STUDY OF CONSUMER'S UNCONSCIOUS REACTION TOWARDS THE USE OF ANTHROPOMORPHIC APPEARANCE OF AI: AN EYE-TRACKING EXPERIMENT

Irina Ene
Bucharest University of Economic Studies, Romania
E-mail: irina3ene@yahoo.com

Abstract: With disruptive technologies constantly emerging, the impact of artificial intelligence is becoming a relevant topic nowadays. An extensive investment in business intelligence support systems has been recognized as one of the top priorities of most successful managers. However, these constant internal changes of systems and management styles rarely happen smooth and natural, and frequently they trigger serious issues for the companies and its interactions with their customers. Implementations like automated call centers and online payment systems are just mainstream examples which can be used to show the numerous implications of the intrusion of artificial intelligence systems in our everyday life. With the increasing use of various forms of technology, an ongoing discussion has emerged about people's willingness to accept these technological trends. There are, of course, both pro and counter arguments to be discussed. In this article there are presented the results of an eye-tracking experiment about the reaction of consumers towards several forms of artificial intelligence. It has been shown that consumers have the tendency to react more at unexpected situations involving robots and forms of artificial intelligence.

Keywords: robots, consumer perception, eye-tracking analysis, artificial intelligence, innovation;
J.E.L. CODES: O30, Q01

1. Introduction

Studies have shown that it takes up to 5-8 years for a company to realize that it needs to redefine everything they had believed to be innovative and to align itself with the new optimizations available on the market, in order to survive and to maintain a competitive advantage (Silahtaroğlua, Alayoglub, 2016). They depend both on the employee's and customer's resistance to change and their tolerance to technological advances. The development of the PC and cell phones in the '90s and smartphones in the' 2000s are some of the drastic changes that the business world has experienced in the recent decades. Side by side with the development of the technology, companies had to change their approach to meet the new requirements which were leading to success. The way consumers behave has been also

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

55

STUDIA UNIVERSITATIS ECONOMICS SERIES
"Vasile Goldiş" Western University of Arad

Ene, I., (2018)
Study of consumer's unconscious reaction towards the use of anthropomorphic appearance of AI: an Eye-Tracking experiment

influenced and companies have found out that it is relevant to understand which innovations are meaningful and which are largely unimportant.

The development of technology has many advantages, such as cutting costs, increasing efficiency, saving time, attaining a competitive advantage through innovation, etc. Companies gain more profit, by replacing analytical workplaces with automated one. The same tasks that used to be done by humans are now done faster and more cost efficiently by several intelligent systems. By this, companies create competitive advantage by being 24/7 available for consumers with the help of innovative, automated systems.

The challenge, however, is to increase the customer satisfaction (East et al., 2008), because in most cases robots do not have the answers to all the questions and they cannot interact as flexibly as humans. They are also unavailable in the case of a system failure, which can be difficult to explain to the inpatient customers waiting on the phone. The jobs that were once lost will no longer be so attractive in the situation in which the company decides to shift back to people instead of software programs. The sense of insecurity among employees from other departments will lead to a decrease in motivation, which is also an important counter argument.

2. Literature Review

2.1. Changes in the technological environment of the consumers

A study by McKnight (McKnight et al., 2002) has analyzed the impact of implementing disruptive technologies on people's willingness to use these technologies. They emphasize the crucial role of initial confidence in the early phase of implementation, which overtime shifts to reliability and ultimately to belief. In the final phase, the subject will come to accept and trust this technology. Lee and See contribute to this theory and explain that if a system is untrustworthy in the beginning, it will not be used and if it is not used, the subject will not make contact with its abilities. Therefore the initial confidence is unlikely to grow (Lee and See, 2004).

In order to understand the development of disruptive technologies, in the following there are presented several examples of technologies which are already influencing consumer behavior to a relevant degree and which will become even stronger influencing factors in the future. Among these, we focus on the chatbots, the ad networks, the social media influencers, the digital optimization, the virtual and augmented reality, the cloud storage, the Internet of Things and personalized analytics.

