Three heuristic approaches for predicting future lifestyles

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Abstract: 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.

1. INTRODUCTION

As a very good example of experiencing the coming world in our current daily lives, people watch science fiction movies that provide amazing visions of the future. One well known movie series and its popular example of future technology is the transporter in the Star Trek universe. Wikipedia (2014a) describes that "Transporters convert a person or object into an energy pattern,

then "beam" it to a target, where it is reconverted into matter". Although the transporter is a fictional teleportation machine in reality, it encourages scientists to discover all potentiality to afford as well as to deny it. In this case, future scenario gives people insights to imagine future technology. Not surprisingly, it is what industrial designers do every day.

For innovation, sometimes it is necessary to imagine future lifestyles in order to design corresponding products, services, or systems that will come true after years. 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. For easily predicting future lifestyles, this paper proposes three heuristic approaches. They are Analogical Reasoning (AR), Timeframe Reasoning (TR), and Causal Relationship Reasoning (CRR). The author has both graduate and undergraduate students in Industrial Design apply the three approaches to test their usefulness.

2. LITERATURE REVIEW

2.1. Predicting Future Lifestyles

In science, a prediction must be a rigorous and accurate statement that points out what will (not) happen under certain conditions. A prediction is made scientifically, for example, through repeatable experiments or observational studies (Wikipedia, 2014a). Shuttleworth (2009) discusses how prediction is made in several disciplines including medicine, physics, astronomy, and archaeology. For example, Einstein and Hawking apply mathematical theories to predict how the universe behaves based on their thoughts. Quantitative models powered by computer technology now can enormously and accurately predict weather, natural disasters, economy, and political survey. However, any successful future prediction relies on extensive research ranging from history, current trends, long-term environmental changes, technology advancements, regional and international political evolution and more (FutureTimeline.net, n.d.).

Because this paper specifically focuses on predicting future lifestyles, the author hypothesizes that future is predictable based on historical contexts and any future lifestyle is the extension or the contrary of the current one. This hypothesis is partially founded on a pseudoscience called "psychohistory" derived from the Foundation fiction series by Isaac Asimov. It says that, in the fiction, historical events can be theoretically remodeled by a mathematician to simulate history in the present as well as extrapolate the present into the future (Wikipedia, 2014b). Furthermore, the website of Business Insider posts 15 trends that are shaping the future. Among the 15 trends, seven are shown in Table 1. For example, 90% of all internet traffic in 2017 will be video. People will start to record or measure every move they make (SAP, 2013). Obviously, future lifestyles are exactly the extension or the contrary of the current ones.

2.2. Analogy

The use of analogy is to transfer relational information from a known domain, to a different domain that needs answer or explanation (Vosniadou & Ortony, 1989). The identification of relational information among possible relations of the two domains results in the creation of an analogy (Casakin & Goldschmidt, 1999). To simplify, an analogy can be regarded as a likeness of relation. For example, A : B :: C : D is interpreted as A is related to B like C is related to D. This formula implies that there is a higher or more abstract concept that makes equally well for A : B and C : D. When analogizing in many cases based on this formula, A, B, and C are given and D has to be determined (Pierce & Gholson, 1994). To solve a specific problem, analogical reasoning makes people retrieve information of former problems and corresponding solutions as a means for

Table 1: Examples of future lifestyles (SAP, 2013)

Present Lifestyles	Future Lifestyles
■ 29% of Millennials find love through Facebook while 33% are dumped via wall posts or text messages.	■ Social media makes it a lot easier to break up with people.
■ Typical mobile users check their phone 150 times per day.	■ People will check their phones every 9 minutes (or stare at their phones longer).
■ People are watching more and more video online.	■ 90% of all internet traffic in 2017 will be video.
■ 66% of Millennials will look up a store if they see a friend check-in.	■ People will be curious about what our friends do and where they go.
■ Millennials trust strangers over family and friends. They lean on user-generated experiences for purchase decisions.	■ People will listen to complete strangers when deciding what to buy.
■ Wearable devices have grown by 2 times month over month since October 2012.	■ People will start to (record or) measure every move they make.
■ The amount of time parents spend with their children continues to go up in the US.	■ Dads will be getting better about sharing the housework.

searching the target solution. Scholars believe that analogical reasoning is the core element of problem solving and creative thinking (Ball, Ormerod, & Morley, 2004).

