" in Taiwanese language which resembles the phonic of "settle down" in Taiwanese, it can be a medium of nonverbal communication between parents and offspring as well as to achieve the purpose of sending out parents' blessing to their children. This piece of work not only pursues the perfection of its design, but also seeks the significance of the design. The "Fortune Chicken" product has taken place of live chicken in the wedding ritual of today as society continues to evolve. It is for display as well as for reproduction, in another words, it is in between abstract and figurative, performance reproduction with the body. This study experimentally designs identical stuffed "Fortune Chicken" with different colors in order to explore diverse effects in communication of aesthetic imagery. In this way, the "Lead the way Chicken" product is able to interpret the principles of Chinese art aesthetic which are "endless words", "lively" and "Godlike". In this study, the image scale is used to measure different colors and aesthetic imagery. Primitively, some common "Fortune Chicken" product samples were used to analyze the application of fabric, afterward, seven designs of "Fortune Chicken" were created so as to allow customers and manufacturers have better understanding of the feeling that the fiber cloth made "Fortune Chicken" can bring. The study aims at creating products for various consumers by combining dissimilar colors of fiber cloth with "Fortune Chicken" goods in order to achieve the new aesthetic concept. Furthermore, this elevates the interest of customers in purchasing the fabric "Fortune Chicken." In the long run, this is expected to become a symbolic wedding gift in Taiwan. the study also discovers the difference between the designers and the subjects towards the sense of style, in the meantime, the study learns that based on aesthetic imagery, color red, blue with the design of big peony tend to be more popular in Taiwan's wedding ceremony. The outcome of this study can be used as a reference for further production and design of "Fortune Chicken" moreover the new "Fortune Chicken" product can be the best gift in this constant merging, renovating and pervading Chinese wedding culture.

Keywords: Fortune Chicken, Aesthetic Imagery, Cultural Merchandise

5B - Textile 3

THE EVALUATION OF MECHANICAL AND THERMAL PROPERTY OF WOMEN'S HOSIERY AND AESTHETIC IMPRESSION (8)

Naoko Nakayama *, Takako Fujimoto

To wear comfortable stockings and make legs look beautiful are the attractive subjects for women of all ages. With the exception of summer season, almost all women wear hosiery: panty hoses, tights, knee-length socks and socks. In general, knitted fabric of hosiery has the advantage of being highly efficient at both stretching highly and fitting. In this study, a variety of women's hosiery ate examined for their performance both under no deformation and deformed condition during wearing. One of purposes of this study is to compare the performance of various hosieries objectively. The other of purposes is to estimate the change of the performance by wearing deformation for each sort of hosiery. Deformation is observed in wearing test and given an account of stretch ratio values for wale and course directions. Compression property is measured first. Standard thickness, compression work and resilience values are recorded from the pressure-thickness relation curves. And air resistance and thermal conductance are measured by KES- AP1 and KES- THERMO- LABO II fabric testing instruments, respectively. In addition, sensory tests are carried out to examine affective disposition of women who choose stockings to acquire better aesthetic and comfort. Tests are held with several items, for example, tactile impressions of softness, thickness and smoothness, and visual impressions of transparency and degree of compression. In the tests questionnaires are used and judges are young women.

Keywords: hosiery, compression property, air resistance, thermal conductance.

A NEW EVALUATION METHOD FOR FABRIC WRINKLES USING THE MORPHOLOGICAL TECHNIQUE (123)

Chie Muraki Asano *, Akira Asano, Rino Ouchi, Takako Fujimoto

A new evaluation method of fabric wrinkles based on mathematical morphology is proposed. The method employs morphological size distribution to the shape of wrinkle caused by folding a fabric. The size distribution of a shape is measured by size density function, which shows proportion of areas of a part corresponding to each size in an image object. It is shown experimentally that the shape of wrinkle is characterized by the skewness of the size density function.

Keywords: wrinkle evaluation, mathematical morphology, size distribution

EFFECTS OF THE MODIFICATION OF FIBER SURFACE ON THE MECHANICAL PROPERTIES OF COTTON FABRIC (139)

Sawako Shibata *, Machiko Murakami, Kyohei Joko

Recently, the modification of the fiber surface is becoming an essential factor for comfortable clothing life. Therefore, understanding the relationship between the fiber surface characteristics and comfort of the garment is very important. However, studies on the effect of modification of the fiber surface on wear comfort of the garment has been done little. In this study, the effect of balance between hydrophilic and hydrophobic property of the fiber surface on the mechanical and frictional properties of the cotton fabric is investigated. In order to change the hydrophilic/hydrophobic balance of the fiber surface, we adopted a method of fixing the hydrocarbon chains directly to the surface of the cotton fiber. The resulted fabrics demonstrated a good water repellency and the degree of water repellency can be controlled by the hydrocarbon agent (stearylamine) concentration in the non-aqueous media. Mechanical and friction properties of cotton fibers that are immobilized by stearylamine are assessed by KES-FB1~4, and 16 properties are measured [1]. In addition, based on these values, the primary hand value is computed. Consequently, it is found that hysteresis of shear force, 2HG, and hysteresis of bending moment, 2HB, of stearylamine-treated cotton fabrics tend to be lower, and tensile resilience, RT, tends to be higher. On the other hand, it is found that KOSHI (stiffness), HARI (anti-drape spread) tend to be lower, and SHINAYAKASA (flexibility with soft feeling) tends to be higher. These results suggest that the cotton fabric used in this study becomes softer by immobilizing the hydrocarbon chains.

Keywords: modification of cotton fiber, KES, water-repellent

INFLUENCE OF PLASMA TREATMENT ON TOTAL HAND VALUE AND ADHESION PROPERTIES OF BI-FABRICS OF FUSED INTERLINING AND WOOL FABRICS (153)

Machiko Murakami *, Masukuni Mori, Takako Fujimoto, Choji Murata

Plasma treatment to wool fabrics is effective to the shrink-resistant performance without using chlorination and dyeing performance. The adhesive property between fabrics is growing by the treatment when we make two-layer fabric from face fabric and fusible interlining. During the process of apparel making, interlining fabric is fused on the rear side of the face fabric to make and keep a beautiful silhouette of garments. In this study plasma effects on adhesive strength between face and interlining fabrics are measured objectively. Fabric mechanical properties are investigated, and adhesion properties of bi-fabrics structure of fused interlining and wool fabrics are also discussed. Three types of face fabric are treated by argon-plasma and fusible interlining is adhered on them respectively. Interlining used in this study is polyester plain weave with polyamide adhesive resin. Interlining and face fabrics are bonded together using Flatbed type press machine. Face fabric samples used in this experiment are basket weave, twill and hound's-tooth wool fabrics. Bending, shearing and compression properties and air permeability are measured by KES measurement instruments [1]. Peeling strengths of the bonded fabrics were measured using KES FB1 tensile tester. The results show that adhesion property enhances by the plasma treatment. In the next stage, we study how adhesion bond impregnate with fibers and yarns and what is the difference in penetration between treated and untreated fabrics. Finally we study the influence of plasma treatment on total hand value of bi-fabrics.