The chatbot is a computer program designed to simulate an intelligent conversation with one or more human users either in audio or in a writing manner, in order to

56

sciendo

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

substitute the human answers to frequently asked questions (e.g. troubleshooting steps) (Jia, 2009). With the development of automation software and chatbots in particular, companies today can more efficiently communicate with their customers. This increases the expected quality of the provided service, as problems need to be effectively addressed, since the automated system lacks flexibility and deep understanding. As customer service tends to be considered a priority by companies lately, this technology continues to evolve and consumer habits tend to adapt accordingly. However, when faced with the trends and changes in consumer behavior, it is really hard to enhance the consumer experience by using automatization.

The advertising networks also have a strong influence on consumer behavior today. An ad network is a company that connects advertisers to websites that want to display their ads. The main function of an ad network is to aggregate the publisher's ad space offerings and match the advertiser's demand (Lin, Hsu, 2009). The two big users of this technology are Google and Facebook, but Instagram or Snapchat ads are also becoming more and more visible. The use of such ads has shown that there is a change in the search habits of consumers. In the past, consumers would prefer Google only to search, but today they have a tendency to use both networks, Google and Facebook, to pick something. Moreover, companies need to understand their advertising material and adapt their advertising media to the preferences of their customers.

The social media "Influencers" also play a big role today. With the increasing importance of social media networks in our lives, people have started behaving differently, thinking differently and buying differently (Tantau et al. 2018). Studies show that every person reacts faster than before. There is an 8-second average increase in attention, which means companies should enhance the purchase intent more quickly. In addition to this, consumers are nowadays addicted to social media content. The coordination between the customers and the content they want is crucial for building the brand for a company. Even though a company decides not to use media content for advertising, it should be noted that in many cases, customers want to buy things just to show it in a photo online, which means that today's buying decisions vary from the ones from two decades ago.

Digital optimization describes the process of applying search engine optimization techniques to web pages. The strategy of adding relevant information to the site is of great value today, while using keywords will fail. Responsible and targeted content management can increase organic search results and attract more visitors to the site. Businesses can create shorter, meaningful domains that create simpler paths to content that is normally hidden deep in their Web site and can only be found through search. Digital optimization is a direct means of promoting direct

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

57

content navigation and provides the opportunity to develop a deeper relationship with customers. More simply, digital optimization allows customers to type what they are looking for followed by the ".brand" domain of the organization they are looking for. They discover content faster and easier and third-party providers are avoided, creating a strong branding for the marketer (Rognerud, 2014).

In the case of augmented reality, graphics, sounds, and touch feedback are inserted into our natural world for an enhanced user experience. In contrast to virtual reality, which requires a complete virtual environment, augmented reality uses the existing natural environment and simply overlays virtual information. As both virtual and real worlds coexist harmoniously, augmented reality users experience a new and improved natural world in which virtual information is used as a tool for everyday activities (Metz, 2012). Some of the key ways for brands to engage with customers are high quality virtual reality and augmented reality content. Whether it's a new camera filter or a virtual music video, the development of virtual experiences can provide consumers with a brand new experience.

Cloud storage refers to storing data on a remote server from which it can be downloaded, edited, or added from anywhere, as needed. The rise of cloud technologies has also developed the concept of Software as a Service (Panker et. al., 2007), which enables companies to outsource their data and software to a service provider. Storing data in a central cloud allows companies to access it, analyze it, and improve their algorithms to better serve their customers. Cloud storage makes it easier for businesses to monitor consumer behavior. Services like social media or music streaming are just some of the benefits that the cloud offers. As cloud storage becomes more popular, the need for local storage will decrease. Devices that need access to data can connect to the server and retrieve it over the network. The cloud has already changed the way consumers use devices like smartphones, tablets or laptops.

The Internet of Things describes a home or work environment in which most devices and systems such as the refrigerator or lighting system are connected to the Internet. This leads to smart homes where most of the work is done by the appliances themselves (Hassan, 2018). Since this automation gives the consumer a lot of time, it is likely that a change in consumer behavior will be triggered. Constant networking also means a tremendous amount of data for businesses to work on to provide their customers with a very personal experience. The future generation of wearables allows the consumer to even automatically pay for goods when they exit the store.

Personalized analytics enable companies to better target customers, by storing cookies of their searching history (Kotu & Deshpande, 2015). Consumers look up a product on one website and then see other shopping sites offering this or similar

products. Predictive Analysis instruments enable companies to offer their customers what, when and where they want it. With access to offline behaviors, marketing will evolve into a behavioral analysis space where every single person will be treated as an individual customer.