The application of analogical reasoning is prevalent academically. In science and engineering, not surprisingly, analogy is a critical approach for organizing schemes, such as Moody charts and Periodic Table. In creative thinking, analogy plays an essential role. For example, disassembling a watch as a case review to figure out how to mix fuel and air in the car is absolutely a fruitless exercise for students in Mechanical Engineering (McAdams & Wood, 2002). Likewise, students in Industrial Design realize that a bicycle helps the human body to move further and faster than before with convenience. By implication, a latest computer will help the user to complete more tasks and faster than before with less effort (Hey et al., 2008). Actually, design problems are commonly viewed as prototypical cases that are either complicated or ill-defined. Accordingly, designers rely on analogical reasoning. That is, prior knowledge and experience helps designers to search for practical solutions (Chi, Feltovich, & Glaser, 1981).

Gentner and Markman (1997) state that analogical reasoning is the process of mapping knowledge from one situation to another. This mapping fosters new inferences and promotes insights for solving problems. The capability for solving problems is more creative when the reasoning maps two very different domains at the first glance. Moreover, there are theories, methods, or tools established based on analogical reasoning. One well known example is the Theory of Inventive Problem Solving (TIPS) or TRIZ. It is an analogy-based problem-solving theory as well as an idea-generating method applied in Mechanical Engineering and Product Design. TIPS creatively maps design problems and working principles derived from a large amount of patents of U.S.S.R. It makes it possible that design principles have proven successful in the past can be applied to solve new problems (Altshuller, 1984).

3. THREE APPROACHES

3.1. Analogical Reasoning (AR)

   AR provides a simple way of imagining a specific future lifestyle. Its reasoning formula is "A1 : B1 :: A2 : B2". For example, as shown in figure 1, assuming that A1 is defined as a carrier pigeon, B1 is a postman who drives a mail truck, A2 is a fax machine, and B2 is unknown. One designer can think about the difference between a postman and a carrier pigeon, and then apply the difference to redesign a fax machine as well as to define B2. If the designer assumes a postman differs from a carrier pigeon in professional human resource, B2 could be express service involving human deliverer such as DHL. If the difference between a postman and a carrier pigeon is systematic process, B2 could be an email system that we use nowadays. However, if the designer feels that B2 just defined is not so futuristic, what he or she needs to do is to replace A2 with B2 and then redo the reasoning process over and over again until good ideas generated.

   This research finds that two undergraduate students in Industrial Design can apply AR to efficiently think out uncommon but reasonable future lifestyles. For example, one student came up with that the difference between a fax machine and a postman is micro-electronic application. That is, a bigger mail truck evolves into a smaller fax machine and a postman is replaced by wire networks. Hence, rather than larger computer monitors or cell phone screens, people will check emails or surf online on their clothes or skin in the future. The other student described DHL delivers in a way that directly contacts or touches customers. This is what USPS seldom does. So, rather than typing texts or sending emails to friends on a touch screen, in the future, people will talk to their cell phones that send their voice to their friends. And then those friends will listen to the voice messages based on his or her best timing.

3.2. Timeframe Reasoning (TR)

   The formula of TR is defined as "Now > Next > Future > Ideal". The symbol ">" here indicates "progress" rather than "more than". To predict a specific future lifestyle or a design idea in the future, three items including *Now*, *Next*, and *Future* must be well defined by designers while *Ideal* is unknown. One designer needs to think about the difference between any two of *Now*, *Next*, and

Carrier Pigeon		Postman		Fax machine		Express Service / Email System / ?
A1	:	B1	::	A2	:	B2

Figure 1: Examples of Analogical Reasoning

Future. Then, *Future* is upgraded based on the difference in order to define *Ideal*. Similar to AR, if the content of *Ideal* is not satisfied, the designer should regard *Next*, *Future*, and *Ideal* as well-known contents and then apply the reasoning process over and over again until the result (new *Ideal*) is acceptable. Alternatively, the designer can regard *Future* as unknown. Afterwards, *Ideal* is deteriorated based on the difference in order to define *Future*.

Figure 2 shows examples of TR that illustrates the advancement of Iron Man. Since Mark II, each type of Iron Man is designed for solving the primary problem of the previous type. For instance, Mark I's problem is that Tony needs Yinsen's help to suit it up in the cave. Then, Mark III with the suit-up gantry indicates that Tony cannot bring it elsewhere. Subsequently, Mark V is portable as a suitcase but Tony needs Hogan's help to carry it. It is amazing that Mark VII can rapidly and precisely suit up on Tony. However, it is too bulky. As a result, Mark XLII, the latest type of Iron Man, is designed for making it modular and smaller. Obviously, the difference between any two consecutive types of Iron Man is that the new type moves easier and suits up faster. Therefore, it is possible to generate ideas of new Iron Man based on TR.