Keywords: Bi-fabric, plasma treatment, fusible interlining, adhesion property, mechanical property

5C - Measurement 3

THE SENSATION OF PLEASANTNESS DURING TACTILE EXPLORATION (38)

Anne Klöcker *, Massimo Penta, Hayward Vincent, Jean-Louis Thonnard

Humans constantly explore surfaces with their fingertips, providing information regarding the surfaces' physical attributes and their (un)pleasantness level. It is therefore of interest to investigate whether the perception of pleasantness is related to surfaces' physical attributes. Pleasant touch perception is generally measured indirectly and generates ordinal scores, lacking fundamental psychometric properties which are essential for objective and quantitative measurement. Consequently, probabilistic measurement models have been established to allow transformations of ordinal scores into linear measures. Accordingly, we first elaborated a solid basis for future investigations in the domain of pleasantness sensation resulting from active surface explorations with index fingertips. The Rasch model was used to develop a unidimensional, linear and invariant Pleasant Touch Scale, which classifies 37 different everyday life materials according to their pleasantness levels. The latter seemed to be influenced by the respective surfaces' topographies and by the frictional forces resulting from the tactile surface exploration. These evidences were confirmed in our second study. Indeed, the net values of friction forces, recorded during active fingertip explorations of various material samples of the Pleasant Touch Scale could reliably be correlated with their respective pleasantness measures. A further correlation was found between the fluctuations of friction forces and the surfaces' pleasantness measures. Our third study was conducted to determine whether (i) these findings hold true for passive fingertip stimulations and (ii) temperature variations of stimuli impact their pleasantness levels. Frictional forces and surfaces' topographies of stimuli played a crucial role in passive touch pleasantness perception.

Keywords: pleasant touch, surface topography, friction, Rasch model

AN INTERACTIVE GENETIC ALGORITHM FOR THE STUDY OF PRODUCT SEMANTICS (44)

Jean-François Petiot *, Francisco Cervantes, Ludivine Boivin

This study uses an Interactive Genetic Algorithm (IGA) for eliciting users' perceptions of products. It aims to understand perceptions, and to determine the product's attributes that contribute to reinforce - or inhibit - a given semantic dimension. The product proposed to illustrate the study, defined in collaboration with the Renault Company, is a digital instrument panel, integrated in a car dashboard, and the semantic dimension considered is its "sportiness". After a parameterization of the instrument cluster, an interactive assessment test, based on IGA, is conducted on different products' pictures with a panel of 30 participants. The IGA test proposes a set of 8 parameterized designs, which are iteratively presented to each participant with their pictures via an interactive interface. From these designs, the user has to select the most representative ones according to the considered semantic dimension (sportiness). From iterative choices of the user, the results show that the design of the product converges toward representative designs of the semantic dimension. We present in the paper the analysis of the results of the IGA test, using Hierarchical Ascendant Classification (HAC), univariate and multivariate analysis. The effect of the design variables and their different modalities on the sportiness of the product is discussed. The agreement between the different participants is also studied, to uncover different typologies of products and identify design trends. The results show that IGA can be an interesting alternative to classical rating tests on experimental designs, used in conjoint analysis or in Kansei Engineering.

Keywords: interactive genetic algorithms, product semantics, user centered design, multivariate analysis

A MODEL OF USER'S PREFERENCE FOR RETRIEVING PREFERRED CLOTHES (84)

Akihiro Ogino *

This paper proposes a model of user's preference for retrieving preferred clothes. This paper has designed a decision process of user's preference. This paper has made the user's preference model based on indexes calculated in each step in the process. The process has three steps, i.e. Attention, Evaluation and Decision step. The attention step is that a user pays attention to principal features of clothes that is the features related to his/her interest. The attention step detects the principal features by the rough set and calculating Attention index. The attention index indicates the degree of user's positive (or negative) attention to the principal features. The evaluation step is that a user evaluates interest concerning the principal features. The evaluation step estimates the preferred degree of the principal features of a user by Evaluation index. The evaluation index is calculated by unifying the attention indexes of positive and of negative. The decision step is that a user decides his/her preference for clothes by using his/her evaluation. The decision step estimates the user's preference by Preference index that totalizes the evaluation index of the user. This paper has evaluated the estimation ability of user's preference by the preference index. The result shows that the preference index could estimate the preferred feature. This paper also shows the result that has evaluated the recommendation of clothes by using the preferred feature to 9 users. The average of the rate of which the clothes that include the preferred features of the user have appeared in top 5 is 98 %.

Keywords: User preference, User modeling, Personalization, Information retrieval, Rough set

TEXTURE IMAGE CLASSIFICATION USING EXTENDED 2D HLAC FEATURES (101)

Motofumi Suzuki *

HLAC (Higher Order Local Autocorrelation) features are popular image descriptors that have been used for various image-processing applications since the 1980s. Examples of the application of the HLAC features include KANSEI retrievals and subjective retrievals of 2D image databases. In this paper, standard HLAC masks are extended for computing a massive number of features. Typical HLAC features are computed by applying 25 masks to a binary image, whereas our Ext-HLAC features are computed by applying 16,241,567 masks. Since there are a high number of mask combinations, we have developed Ext-HLAC mask generation software programs. Ext-HLAC masks were tested by using 2D benchmark image database sets. For each image, the pattern features were extracted by applying Ext-HLAC masks, and the pattern features were analyzed by a k-NN based approach. Our preliminary experiments show high classification rates for certain image databases.

Keywords: HLAC, Ext-HLAC, pattern feature, k-NN, image classification

CONCEPT OF SATISFACTION (113)

Masaaki Kurosu *, Ayako Hashizume

This article examines the concept of satisfaction from various viewpoints including linguistics, psychology, and philosophy as well as Kansei engineering and will pursue how the design of artifacts that will bring the satisfaction can be realized and how the evaluation of satisfaction can be achieved. Of course, there have been some satisfactory measurement scales such as SUS, SUMI and WAMMI. But they simply measure the degree of resulting satisfaction and does not consider the relationships between the satisfaction and other quality characteristics. What is needed is the measurement of satisfaction based on the consideration on the conceptual network including relevant quality characteristics.

Keywords: Satisfaction, UX, usability

RITE DE TRANSITION A DESIGN CHOREOGRAPHIC EXPLORATION OF CULTURAL VALUE EXCHANGE, THROUGH DEVELOPMENT OF INTERCULTURAL RITUAL ARTEFACTS (61)

J.M.L. Kint, Sietske Klooster, Pierre Lévy *

This research project is called Rite de transition. By means of DesignChoreography, an approach developed by Sietske Klooster, we explore the rituals revolving around traditional Turkish marriage. In due course, inspired by an emotional and auto-ethnographic interpretation of the explored rituals, Klooster designs a novel ritual and artefact that intend to embody shared values, hence intercultural exchange. We choose for a bodily first person approach as we estimate that the complexities of the modern world – i.e. cultural clashes and the breakdown of cultures - require a radical change in tackling these issues. We suggest to move away from pure rational analytic approach our society adhered to. We are on the verge of a new era that embraces diversity and organic interaction that cannot and does not have to be standardized, fixed or rigidly defined anymore. Our approach is based on embodiment and phenomenology, allowing us to diverge from narrowing down broad societal and cultural issues to mere rational thinking and judging. We use DesignChoreography as a vehicle, since the knowing and making body can experience meanings and values that lie underneath visual appearance. By doing so we bring about our bodily understanding for intercultural interaction and exchange.