2.2. The development of different forms of artificial intelligence

The term "artificial intelligence" was first mentioned by John McCarthy at Dartmouth College in 1955 and was defined as the science and technique of producing intelligent machines (McCarthy, 1955). Other names have been proposed for the area, such as Computational Intelligence, Synthetic Intelligence or Computational Rationality.

A more recent definition was given by Swarup, (2012) who states that artificial intelligence (AI) is the intelligence of machines and the field of computer science that aims to create them. Artificial intelligence is the science and technology to build intelligent machines, especially intelligent computer programs. In general, computers should be used to understand human intelligence, but AI is not limited to biologically observable methods (Swarup, 2012). However, what is meant by intelligence is also highly relevant. Different types and degrees of intelligence occur in humans, many animals and some machines. According to McCarthy (1955), intelligence can be defined as the computational part of the ability to achieve goals in the world. The simulation of intelligence has been broken down into a number of specific sub-problems. These consist of specific characteristics or abilities that researchers would like to see displayed on an intelligent system.

Turing (1950) has developed a special theory to determine if a machine is intelligent or not. In 1950, he has discussed the conditions for keeping a machine intelligent. He argued that if the machine pretends to be human for a specialized observer, then it should be considered intelligent (Turing, 1950). This test would satisfy most people, but not all philosophers. A machine that passes the Turing test should certainly be considered intelligent, but other machines could still be considered intelligent without the ability to imitate a human being.

According to Bughin et al. (2017), AI generally refers to the ability of machines to display human-like intelligence - for example, solving a problem without the use of hand-coded software that contains detailed instructions. There are several ways to categorize AI technologies, but it is difficult to make a list that is mutually exclusive and exhaustive overall because people often mix and match different technologies to create solutions to individual problems. These creations are sometimes treated as independent technologies, sometimes as subgroups of other technologies and sometimes as applications. Some frameworks group AI

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

59

STUDIA UNIVERSITATIS ECONOMICS SERIES
"Vasile Goldiş" Western University of Arad

Ene, I., (2018)
Study of consumer's unconscious reaction towards the use of anthropomorphic appearance of AI: an Eye-Tracking experiment

technologies into basic features such as text, voice, or image recognition, and some group them into business applications such as e-commerce or cybersecurity.

A division of artificial intelligence in different species has already been tried by several experts. The criteria of classification are of great importance here. According to the social-intelligence hypothesis, we discover two faces of artificial intelligence systems: strong AI and weak AI. Strong AI systems are, in theory, the ones that can actually duplicate the human brain, while weak AI systems can only simulate human intelligence.

Examples of weak AI systems are Siri or Alexa. Even advanced chess programs are considered weak AI. This categorization seems to be due to the difference between supervised and unattended programming. Speech-activated help and chess programs often have a programmed answer. They feel things as they know them and classify them accordingly. This is a human-like experience, but that's just a simulation. If you ask Siri to call the mother, the programming understands keywords like "mother" and "call". The algorithm responds by calling the mother, but it only responds to its programming. In other words, it does not understand the deeper meaning of the words (Bughin et al., 2017).

The idea of strong AI has not become reality yet. In case of strong AI, a machine should react in such a way as a human. When you talk to a person, you can assume that someone would answer with a question, but you do not know that for sure. For example, when a machine hears "good night" associates this with turning the light off, it would mean that the computer has the ability to decide to turn off the light based on their own thinking.

An analysis conducted by McKinsey & Company in June 2017 divided the forms of artificial intelligence into 6 classes: Machine Learning, Computer Vision, Natural Language, Autonomous Vehicles, Intelligent Robotics, Virtual Agents (Bughin et al., 2017). Machine learning is the most widely used use of artificial intelligence today. Machine learning assumes that computers learn to recognize things themselves. The fields of application of this form can be very different, which is a great advantage of this type. Moreover, the discussion about using robots instead of humans for certain jobs has as background the machine learning ability of artificial intelligence (Sonka, et al., 2008).

Computer Vision looks at how computers can be made to extract and understand basic information from digital images or videos (Leo et al., 2017). From the point of view of engineering, it attempts to automate tasks that are possible for the human visual system. Computer vision tasks include methods of acquiring, processing, analyzing and understanding digital images and downloading high-dimensional data from the real world to generate numerical or symbolic information, for example in the form of decisions. For example, learning 3D shapes

60

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

was a challenging task in computer vision. Recent advances in deep learning have enabled researchers to create models that can seamlessly and efficiently generate and reconstruct 3D shapes from single or multiple depth maps or silhouettes.