In this case, three undergraduate students in Industrial Design applied TR to generate ideas of new Iron Man. One student proposed Mark XLII's problem is that it works well only after it assembles as a complete Iron Man. The new Iron Man will make it possible that its modules operate, such as attack and defense, individually and collaboratively. Another student presented that the new Iron Man, one or few parts, will enable to suit up on different people for transporting them or saving their lives. The other student mentioned that Tony needs to build up several different types of Iron Man with different functions. It obviously takes time and expenses resources. Therefore, Tony will apply modular design to the new Iron Man series. That is, for example, there is a minimum of 20 modules any group of which can assemble different type of new Iron Man with specific function. Besides, after one module suits up on Tony, another module can suit up on it. The

Mark I	Mark II	Mark III	Mark V	Mark VII	Mark XLII	
Now	> Next	> Future	> Ideal			
	Now	> Next	> Future	> Ideal		
		Now	> Next	> Future	> Ideal	
			Now	> Next	> Future	> Ideal
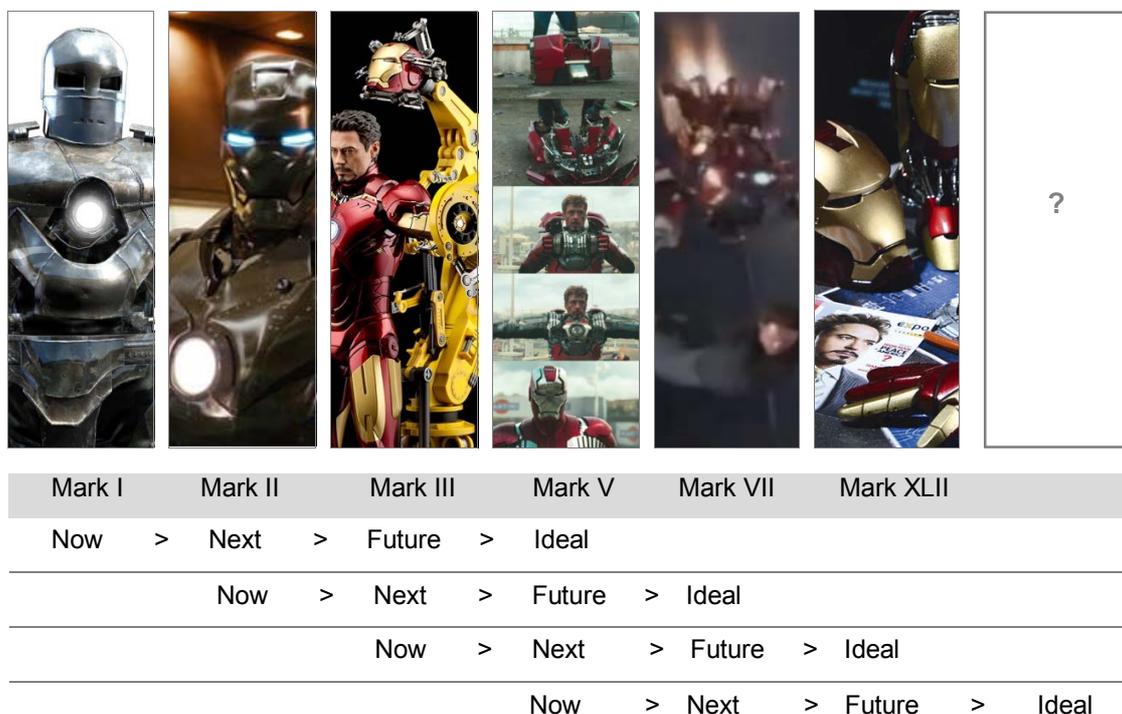
Figure 2: Examples of Timeframe Reasoning

other modules or parts that do not suit up on Tony are just with him in order to assist or protect him.

3.3. Causal Relationship Reasoning (CRR)

CRR is apparently used to infer the relation between cause and effect not only in the past or right now but also in the future. Its formula is "Cause 1 > Effect 1 = Cause 2 > Effect 2". Again, the symbol ">" here means "progress". When CRR is applied, either Cause 2 or Effect 2 is unknown while the rest must be defined by the designer. The designer needs to expand on the relationship between Cause 1 and Effect 1. Then, according to the relationship, the designer proposes the most likely Effect 2, if unknown, based on Cause 2 that is just defined. Different from AR and TR, if the resulting inference is not satisfied, better Cause 1 and Effect 1 are needed to replace the original set. The designer needs to start over the reasoning process rather than redoing it over and over again.