Keywords: Cultural values; DesignChoreography; embodiment; experience-based interaction design

A SPONTANEOUS CROSS-CULTURAL EMOTION DATABASE: LATIN-AMERICA VS. JAPAN (16)

Maria Alejandra Quiros-Ramirez *, Senya Polikovsky, Yoshinari Kameda, Takehisa Onisawa

In this paper, we present a new database to support the cross-cultural studies. Two cultural groups are selected: Latin America and Japan, to represent western and oriental cultures. Emotions are elicited through an experiment in which participants observe emotionally loaded stimuli and then rate their feelings in a valence (how positive or negative is the experienced emotion) and arousal (how intense is this emotion) scale. The interactions are recorded using audiovisual and thermal devices. This database features three innovative characteristics: spontaneous emotion expressions, multiple synchronized sources of interaction, cross-cultural comparison support. This set of characteristics is missing in the currently available emotion databases, making our database a unique open option for studying spontaneous expressiveness of emotions in a cross-cultural context.

Keywords: cultural specificity, universality, multimodal corpus, affect

STUDY ON CULTURAL DIFFERENCES OF USERS' PERCEPTION TOWARDS SHAPE CHARACTERISTICS (88)

weihu lu *, Vanja Čok, Rupeng Zhu

In the recent marketplace, it's necessary but no longer sufficient to offer a good functioning product. The emotional quality of products plays an important role for differential advantage. Particularly, globalized markets mean more intense competition than ever before. Understanding the users' real emotional needs in different cultures is becoming a key strategy for the adaptation of products in overseas market. This proposed study elicits insights on cultural differences between European and Asian values and investigates how these affect user's reaction to designed products. Two experimental studies of products' emotional quality are carried out on European and Asian participants via Semantic Differential Method: one case is conducted with the shape contours (pellet burners) represented by Europeans and South Asians (Indian) respectively for the investigation of their shape preferences; another case is organized with prototype model defined with geometrical design attributes (eyeglasses frames) represented by Europeans and East Asians (Chinese) respectively in order to reveal the structure of shape meaning comprehension. After conducting statistical analysis, the result of this study helps to improve user satisfaction both within national and overseas markets. It's useful for designers to identify and emphasize these shape features of new products which will stimulate the positive responses to required user preferences.

Keywords: cultural differences, Kansei Engineering, Semantic Differential Method, shape.

KANSEI AND IRANIAN CULTURAL CHALLENGES; THE USE OF TRADITIONAL MOTIFS IN DESIGN (124)

Negin Yashmi *, Maryam Bahoosh Sabet, Hamid Amouzad khalili, Behnaz Hatami Dizgah, Sepideh Behmaram, Maryam Fariborzi, Jalal Yashmi

Often customers make their purchase decision based on price, quality and functionality of the product. Sometimes the decision is influenced by the perceived value, which is always subjective and emotion-driven. In order to ensure successful launch of a product, it is extremely important to predict the perceived value of design alternatives systematically based on the common language understood by both target users and designers. It was believed that human verbal expression could not be quantified with absolute values and should be more adequately interpreted. Kansei is a method which does this interpretation. This cross-sectional study was done based on Kansei method and it consists of three stages: First, through newspapers, magazines, web pages, users, interviews and other related sources Kansei words were collected, and four different motifs were tested on the product which is car. One of these samples has been designed with Iranian motifs. A focus group was invited to identify the essential elements that influence the perceived value of product. Third, the perception differences of sample products were conducted to verify the validity of culture index. The findings of this study demonstrated that culture was effective for decision making in product design.

Keywords: kansei, design, traditional Motifs, culture, user behavior.

PERCEPTUAL RICHNESS AND AESTHETIC SENSIBILITY IN TRADITIONAL AND MODERN PRODUCT DESIGNS - A CROSS-CULTURAL KANSEI STUDY USING AFRICAN INSPIRED PRODUCT DESIGNS (110)

Oluwafemi Samuel Adelabu *, Toshimasa Yamanaka

Why do people tend to value an old product over a modern one? This study aims to explore cross-culturally, the conceptual basis of perceiving aesthetic values in product design characterized as being traditional and modern. To this end, a quasi-experiment was designed to evaluate the cognitive and affective richness in the aesthetic appreciation of both traditional and modern objects. For this experiment, 15 culturally inspired African products were pre-selected and classified into three categories, each class representing the different level of visibility of cultural elements in the sampled objects. 20 African subjects and 20 East-Asians including Japanese and Koreans studying at the University of Tsukuba participated in the survey test by doing a visual evaluation for the selected product samples using semantic differential and self-assessment manikin questionnaires. Having subjects from two distinct regional cultures provides a platform for cross-cultural comparison and discussion on the value perception style for typical traditional and modern products. The result outlines similarities and disparities of two cultural domains for the three product categories.

Keywords: Product design evaluation, Visual perception, Aesthetics, Kansei value, Cross-cultural study

6A - Evaluation 4

DEVELOPMENT OF AN AFFECTIVE SENSORIAL ANALYSIS METHOD FOR THE FOOD INDUSTRY (160)

Simon Schutte *, Lluís Marco-Almagro

Some type of product development method is applied in all industrial branches. In food industry, most of these development methods involve a food designer preparing a number of prototypes to be tested with potential consumers. Several feedback loops allow the designer to improve the product until it is satisfactory. However, it is often not clear to what extend the resulting product is optimized regarding affective aspects. This study presents a method for affective food product development, deeply based in the classical Kansei Engineering model widely used in other sectors, but that integrates ideas presented in the Kansei Food Model suggested by M. Shibata. Basically, the new method incorporates both sensory items and hedonic expressions as Kansei words, and evaluates not only the link between them and the space of properties, but also the relationship between them. The new method is applied in three case studies (two Swedish companies and one Spanish company). Data collection is conducted in both countries, allowing comparisons based on the origin. The method developed worked as expected, and details are given in an applied way based on the case studies. The paper also shows that sometimes results were surprising or unexpected – such as differences and similarities between countries, or the fact that customer preferences ("like it") and desire ("want it") do not exactly match. Difficulties met and advice on how to conduct the proposed method is also given in the text.

Keywords: Affective design in food industry, Kansei Food Model, regression analysis, Quantification Theory Type 1

CONSIDERATION OF EXPRESSION METHOD OF THE ENTROPY CONCEPT (12)

Tomoaki Sato *, Mutsumi Suganuma

In this report, we investigated the correlation between the entropy and the psychological quantity obtained by showing several contents which show binary dot pattern images to participants. We examined the correlation between the entropy values calculated by several different algorithms and the psychological quantity by three verbal expressions. In the comparisons between the binary dot patterns which have natural randomness that may exist in real photo picture, we obtained that the psychological quantity by three verbal expressions have high correlation with entropy values. We found that the entropy values calculated by means of measuring the length between each black pixel has highest correlation to the psychological quantity.