The "natural language" form of artificial intelligence deals with the interactions between computers and human (natural) languages, especially with the programming of computers to process large amounts of natural language data. Challenges in natural language processing often include speech recognition (Van Engen & Mc.Laughin, 2018), natural language comprehension, and natural language generation. Some of the most commonly explored tasks in natural language processing are: syntax, semantics, discourse, and language. An example in which natural language processing is a major component is an automated online assistant that provides customer service on a web page. Other examples of natural language processors are Alexa, Siri or Google Home.

The self-propelled vehicles are machines that are able to recognize their surroundings and navigate and park without human input (Fagnant & Kockelman, 2015). Autonomous cars use a variety of techniques to capture their surroundings, such as radar, laser light, GPS, odometry and computer vision. Modern control systems interpret sensory information to identify appropriate navigational paths as well as obstacles and relevant signs. Autonomous cars must have control systems that are able to analyze sensory data to differentiate between different cars on the road.

An intelligent robot is a form of artificial intelligence (AI) that can learn from and build upon its environment and experience. Smart robots can work with people and learn from their behavior. The number and types of tasks that can be automated or supplemented by software, robots, and other intelligent machines are increasing rapidly. Intelligent robots not only have the ability to do manual labor but also have cognitive tasks. Of course, most robots are used today in manufacturing. But they are also expected in hospitals, in offices for cleaning, in shops to fill store shelves, in houses to clean or to serve food in restaurants and to cook.

A virtual agent is a contact center feature that uses a virtual character created through computer generation, animation, and artificial intelligence as a customer service representative through the chat bot functionality. The intelligent virtual agent is able to answer customer questions and provide information about a company's products and services. For example, chatbots are considered virtual agents.

3. Methodology of Research

The ability to measure and understand unconscious reactions has changed the way companies are creating value (Buxbaum, 2016). In particular, marketing has to earn

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

61

a lot from such analyzes. At the beginning of the second millennium, such tools as eye tracking have become very popular in advertising design and PR.

The description of "eye-tracking" is understood to mean both the research technique and the instrument used to carry out this research (Rosca, 2017). First, this is an observation method that can register the point of view. Then, data about the dilation of the pupils can be collected. With the help of this instrument one can measure the time in which the eye of a subject has a certain fixation in a certain point.

Most importantly, this type of research measures the movements that cannot be controlled by will. Such reflexes are very relevant because they show unconscious, uncontrolled responses to various stimuli. As a result, the results are much more accurate and valuable, as they can be used in many applications. For example, companies can test the store shelves or advertisements to see what the subjects actually notice and what they do not.

The Eye Tracking Instrument includes many applications. For example, you can find out how long you look at certain so-called "areas of interest". It is important to analyze how many different elements such as the brand or slogan are observed in comparison with other elements such as price. More importantly, if there are such elements that can be misunderstood when viewing a commercial or reading a slogan.

What is actually of great importance is to find out which elements attract the most attention and which ones are the least and which stimuli actually activate the consumer's attention. Therefore, the most common marketing applications are: packaging testing, shelf item positioning testing, TV spot and street panel research, web site research, shelf product shelf testing, booklet testing, or even computer product development research.

Our eye tracking study has been designed to analyze consumers' reactions to various forms of artificial intelligence. For this, a photo collage has been created, containing different situation in which artificial intelligence has been involved. The collage has been displayed for 10 seconds to a sample of 20 participants. The sample has included 18 female and 2 male respondents with ages between 23 and 30 years. The collage has contained four photos describing four situations in which robots appear instead of humans: a robot that cleans out, a robot that seems romantic, a robot with secretary duties, and a robot that serves food in a restaurant. The role of this experiment is to find out which situations are considered strange by the subjects and which normal. This collage has appeared twice in the experiment. First, we have analyzed the unconscious reaction of the subjects. Before the second display, the subjects have been informed that they will see a photo, after which they should answer to a question related to it. After this message, the subjects will

STUDIA UNIVERSITATIS ECONOMICS SERIES
"Vasile Goldiş" Western University of Arad

SUES

Ene, I., (2018)
Study of consumer's unconscious reaction towards the use of anthropomorphic appearance of AI: an Eye-Tracking experiment

be ready to analyze each situation in more detail, in order to be able to answer the question afterwards. This means that they now consciously distribute their attention in an equal way to all four photos of this collage in order to be able to make a selection. After seeing the same collage again, a question has appeared and the respondents had to choose which from the 4 photos represents the most common situation for a robot, according their opinion.