Figure 3 shows examples of CRR for inferring future lifestyles. These are done by two undergraduate students in Industrial Design. For instance, because any driver will probably encounter or involve in traffic accidents at any time in the future, it is necessary to install and use dashboard camera at all times in order to protect his or her rights and interests. By the same token, because any woman takes risks walking at night or in dangerous area, it is necessary to install and use "walking camera". Actually, the idea of walking camera not only secures the owner but also helps to build the street view, similar to that of Google Map, based on the viewpoint of a passenger in addition to a car. The second example relates delivery to shopping. For instance, if someone buys a product online at home, the product will be delivered to his or her home. In the same way, if someone buys a product on a touch screen on the way to somewhere, the product should be delivered, as soon as possible, to the person on the way. This service will absolutely provide consumers a better shopping experience.

Traffic accident		Dashboard camera		Personal security		Walking camera
Cause 1	>	Effect 1	=	Cause 2	>	Effect 2

Shopping at home		Delivery to home		Shopping on the way		Delivery to individual
Cause 1	>	Effect 1	=	Cause 2	>	Effect 2
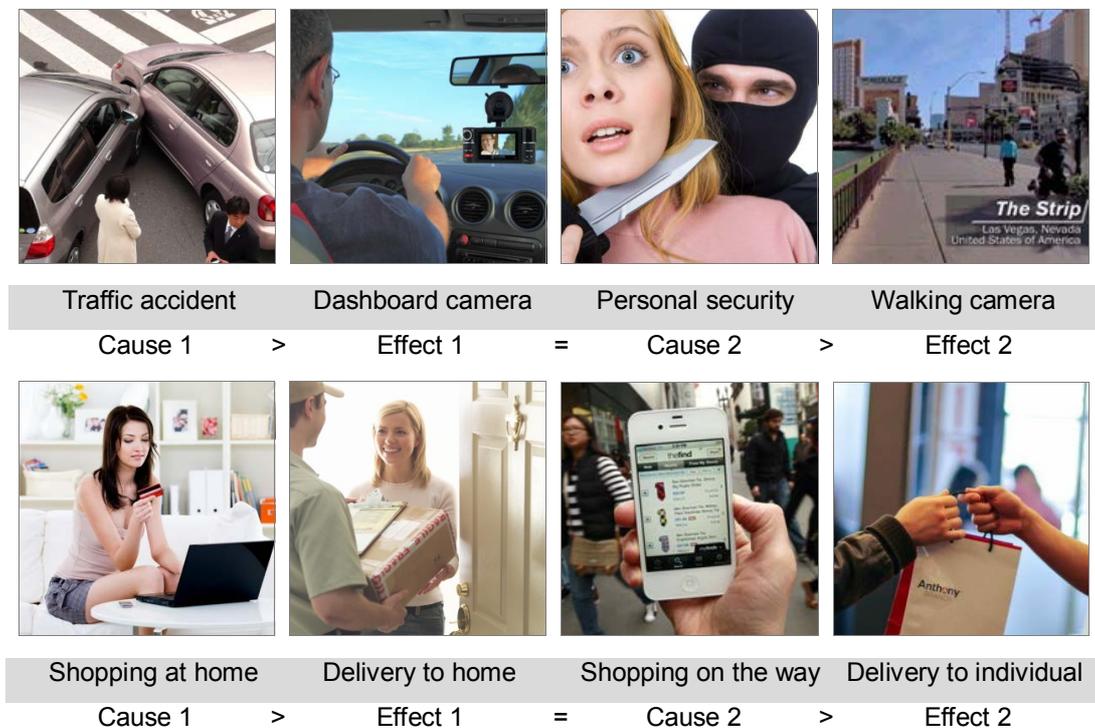
Figure 3: Examples of Casual Relationship Reasoning

4. CONCLUSION AND DISCUSSION

This paper presents three approaches, including AR, TR, and CRR, for primitively reasoning future lifestyles. The three approaches have been taught in several courses including Sensational Product Engineering, Form Design, and Color Design. Many graduate and undergraduate students apply them to generate ideas of vivid future lifestyles. These lifestyles range from product concept such as car styling and car interior functions to future trends such as color schemes and living habits. According to the author's practical application in class, AR, TR, and CRR are capable of helping design students to think about design or product ideas in the future.

However, the three approaches need to be adjusted and improved for better effectiveness. For example, these approaches are only tested by relatively few groups of students so far, more tests involving more subjects dealing with different types of reasoning or future trend are required next. It is the only way, after all, to make these approaches become methods that are more reliable and can be applied in most cases. In addition, these approaches imply a novel way of visualized thinking. In fact, they enable visualized reasoning that is different from and more powerful than Brainstorming or Brainwriting for idea generation. For this valuable and creative purpose, the format and process of these approaches need to be redesigned. The author plans to make it more clear and manageable as a set of worksheets or application program in the near future.

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