Keywords: Entropy, Thermodynamics, Information Theory, Language Expression, Visual Expression

PRODUCT DEVELOPMENT BASED ON BERND H. SCHMITT'S 'EXPERIENCE VALUE' RESEARCH CASE ON THE IGNIS NATURE SERIES (114)

Takao Someya *, Schoich Kobayashi, Takayoshi Ito, Shin'ya Nagasawa

We research into a variety of successful-selling products has clarified that offering appeals to customers' sensibility values is the key to higher value-added products, rather than merely offering functionality and benefit. Thus, this quantification acts as a tool for analysis of difficult sensibility values. The analyses based on the concepts referred to as "experience value" by Bernd H. Schmitt have indicated, through a large number of examples, that they are perfect for communicating the superiority of the products. With the analysis of the competitive advantage held especially in the high-class goods market, notions regarding this experience value demonstrated a certain power and influence, and made it possible to clearly recognize the brand's superiority and more easily compare the differences between brands. While the experience value concept was utilized as a tool for analyses of existing successful products, it is also thought crucial for creating successful products by theoretically conferring sensibility value upon them. Therefore, we investigated methods by which products' success rates could be raised by incorporating this concept of experience value into the IGNIS Nature series manufactured and sold by the ALBION Co., Ltd. Here, ALBION' Shirakami Laboratory adopted a value-added approach towards products by forming a framework for the same with plant extract compounds from various species of privately cultivated herbs. The result was an increase in sales volume.

Keywords: Experience value, Cosmetic

EDUCATIONAL EXPERIENCE IN KANSEI (54)

Igor Fernández-Plazaola *, Maria Pons-Morera, Antoni Montañana, Carmen Llinares-Millan

Since the earliest Kansei works saw the light now more than 30 years ago, the Kansei has boomed exponentially. Because of many and various achieved business successes by different working groups as well as the methodology geographical dispersion throughout the world. Multi-faceted Kansei has been developed for the last 20 years in a very wide and varied way. The Kansei has experienced as if talking of a tree, a branching experience still going on nowadays. Today we can speak from Kansei in theory, Kansei emotion measurement, Kansei engineering, Kansei information, Kansei education, Kansei design to Kansei in practice and many other disciplines. Three years ago our team started the experience to introduce Kansei in the educational atmosphere, applying it to the finals degree projects. In the School of Building Engineering at the Universitat Politècnica de València and inside its final degree project proposal, a workshop on Kansei Engineering was offered. During these years at the eighth semester of the building engineer degree, students have been working for almost 5 months under the supervision of a team of teachers on their final project till the final public oral defense was made infront of a committee. During these years we have worked with an average of 10 students per year. Some have successfully completed their final projects, others have not achieved the minimum required. The article aims to explain the experience during the last 3 years the team has accumulated in Kansei Education, and can be of interest for every teacher.

Keywords: Academic Kansei, Kansei final project, educational experience.

CAN WE CATEGORIZE MOVIEGOERS ON THEIR EMOTIONS? (3)

Emilie Poirson, Da Cunha Catherine, Jean-François Petiot *

The choice of a product is based on the performances but also on the emotions it caused, particularly in cultural products. We hypothesize that customer preferences are partly dependent on the emotions aroused by the use. For each pair user/product type there exists a function linking emotions and preference. The design of online recommendation systems, such as those used in e-commerce, is a real challenge. This requires understanding the customer's need in order to recommend the right products for them, i.e. those that are likely to be appreciated. The current recommendation systems rely on similarities between customers based on products purchased (or assessed). The best way to advise an amateur is then to determine its emotional neighborhood, and recommend the products liked by its neighbors. To validate this hypothesis a full-scale study was conducted on a given product: movie. After determination of a list of emotions adapted to movies; data were collected through an online survey. The data processing (more than 6500 evaluations) has several objectives: 1 . Identify, for each client, relationships between emotions and overall assessment; 2 . Identify groups of customers with similar overall assessments; 3 . Identify groups of customers with similar relationships.

Keywords: User, Emotions, Preference, Neighborhood

6B - Writing

ADJECTIVE-BASED ESTIMATION OF SHORT SENTENCE'S IMPRESSION (60)

Nguyen Thi Thu An *, Masafumi Hagiwara

This paper proposes a new method to estimate impression of short sentences considering adjectives. In the proposed system, first, an input sentence is analyzed and preprocessed to obtain keywords. Next, adjectives are taken out from the data which is queried from Google N-gram corpus using keywords-based templates. The semantic similarity scores between the keywords and adjectives are then computed by combining several computational measurements such as Jaccard coefficient, Dice coefficient, Overlap coefficient, and Pointwise mutual information. In the next step, the library sentiment of patterns.en - natural language processing toolkit is utilized to check the sentiment polarity (positive or negative) of adjectives and sentences. Finally, adjectives are ranked and top na adjectives (in this paper na is 5) are chosen according to the estimated values. We carried out subjective experiments and obtained fairly good results. For example, when the input sentence is "It is snowy", selected adjectives and their scores are: white (0.70), light (0.49), cold (0.43), solid (0.38) and scenic (0.37).

Keywords: Impression, polarity, relatedness, semantic similarity.

UNDERSTANDING CUSTOMERS' AFFECTIVE NEEDS WITH LINGUISTIC SUMMARIZATION (74)

Fatih Emre Boran, Burak Efe, Diyar Akay *, Brian Henson

To increase the chance of launching a successful product into market, it is essential to satisfy customers' affective needs during the product design stage. However, understanding customers' affective needs is very difficult task and product designers might misunderstand the customers' affective needs. In this study, linguistic summarization with fuzzy set is used to present customers' affective needs with natural language statements which could be easily understood by human beings. The relations between customers' affective needs and product design elements are represented by type-I and type-II fuzzy quantified sentences. To illustrate the applicability of the linguistic summarization with fuzzy set in translating customers' affective needs to natural language statements, a case study is conducted on mobile phone design. The results indicate that the linguistic summarization with fuzzy set can be a useful tool to assist designers to create products satisfying affective needs of customers.

Keywords: Affective Design, Linguistic Summarization, Fuzzy Sets

DIFFERENCES BETWEEN KANSEI EVALUATIONS CAUSED BY THE AWARENESS OF DIFFERENCES IN BACKGROUND INFORMATION: THROUGH THE STUDY ABOUT TITLES, WA-GASHI AND ILLUSTRATIONS (79)

Misa Ikeda *, Toshimasa Yamanaka, Shigeru Ozaki, Toshiaki Uchiyama

This research is based on the outcome of a previous study on Wa-Gashi (a traditional Japanese sweet), its title explanation and evaluation. In this research, we focused on 'Haru-no-yume'. From the result, in five-sixth patterns, we found that the evaluations varied as we gave more information. Furthermore, we conducted another experiment. Through an evaluation of six painting illustrations which were created by two students, we investigated on the relationship between the evaluation process and title. Similarly to the result of the previous study about Wa-Gashi, it was revealed that the evaluations were certainly affected by the titles in several cases. Moreover, we saw that the evaluations were not only affected by direct elements but also indirect elements, such as something with which it is associated with, or resemble.