Based on the results, we have analyzed the unconscious versus the conscious focus of attention and the interpretation of the answers to the question.

4. Results of the research

The eye-tracking instrument transmits key performance indicators that can be used to perform quantitative analysis. In order to analyze the KPIs adequately, different areas are set up in the pictures. A field of interest, also referred to as AOI (area of interest), is an instrument for selecting sub regions of displayed stimuli and for calculating indicators specific to those sections of the overall photograph. The KPI analysis shows the indicators for all selected parts. The performance indicators will be briefly explained.

The sequence shows the order in which the areas were viewed assuming that number 1 was first observed. The entry time is measured in milliseconds and shows how long it took for a particular element to attract the eye and to be examined. Such elements that are important to be analyzed in case of this indicator are, for example, a logo or a price. The average fixation may also be presented in milliseconds or percentages and shows the sum of the fixations of a particular "area of interest" as a percent or value of the total number of fixations. The first fixation is also measured in milliseconds and calculates how much time a particular item has been examined for the first time. The dwell time shows how much time one has analyzed a particular point and is measured in milliseconds. This indicator includes the sum of all individual examinations. The hit ratio stands for the number of subjects who have observed at least once an "area of interest" and is calculated as an average between the number of people who looked at a zone and the total number of participants in the experiment. The revisits include the number of subjects who have looked at an "area of interest", then went were distracted by another item and then returned back to the same AOI. The fixation count is the number of fixations of subjects divided by the total number of subjects. If this indicator equals 1, then it is said that, on average, all subjects had a fixation on the particular AOI. If it is greater than 1, it means that the subjects have looked at the examination area several times, and if it is less than 1, it means that not all subjects have had a fixation on the considered AOI.

The Key Performance Indicators were collected and stored for each person who has

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

63

examined this collage. In the following, the average key performance indicators for each of the four predefined AOI will be examined.

The selected AOI for this photocollage are presented in Table 1. The remaining parts of the collage, which were not selected, will form the so-called "white space". We will leave the values of "white space" out of the analysis.

Table 1 Areas of Interest (AOIs)

Variable	Description of variable
AOI 001	Cleaning robot
AOI 002	Romantic robot
AOI 003	Robot as secretary
AOI 004	Robot as waiter

Source: Own determination of the variables

The analysis of the collage aims to compare four different possible roles of robots in the society. Because of this, other details and environments were ignored and only the areas with the robots were taken into account. The key performance indicators calculated in the photo collage are listed in Table 2.

Table 2 Key Performance Indicators for the Eye-Tracking Analysis

Variable	Sequence	Entry time (ms)	Average fixation (ms)	First Fixation (ms)	Dwell time (ms)	Dwell time (%)	Hit ratio (%)	Revisitors
AOI 001	3	989.4	287.7	296.6	1591.5	15.9%	100%	18/20
AOI 002	**2**	**904.4**	**296.6**	**276.6**	**1628.2**	**16.3%**	**100%**	**18/20**
AOI 003	4	3039.2	290.4	270.0	2016.5	**20.2%**	100%	**14/20**
AOI 004	5	3469.1	448.0	383.3	1776.5	17.8%	100%	20/20
AOI 001*	3	1857.6	258.2	253.3	1518.2	15.2%	100%	20/20
AOI 002*	**2**	**1026.7**	**267.6**	**225.0**	**1838.2**	**18.4%**	**100%**	**20/20**
AOI 003*	5	2017.6	293.7	321.6	1786.5	17.9%	100%	20/20
AOI 004*	4	1924.2	346.2	335.0	1694.8	17.0%	95.0%	19/20

Source: Own Research

Since the collage has been displayed twice, there are two rounds of results. The AOI001, AOI002, AOI003 and AOI004 correspond to the first view of the photo, while the AOI001 *, AOI002 *, AOI003 * and AOI004 * correspond to the second so-called conscious analysis of the photo by the subjects.