Keywords: familiarity, knowledge, evaluation, background information, impression

TEXT DATA MINING OF ENGLISH BOOKS ON TOURISM (106)

Hiromi Ban *, Takashi Oyabu

Nowadays, approximately sixteen million Japanese travel abroad, and six million foreigners come to Japan for sightseeing. It can be said that it is just the time of sightseeing right now. Therefore, the knowledge of tourism has become more and more important, and reading materials in English that can be said to be a world common language has been indispensable. If we have beforehand enough knowledge of the features of English in this field, reading of the texts will become easier. In this paper, we investigated several English books on tourism, comparing with journalism in terms of metrical linguistics. In short, frequency characteristics of character- and word-appearance were investigated using a program written in C++. These characteristics were approximated by an exponential function. Furthermore, we calculated the percentage of Japanese junior high school required vocabulary and American basic vocabulary to obtain the difficulty-level as well as the K-characteristic of each material. As a result, it was clearly shown that English materials for tourism have a similar tendency to literary writings in the characteristics of character-appearance. Besides, the values of the K-characteristic for the materials on tourism are high, and the books with older publication and with higher specialty are more difficult than journalism.

Keywords: English style analysis, Metrical linguistics, Statistical analysis, Text data mining, Tourism

TRIAL-MANUFACTURED OF PAPER LIKE WASHI BY REUSING WOOD AND PLANT WASTE (140)

Satoru Ohya *, Takako Fujimoto, Kento Tokumitsu

To make paper from non-wood fiber is important because of protection of forest resources environmentally. Moreover, if paper can be made from familiar plants, it will be useful for both effective utilization of resource and environmental education. In this research, corn shuck and leaf, and half-split chopsticks were soaked into the bleaching agent on market in Japan, with changing concentration of the agent and soaking time, and pulp was manufactured. Relations between the quantity of the agent and the soaking time, or pulp yield were examined. For corn shuck and leaf, the yield decreased linearly with increase of the agent or soaking time, in general. But, for the case of applying much shuck, the relation showed maximum curve. If the agent was very less, paper had yellowish. If the agent was increased, the paper became whiter, but orange tint slightly. Compared with papers on market, created papers had smaller apparent specific gravity and air resistance, and were thicker. The sensory test was conducted using both of created papers and papers on market. Homogeneity impression was associated with many impression factors. Papers which were judged as homogeneous had impressions of high intensity, high artificial degree and not-warmth. Papers with heterogeneous or rough impression brought high ventilation impression for subjects. Individual differences of impression point relevant to visual and tactile were apparently smaller than those which might be regarded as physical properties, in general.

Keywords: Paper-making, Half-split chopsticks, Corn shuck and leaf, Japanese paper, Sensory test.

6C - Health

STUDY ON COLOR ART THERAPY TECHNIQUES - AN EXAMINATION OF TECHNIQUES WHICH ALLOW ELDERLY PATIENTS WITH SEVERE DEMENTIA AND MOTOR IMPAIRMENT OF THE HANDS TO EXPRESS THEMSELVES TO THE SAME EXTENT AS HEALTHY PEOPLE - (6)

Chitose Ikeda *

This research project is focused on art therapy techniques which can be used with patients suffering from severe dementia, and considers the extent of expressive ability patients can achieve through their use. Art therapy is one type of psychotherapy, and consists of a variety of different techniques, such as painting, 3-dimensional expression through sculpture, and miniature garden tending treatments. This type of therapy is used as a treatment for patients' with mental health problems, and as a way of analyzing patients' state of mind. There have been reports that use of art therapy can improve concentration in elderly dementia patients, and there is an increasing need for these treatments at geriatric care facilities. However, implementing art therapy for patients with severe dementia or hand motor control impairments is difficult, and these conditions often result in limitations of the patients' self-expression. In cooperation with the psychotherapy department at The A Hospital, a Japanese facility where elderly dementia patients receive long-term care, this study observed the progress of art therapy treatments in order to clarify their contents, and confirmed the effectiveness of the use of color tile arrangement for expressing abstract themes, a specific method used to enable patients to express their feelings in spite of their dementia. In addition, a comparison of the artworks created by these elderly dementia patients with samples created by healthy people in their 20s showed that this therapy technique enables an equivalent diversity and individuality of expression in both groups.

Keywords:Psychotherapy, Art Therapy, Dementia, Impairment, Elderly

FOSTERING TRUST-BASED RELATIONSHIP BETWEEN SELF-CARE USERS AND HOME MEDICAL DEVICE IN THAI AND JAPANESE (127)

Sittiphan Jiyavorananda *, Toshimasa Yamanaka

This paper presents a cross-cultural research on the perception of trustworthiness in self-care home medical device - in particular, blood pressure monitor - in Thai and Japanese young adults. The study focuses on the method of incorporating social role image into the device to strengthen the image of trustworthiness, and its effects on Japanese and Thai users. The emerging challenges in home medical device design call for the integration of trustworthy image in order to help alleviate the feeling of fear and worrying of non-professional users when interacting with medical devices. This research focuses on one particular methodology for creating perception of trustworthiness in technological agent: the incorporation of social role image. The first part of the research includes a cross-cultural survey (Thai and Japanese) on trustworthiness im¬pressions of 7 social roles that are related to home medical products. The second part is comprised of an experiment to investigate different methods of incorporating "Caretaker/Nurse" social role into blood pressure monitor (BPM)'s cuff, and their effectiveness in conveying impression of trustworthiness of BPM to Thai and Japanese young adult users. The result shows no significant differences in direct trustworthiness rating between designs with social role image and design without, in both Thai and Japanese. However, there are significant changes in mood and ratings of components that are found in literature reviews to be related to perception of trustworthiness.

Keywords:Trustworthiness, Home medical device, Social roles, Cross-cultural, Blood pressure monitor

THE KITCHEN SUPPLY DESIGN BASED ON KANSEI ENGINEERING STUDY FOR THE ELDERLY USER OF INDEPENDENT (134)

Peng-Jyun Liu *, Sheng-Houng Lin, Ching-Yi Wang, Ming-Chuen Chuang

The world's elderly population (Age over 60 years) rapid rise and to 22% of the total population and will more than children (under 15 years) population in 2050.The world Health Organization (2002) Active Aging concept, Promote the importance of maintaining the autonomy and independence of the elderly clarify. This study used inductive method such as lifestyle population surveys, focus group interviews, Kano model, and QFD (quality function deployment). The results show that important for having idpendent living for to study the possibilities of desiging kitchen supply for the independent aging. The most important design elements for ederly using kithen supply are to have the anti-hot pot body, fast heat conduction, heat dissipation, no ship handli, lightweight and easy to pick up, and in line with the hand.

Keywords: QDF deployment matrix, elderly user, independent living, active ageing, kano model

6D - Design

PRINCIPLES FOR USER EXPERIENCE: WHAT WE CAN LEARN FROM BAD EXAMPLES (56)

Constantin von Saucken *, Florian Lachner, Udo Lindemann

The idea of User Experience (UX) is to achieve a positive emotional reaction of users on a product interaction and thereby to create a unique selling proposition. However, people's needs, perception and resulting emotions are subjective and very diverse. Furthermore, UX is dependent on the physical and social context. We developed the Customer Experience Interaction Model (CEIM) which consists of UX-relevant elements from different relevant disciplines to handle this complexity. In order to support real designers without theoretical background, we surveyed real customers' product reviews describing good respectively bad UX from different sources and extracted UX principles. We already presented principles taken from positive samples in another publication. In this paper we discuss principles based on reviews with negative examples. These UX principles shall clarify to developers how to avoid negative experiences. Thereby, we combine a theoretical approach and concrete principles and examples, which illustrate the application of theory and help preventing bad UX.

Keywords:User Experience, Emotional Design, User-Centered Design

AN EMOTIONAL STUDY FOR URBANCAGE FROM THE VIEW OF EXPERIENCE DESIGN (53)

Chien-Kuo Teng *, Yi-Ting Chen

In nowadays, urban living gradually can't live without technologies and automobiles, which accompany people for 24 hours just like two soul mates or pets. People hope to interact with others closer via Internet; however, the convenience of technology condenses the genuineness and cares from humans. In the past, there are two purpose of having The Cage, one is for admiring-use, to show the elegant movements and the sound of birds; the other is the symbol of society, representing the social level by having a delicate Cage. Deep inside their mind is their reliable consistency. This research was presented a design project "Urbancage" that was tries to aroused an experience from peoples innocent imagination. Compare with the social phenomenon in nowadays that over-using mobile phone and the behavior of raising birds in the past. Those unite the cage and the mobile phone by penetrating the action of holding and placing the cage, so we can metaphor the automobiles to the birds in cage. Therefore, user would connect the icon of electronically bird with human being via the technology of the application, creating a new life style and habit by that. Finally, this paper would discuss its discover for record of "Urbancage" that presented at exhibition of Tokyo Designer Week and exhibition of PRODUCT DESIGN MADRID2. Those were analysis the act of interaction between audients and product, and make suggestions for regarding the social interaction design.

Keywords:experience, emotion, readymade, communication, product design.

POTENTIAL OF OBJECTIVE PREFERENCE EVALUATION IN A CREATIVE PROCESS (71)

Namgyu Kang *

Nowadays, many researches on the objective and logical evaluations of created objects are conducted in Kansei design field. However, there are not many studies on the relationship between creator's own creativity and the evaluation on their work in fine art field like glass art. Many students in the fine art field conduct creative work with their limited favorite styles although they have not developed their own expressive characteristics yet. It simply means they need to introspect and cultivate their own Kansei. With this background in mind, the purpose of this study is to provide students in the field of glass art with new perspectives so that they can introspect their own Kansei and develop characteristics of their creative work. Thus not only Kansei as a source of creativity but also Kansei as an evaluation on perceived stimulus from outside are addressed in this study. As a result, the relationship between student's preference in a creative work and others' Kansei evaluation on it was analyzed by multivariate analysis. All students were able to introspect their own Kansei as a source of creativity based on the others' objective evaluation. The result means each student can understand one's characteristics of creative work. That is instrumental in trying various expressions in their creative work. Moreover, they can convey their creative work to others objectively and logically by using the results of analysis.

Keywords:Creativity, Preference, Introspection, Kansei evaluation, Fine Art

THE IMPACT OF NARRATIVE METHODS ON DERIVING USER-CENTERED PRODUCT REQUIREMENTS FROM INDIVIDUAL KNOWLEDGE (151)

Christian Wölfel *

Industrial design education and practice often sits on the fence between rational approaches as established in engineering design on the one side and free-spirited approaches familiar to fine arts on the other. Especially when in interdisciplinary contexts, this may cause some issues since industrial designers and their methods may be perceived as either too narrow-minded or too chaotic. One example of reoccurring surprise is the use of narrative methods such as personas and use case scenarios in systematic product development processes. Usually, collaborating engineering designers are sceptic in the beginning but later on accept the methods as means of communication and collaboration. However, narrative methods are not only means of team work and presenting concepts or solutions, but also help analysing the task, defining requirements and evaluating design proposals. This paper describes a study that aims at proving the impact of narrative methods in industrial design on an empirical basis.

Keywords:individual design knowledge, narrative methods, user-centered product requirements

RESEARCH ON THE LATEST DECISION-MAKING STYLE IN AUTOMOBILE DESIGN DEVELOPMENT (111)

Noboru Koyama *, Mikio Yamashita, Satoshi Yoshida

Prior research has looked at the relationship between decision-making style and design strategy in the automotive industry. Table 1 shows the features derived from the prior research of automobile manufacturer's decision-making styles in Japan, Europe, and the U.S. The decision-making style of Japanese companies differs from that of European and American companies, in that (1) the frequency of decision-making is higher, (2) there is a greater diversity of members in the decision-making process, (3) the number of members involved in decision-making is larger, and (4) group consensus and guidelines are used as decision-making criteria. However, there have been changes in recent years in so called 'panel evaluation' methodology, with moves to include the best features of the Japanese and European/US models. This paper also contains the results of analysis comparing these to Korean manufacturers, which have been creating an increased presence in global markets in recent years.

Keywords: Design management, design decision-making, panel evaluation, design screening

7A - Evaluation 5

ELECTRONIC PRODUCT DEVELOPMENT WITH KANSEI ENGINEERING / KANSEI ERGONOMICS (154)

Shigekazu Ishihara *, Mitsuo Nagamachi, Keiko Ishihara

Successful products cannot be made with only ergonomic considerations, and Kansei engineering provides eloquent answers to the problems that arise. In this paper, we report Kansei ergonomics process of electronic products, shaver and washer-dryer from SANYO electronics. Both of the cases have ergonomic researches into detailed Kansei domain. New prototype of electric shaver has 80 degree bent head and shaped to pen grip. Electromyogram of fore arm and pressure to skin are both significantly lower. Washer-dryer has evaluated with subjective Kansei, working posture analysis and kinematic model. Control panel was also examined and improved. Research results of both projects have commercialized, and have got successes.

Keywords:Kansei Ergonomics, Product Development, Electronic Products, Measurements

EVALUATION OF THE EFFECT ON VIEWER RECOGNITION OF VIEWING AT AN ANGLE A SIGN WITH ARROW MARKINGS (112)

Masaaki Koyama *, Yuki Takahashi, Hisao Shiizuka

This paper presents an evaluation of the effect on viewer recognition of viewing at an angle a sign with arrow markings. Focusing on the case in which a sign at an intersection is marked with an arrow pointing in the direction of a given destination, this paper (a) investigates, using linear transformation, how to represent such an arrow in a manner which ensures that drivers follow the proper direction, even when the arrow is viewed from different angles, and (b) proposes a specific approach to representing such an arrow. It has been shown that the direction and magnification of a given arrow marking are important factors in the recognition of the proper direction on the part of observers.

Keywords:Evaluation, viewer recognition, sign, arrow marking.