First, it can be noticed that the sequence is almost the same. In the case of the first preview of the photo, when the subjects have examined the photocollage for the first time, they had the tendency to look at the four photos in the following series: the robot that seems romantic (AOI002), the robot that cleans (AOI001), the secretary (AOI003) and finally, the waiter (AOI004).

After announcing the subjects that after the second preview of the picture they need to make a choice, they have looked at the photo again, this time deliberately focusing their attention. However, the sequence has not changed in a significant manner, having the following order: AOI002, AOI001, AOI004, and AOI005. The first AOIs, referring to the robot that seems romantic (AOI002), the robot that cleans (AOI001), have remained unchanged, while the last two have exchanged their sequence. What is important to note here is that the cutout AOI002, with the robot that seems romantic, was the first cut that was observed, which means that the subjects' attention was very fast addressed to this photo, probably due to curiosity or intrigue. The data shows that it took 904.4 ms on average for the subjects to watch the AOI002 area for the first time and 1026.7 ms for the second presentation of the same image (AOI002 *). The two durations are the smallest values compared to the other AOI, which means that the AOI002 and AOI002 * were the first snippets of collage viewed. This first fixation on this AOI lasted an average of 276.6 ms for the first preview and 225.0 ms for the second.

Secondly, the data shows that the AOI003 has been viewed for the longest time in the first round. With a percent of 20.2% at the "dwell time", subjects have spent the majority of the 10 second time examining the robot which seems to have secretary duties, followed by the waiter robot (AOI004) and only then, by the AOI002. However, the situation changes in the second round, when the AOI002* has been viewed for 18.4% of the total time, the largest percentage compared to the other AOI.

Finally, looking at the data of the "revisitors", one can see that for AOI003, only 14 out of 20 subjects have watched the analyzed area again. However, AOI003 has been the longest viewed with a dwell time percentage of 20.2%. This may mean that the subjects have analyzed this photo more than the others, and therefore a return was no longer necessary as they felt that they had already adequately analyzed the image. This does not necessarily mean that the situation in the image was not interesting enough.

While analyzing the responses to the question, the majority of respondents (60%) have answered that the robot that cleans is in one of the most common situations compared to the others. On the second place came the robot who is a waiter, with 35% of the responses. It is interesting that the situations in which the robots drive people-specific activities were at least preferred. Only 5% of respondents have

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

65

STUDIA UNIVERSITATIS ECONOMICS SERIES
"Vasile Goldiş" Western University of Arad

SUES

Ene, I., (2018)
Study of consumer's unconscious reaction towards the use of anthropomorphic appearance of AI: an Eye-Tracking experiment

thought that the close connection between a robot and a human appears as usual, and no respondents described the secretary as a common reality for a robot.

5. Conclusions

The use of artificial intelligence for marketing purposes is already a must for all innovative and successful companies around the world. Consumer expectations are now easier and better to achieve, with the help of all the tools available to marketers, such as neuromarketing tools.

Fortunately for the market analysts, the determination of the consumers' exact expectations or standards has recently been facilitated by the use of various neuroscience methods available to understand consumer behavior, thus offering compatible and optimal solutions to customer needs. Based on such experiments, the content of the commercials could be evaluated and changed, so that the end result could have a greater impact on the effectiveness of the marketing strategy.

Nowadays, it is becoming more important than ever to analyze the impact of artificial intelligence forms on our behavior as consumers, as in the last decade smart devices have become a big part of our lives. When you think about it, you use an application or program for most of the activities you do on a daily basis. While the benefits are very easy to see, the disadvantages can not be overlooked. From the use of personal information to job insecurity, the various technology leaps bring with them many risks and threats.

References

1. Bughin, J., Hazan, E., Ramaswamy, S., Chui M., Allas, T., Dahlström, P., Henke, N., Trench, M., (2017), *Aritificial Intelligence: The next digital frontier?* online at https://www.mckinsey.com/~/media/McKinsey/Industries/Advanced%20Electronics/Our%20Insights/How%20artificial%20intelligence%20can%20deliver%20real%20value%20to%20companies/MGI-Artificial-Intelligence-Discussion-paper.ashx; accessed on 05.11.2018;
2. Buxbaum, O. (2016), *Key Insights into Basic Mechanisms of Mental Activity,* Springer, online at http:// www.springer.com/978-3-319-29466-7, accessed on: 04.11.2018;
3. East, R., Wright, M., Vanhuele, M., (2008), *Consumer Behaviour: Applications in Marketing*, Sage, London;
4. Fagnant, D. J.; Kockelman, K. (2015), Preparing a nation for autonomous vehicles: Opportunities, barriers, and policy recommendations. *Transportation Research Part A: Policy and Practice,* 77, 167–181;
5. Hassan, Q.F. (2018). *Internet of Things A to Z: Technologies and Applications*. John Wiley & Sons. pp. 27–8. ISBN 9781119456759;
6. Jia, J. (2009), CSIEC: A computer assisted English learning chatbot based on textual knowledge and reasoning, *Knowledge-Based Systems,* 22(4) 249-255, https://doi.org/10.1016/j.knosys.2008.09.001;

66

sciendo

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

7. Kotu, V., Deshpande, B., (2015), *Predictive Analytics and Data Mining*, Morgan Kaufmann, Waltham, USA, ISBN 978-0-12-801460-8;

8. Lee, J.D., See, K.A. (2004), Trust in automation: designing for appropriate reliance. *Human Factors,* 46(1), 50–80;

9. Leo, M., Medioni, G., Trivemdi, M., Kanade, T., Farinella, G.M., (2017), Computer vision for assistive technologies, *Computer Vision and Image Understanding*, Volume 154, January 2017, Pages 1-15;

10. Lin, C.T.; Hsu, P.F. (2003), Selection of Internet Advertising Networks Using an Analytic Hierarchy Process and Grey Relational Analysis, *Information and Management Sciences,* 14 (2), 1-16;

11. McCarthy, John; Minsky, Marvin; Rochester, Nathan; Shannon, Claude (1955), *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence*, online at https://web.archive.org/web/20070826230310/http://www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html, accessed on: 04.11.2018;

12. McKnight, D.H., Choudhury, V., Kacmar, C., (2002), The impact of initial consumer trust on intentions to transact with a web site: a trust building model. *Journal of Strategic Information Systems,* 11(3), 297-323;

13. Metz, R. (2012), Augmented Reality Is Finally Getting Real. *Technology Review*, 2012, online at https://www.technologyreview.com/s/428654/augmented-reality-is-finally-getting-real/, accessed on: 06.11.2018;

14. Panker, J., Lewis, M., Fahey, E., Vasquez, M. J. (2007). How do you pronounce IT? *TechTarget*, online at https://whatis.techtarget.com/reference/How-do-you-pronounce-IT, accessed on 06.11.2018;

15. Rognerud, J. (2014). *Ultimate Guide to Optimizing Your Website*, Entrepreneur Press; Rosca, M.I, (2017), *Metode de cercetări de marketing utilizate în publicitate*, ASE, Publishing House, Bucharest;

16. Silahtaroğlua G., Alayoglub, N. (2016), Using or Not Using Business Intelligence and Big Data for Strategic Management: An Empirical Study Based on Interviews with Executives in Various Sectors *Procedia Social and Behavioral Sciences* 235, 208-215;

17. Sonka, M.; Hlavac, V.; Boyle, R. (2008), *Image Processing, Analysis, and Machine Vision*, Cengage Learning; Swarup, P. (2012), Artificial Intelligence, *International Journal of Computing and Corporate Research*, 2(4), online at https://www.ijccr.com/july2012/4.pdf, accessed on: 06.11.2018;

18. Tanţău, A.; Pelau, C.; Pop, M. (2018), Fake news in the energy industry, in: Pleşea, D., Vasiliu, C., Murswieck, A., Pamfilie, R., Dinu, V., Tăchiciu, L. and Olaru, M. (eds.) *Fourth BASIQ International Conference on New Trends in Sustainable Business and Consumption (BASIQ)*, Heidelberg, Germany, 11-13 June 2018. Bucharest: Editura ASE, pg. 204-210;

19. Turing, A. M. (1950), Computing Machinery and Intelligence, *Mind,* 433-460;

20. Van Engen, K.J., McLaughin, D.J., (2018), Eyes and ears: Using eye tracking and pupillometry to understand challenges to speech recognition, *Hearing Research,* 369, 56-66

Studia Universitatis "Vasile Goldis" Arad. Economics Series Vol 28 Issue 4/2018
ISSN: 1584-2339; (online) ISSN: 2285 – 3065
Web: publicatii.uvvg.ro/index.php/studiaeconomia. Pages 55 – 67

67