STRUCTURAL COMPARISON OF IMPRESSION ABOUT A CHARACTER- AGENT DERIVED FROM USERS EMPATHY (100)

Keiichi Muramatsu *, Tatsunori Matsui

In today's information-communication society, it is important to establish a good relationship between humans and computers. Several human-agent interaction studies have succeeded in creating a more profound relationship with people, such as fostering empathy with agents. However, none of these studies has examined how human empathy is affected from the impressions formed about agents. We conducted an experiment to collect emotional response to a character-agent from participants. Then, we compared attitude structure to the agent between empathic and non-empathic groups of the participants. The results show that empathic participants evaluated the character-agent from various aspects and did not bestow low scores, unlike non-empathic participants.

Keywords: Human-Agent Interaction, Character-agents, Empathy, Impressions.

POSTURAL SWAY WITH ILLUSORY MOTION INDUCED BY STATIC VISUAL STIMULI IN MIGRAINEURS AND NORMAL CONTROLS (28)

Shu Imaizumi *, Motoyasu Honma, Haruo Hibino, Shinichi Koyama

Illusory motion, in which observers can perceive static images to be moving, is an important graphic design concept. Although the mechanism of illusory motion is being uncovered, it is still unclear whether illusory motion can induce postural sway. Patients with migraine headaches (migraineurs) are likely to suffer from motion sickness and are more likely to perceive illusory motion than are individuals without chronic headaches. Since one of the causes of motion sickness is the conflict between visual and vestibular inputs, we hypothesized that migraineurs have an abnormal visuo-vestibular interaction. We measured postural sway during migraineurs' and normal controls' viewing of static visual stimuli with and without illusory motion. We used Kitaoka's artworks as both the illusory motion and control stimuli (Kitaoka, 2003, 2013). The participants stood on a stabilometer while they viewed one stimulus for 30 seconds. Immediately afterward (Experiment 1), or 30 seconds after viewing the stimuli (Experiment 2), the participants closed their eyes and stood on the stabilometer for 30 seconds. The results from Experiment 1 indicated that migraineurs swayed more than controls while their eyes were closed after viewing the illusory motion image. However, in Experiment 2, migraineurs swayed less than controls with their eyes closed following a 30-second interval after viewing the illusory motion. Taken together, these results suggest that static visual stimuli induce not only illusory motion but also postural sway, which may last for 30 seconds in migraineurs.

Keywords:Illusory Motion, Vision, Migraine, Postural Sway

CULTURAL INFLUENCE TO THE COLOR PREFERENCE ACCORDING TO PRODUCT CATEGORY (159)

Kazuko Sakamoto *

In this study, I focus on color, one of the factors involved in design. It has been assumed that color preference is affected by culture and geographical factors, and much international comparative research has been done on this issue. However, the conclusions vary widely, suggesting that it is difficult to generalize. Therefore, in addition to studying color preference itself, I investigated how basic stated color preference is correlated with specific color preference for commercial products. I analyzed how color preferences vary in different countries and product categories. I interviewed Japanese, Chinese Vietnam and Dutch students on their color preferences, and investigated the correlation between their basic color preference and their specific color preference for product categories such as clothes, cell phones, notebook computers, refrigerators, and vehicles. I found that Japanese participants tend to prefer dark colors. All of three nations other than China liked achromatic colors such as black and white for commercial products. By contrast, the color preferences of Chinese participants varied widely. The Chinese tend to have similar color preferences throughout product categories, whereas the Japanese, Vietnam and Dutch people showed different tendencies for different categories.

Keywords:Color Preference, Product Category, International Comparison, Cultural Background

7B - Music

DOES ARCHITECTURE AFFECT ACOUSTIC PERCEPTION IN MUSIC HALLS? (52)

Miguel Galiana Martínez *, Carmen Llinares Millán, Jaime Llinares Millán

Acoustics and architecture are two of the main parameters that influence the quality of a music hall. However, does the user perceive these two factors independently? A good architectural design may affect the perceived acoustic quality and vice-versa? In this line, the present work aims to determine the conceptual structure employed by the users when evaluating a music hall. This study also pursued analyzing whether architectural variables have an influence on the perceived acoustic quality and vice-versa. To achieve these goals, a previous research was conducted in 17 venues of the Valencian Region using Semantic Differential within the frame of Kansei Engineering. A sample of 221 users classified as "non-experts" (neither musicians, nor acousticians or architects, nor people related professionally to concert halls) participated in this experience evaluating the architectural and acoustic quality of these venues. Results showed that, from a conceptual perspective, the users clearly differentiated the acoustic variables from the architectural ones. Nevertheless, it was observed that architecture influenced the perceived acoustic quality and vice-versa. Thus, regression models were obtained and tested to measure the perception of acoustic and architecture quality. These results may be interesting to enable optimization of design features of future music halls.

Keywords:music hall, acoustics, architecture, perception, non-experts

ATTRACTIVE PHRASE DETECTION FROM MUSICAL LYRIC FOCUSING ON LINGUISTIC EXPRESSIONS (5)

Ryosuke Yamanishi *, Risako Kagita, Yoko Nishihara, Junichi Fukumoto

This paper describes a method for extracting attractive phrases of lyric focusing on linguistic expressions. Not only chorus but also linguistic expressions seem to be a cause of attractive phrases. We conducted impressive evaluation experiments to clarify the important factors of attraction of phrase. As the result, it was confirmed that "uniqueness of co-occurred terms" and "repetition" especially influenced attraction. Therefore, we modeled the uniqueness of co-occurred terms and repetition as seven mathematical features. And the proposed method detected attractive phrases using support vector machine with the modeled features, which is known as a high performance pattern recognition method. Through the attractive phrase detection experiments, we confirmed availability of the proposed method: the accuracy level and the precision was each 69% and 86%, respectively. Moreover, we discussed about the correctly detected attractive phrases comparing key sentences detected by the existing summarization methods. As the result of the discussions, the proposed method correctly detected the phrases that were ranked in low by the conventional methods though human evaluated the phrases as attractive. From these facts, it was suggested that lyrical linguistic expressions were well modeled in the proposed method, and the proposed method detected the attractive phrases better than the existing summarization method.

Keywords:Music, Lyric, Attractive Phrase, Natural Language Processing

PSYCHOLOGICAL RESPONSES TO SOUND STIMULI: JOINT CONSIDERATION OF AAE MODEL AND CV MODEL (99)

Xi Chen *, Toshifumi Sugiura

Psychological evaluation remains an important problem. Among the current objective methods, Anterior Asymmetry and Emotion model (AAE model) is widely accepted as a trait-related and state dependent measure. However, other inconsistent results suggested that the AAE model is more likely to reflect the motivational direction than the affective valence. Combination with another index to provide more credible evaluation is being considered. Comfort Vector model (CV model) proposed by Yoshida uses the characteristic of the frontal alpha wave fluctuations to evaluate the mood states from affective valence and arousal dimensions. In the present study, we evaluated the psychological responses to two kinds of sound (scary and soothing) in a group of eighteen healthy graduate students by AAE model as well as CV model. Then we discuss the relation between the results of these two models.

Keywords:AAE model, alpha wave fluctuation, Comfort Vector model, sound stimulus

THE STUDY ON PLAYABILITY OF TOYS FOR CHILDREN BASED ON DIFFERENT TEMPERAMENTS (45)

Yi-he Li *, Min-yuan Ma, Wei-chen Li

Children gain knowledge through internalization, adjustment, and construction of individually contact with surrounding environment. During infant phase, a game is life, and life is a game. Toys have become a powerful tool to facilitate children's growth and learning. Besides, Children are born with their natural style of interacting with or reacting to people, places, and things—it is their temperament. Children with different temperaments need different teaching aids in their development. To promote effective learning and in order to stimulate their interest in games, it is important to select appropriate toys for the children with different temperaments. It would help to improve learning effects if adults timely provide children with help and guide. To achieve the above targets, this study aims to builds the relationship between child temperament and toy categories in order to discuss the playability of toys for children based on different temperaments. Study steps are as follows (1) Classify preschool children by temperament test, and pick up representative toys as the experimental samples according to Piaget's game theory.(2) Discuss with experts in EGM and extract the possible playability of toy from it. Classify and arrange data with Factor analysis. (3)When observing the preference of children picking different sort of toys, confirm the attractive factors for playing games continuously by arranging the possible playability with experts.(4)The operating time and frequency of playing toys would be recorded in the experimental procedure.(5)Study if there was preference of different temperament children for toy categories, and built the connection between the playability of toys and temperament of children. This study builds the relationship between child temperament and toy categories in order to discuss the playability of toys for children based on different temperaments. It provides childhood educator a reference to choose toys, but also a design guideline for toy designer.

Keywords: temperament, toy, preference

7D - Packaging

COGNITION AND PRODUCT DESIGN FEATURES OF EMOTIONAL BRANDING (13)

Hui Yun Yen *, Po-Hsien Lin, Rung-Tai Lin

Companies try to employ shapes that are both emotionally appealing and compatible with the brand's image of aesthetics in generating favorable consumer responses. Existing research on branding and product design have demonstrated the importance of emotions. Consumers may base their evaluations of a brand extension on their subjective affective reactions toward the products. In this research, the authors choose products from the emotional branding survey to be the stimulus samples for investigating the product design features. The purpose of this study is to discover the relationship between the brand and the product, and to generate specific guidelines for a product's emotional design characteristics (Attractiveness, Beauty and Creativity) in the future. There were three steps in this study. They are listed as follows: The first step involves the selection of sixteen brands from fifty public brands by the experts to survey brand awareness. The second step was finding the five tops emotionally appealing brands from the above sixteen brands through a consumer survey to understand brand preferences. The third step was finding products from the four tops emotionally appealing brands to analyze the product design features. The findings are listed as follows: (a) Most of the emotionally appealing brands have over 50 years of brand history. (b) Emotionally appealing brands benefit more strongly from user recommendations and repurchase. (c) Product design features of emotional brand are the following: attractiveness, beauty and creativity. The results from this study can provide a guide for future product design development endeavors and growth of an aesthetic economy.

Keywords:Emotional Branding, Product Design, Emotional design characteristics.

KANSEI ENGINEERING APPROACH FOR CONSUMER'S PERCEPTION OF THE KETCHUP SAUCE BOTTLE (55)

Nasser Koleini Mamaghani *, Elnaz Rahimian, Seyed-Reza Mortezaei

Day by day, consumers look into more high quality products to choose and pay more attention to details such as sensual value. To fulfill this essential requirement of consumers, it will be necessary to progressively develop new products with dual nature addressing both functional and emotional needs. Kansei engineering is a successful methodology for gathering and analyzing the relations between consumers' impressions and products' properties. In Iranian food market, different food products with huge variety in type, taste, shape, size, packaging, and so on are available to consumers. A different approach to include consumers' desire and feel is highly appreciated in Iranian food business. Such a strategy will be developed to fulfill customers' feelings in order to attract them to purchase the food product. In Iran ketchup sauce are so much popular. Therefore, ketchup sauce bottle has been selected as a case in current study. 31 Kansei words and 8 different types of sauce bottles with different shapes and function were selected. All experiments were conducted in city of Tehran and 47 people participated in the study, comprising 23 men and 24 women in ages ranging from 20 to 50 years old. 5-point semantic differential scale was considered to determine the relations between products' features and adjectives. The data were analyzed using SPSS software by multivariate statistical techniques such as factor analysis. The expected results and findings can provide a reference to make decisions on the properties of developing new products, which has great impact on future studies.

Keywords:Kansei Engineering, Semantic Differential Method, Factor Analysis, Sauce Bottle, Packaging Design.

A STUDY ON THE IMPRESSION OF PACKAGE DESIGNS FEATURING WOODGRAIN PRINTING (87)

Hiroki Sato *

This study sought to examine the impression of product package designs featuring woodgrain printing through experiments and to find out impression differences they give depending on their patterns and printing methods. In particular, it focused on the "authentic" impression of the woodgrain patterns. The experiment used 15 samples with different combination of sheets with various woodgrain patterns or printing methods, shapes (box package), different pattern directions, etc. 100 male and female participants aging from 20s to 70s evaluated their impressions from the viewpoint of three evaluation items, "high-class", "beautiful", and "authentic", through paired comparison tests. The test results were then put to the analytic hierarchy process and interval analytic hierarchy process. The analyses clarified the following features: 1.The woodgrain patterns printed with the new printing method obtained high score in the "authentic" and overall evaluations; 2.Different age groups and genders demonstrated different evaluation tendencies in assessing the "beautiful" and "high-class" features; 3.No significant difference was observed between the evaluations for sheets and boxes; 4.As for the printing method for the box side, participants found it more authentic-looking when the pattern on the top seamlessly continues to the side. 5.The "high-class" evaluation item was found to be prioritized above the "beauty" and "authenticity".

Keywords:Package Design, Woodgrain, Impression, authenticity

ANALYSIS OF COMMON COGNITION OF IMPRESSION AMONG JAPANESE FONTS AND TEA BEVERAGE PACKAGING (122)

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The purpose of the present paper was to investigate the influence of various cognitions regarding package design on consumer behavior. In considering cognitions concerning product preference, we focused on commonalities between impressions of packaging components, especially typeface design and product characteristics. In Study 1, we developed a scale for evaluating the impression of Japanese fonts using the semantic differential method. Exploratory factor analysis indicated that our scale has three subscales: Activity, Aesthetic preference and Legibility. The results revealed that our factor, "Aesthetic preference," was similar to the "Evaluating" factor in a prior sca- le. In Study 2, we conducted the principal examination using the scale developed in Study 1. Participants (N = 303) responded to a questionnaire that included 12 pairs of adjectives on a 7-point scale to determine their impressions of four kinds of Japanese fonts and four kinds of tea beverages. Structural equation modeling indicated that there was a partial scalar invariance, with two items having differential item functioning for the evaluation of impressions between Japanese fonts and tea beverages. These findings indicate that people have common cognitions of impressions regarding the shape of typeface design and product characteristics.

Keywords:Typeface Design, Product Characteristics, Semantic Differential Method, Commonality, Simultaneous Analysis of Several Groups.