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Neuromarketing and Artificial Intelligence for Effective Future Business

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Abstract

Marketing is nothing but a decision making process from the marketer and the customer. It is a process happening in the brain of the persons involved it. Therefore neuromarketing is the concern for the marketer to understand the '*buybutton*' of the customer. Neuromarketing is a developing topic and area of marketing research. Neuromarketing is a discipline that adapts theories from neuroscience and applies them to the marketing science, economics and psychology. Neuro-scientific methods explain change in the consumer emotions in advertising elasticity or success. Artificial Intelligence is a computer-based logical analytical process that seeks to create computer systems to arrive at conclusions like the human intelligence. Artificial intelligence, machine learning is there to help the corporate operations and marketing teams have wide scope to convey massive value to AI's potential data. The emergence of AI, the combination with Neuro-marketing, the limitations may disappear and the tools and methods would be more accessible. Neuromarketing will be helpful in the formulation of the algorithm for AI and the future of the amalgamation is promising.

Key Words: Neuromarketing, Artificial Intelligence, Eye Tracking, Profound Hunting

Introduction

Marketing is nothing but a decision making process from the marketer and the customer. It is a process happening in the brain of the persons involved it. Therefore neuromarketing is the concern for the marketer to understand the '*buybutton*' of the customer. Neuromarketing is a developing topic and area of marketing research. Neuromarketing is a discipline that adapts theories from neuroscience and applies them to the marketing science, economics and psychology, to develop neuroscientifically sounded theories that shows the impact of marketing on target customer behavior. Neuromarketing is a method of investigation that is important because it uses neuroscientific theories and methods to gain access hidden information in the consumer. Such information is acquired through the perception of neural processes devoid of asking people openly for their thoughts, feelings, memories, assumptions or decision-making strategies. Neuromarketing is a field of study which is a promising discipline that gives the outcome of to develop new marketing theories or supplementing existing theories in marketing and related disciplines. Many neuromarketing scholars have published conceptual (Cruz, Medeiros, Hermes, Marcon, & Marcon, 2016; Fortunato, Giraldi, & de Oliveira, 2014; Plassmann, Ramsøy, & Milosavljevic, 2012; Schneider & Woolgar, 2012) articles in the area.

Neuroscience validates empirically the neuromarketing through the scientific data and helps the marketing researchers, who may develop new dimensions of marketing through neuroscientific methods by associating neuroscience with brain images and its functions.

The role of neuromarketing literature in validating marketing researchers in the field beyond the circle of experienced marketing scholars. Thus, there is a need to demystify neuromarketing and to inspire greater attention in actionable neuromarketing research, especially in academic outlets dedicated to the advancement of marketing science (Daugherty, Hoffman, & Kennedy, 2016). The neuromarketing helps to actualize the assumptions of the researcher and the customer by validating the data and resources empirically.

What is neuromarketing?

Neuromarketing is an interdisciplinary subject of integration of neuroscience and marketing. The concept was first coined and referred to by Ale Smidts in 2002 as "the study of the cerebral mechanism to understand consumer behavior in order to improve marketing strategies" (Boricean, 2009). However, in the last decade, many definitions of neuromarketing came out. Some of the scholars tried to define neuromarketing as "the application of neuroscientific methods to analyze and understand human behavior in relation to markets and marketing actions", while others assumed it as "a field that focuses on the marketing implications from understanding the interaction of cognitions and emotions in human behavior

based on neuroscientific methods" (Javor, Koller, Lee, Chamberlain, & Ransmayr, 2013,), "an extension of traditional marketing methods that seeks a deeper level of manipulation based on instinctive responses" (Nemorin S. 2017), "the intersection of consumer behavior and cognitive neuroscience" (Garcia & Saad, 2008), "the application of findings from consumer neuroscience within the scope of managerial practice" (Hubert & Kenning, 2008)

Neuromarketing, which is commercial and non-commercial, uses neuroscientific theories and methods to understand the consumer insights and marketing effects on consumer (Ramsøy, 2015). It explores the neuroscientific theories and methods to understand the consumer psychology and buying behavior (Plassmann, Venkatraman, Huettel, & Yoon, 2015). Neuromarketing is corresponding to consumer neuroscience and neuroeconomics in that it is a form of non-clinical research in consumer. The theories can also be used in marketing to gain insights into how marketing can help explain unknown states of the person causing sensory activities and reactions in the brain which will contribute to the investigations for neuroscience rather and marketing. The brain and nervous system is monitored in the pursuit of understanding instinctive human behavior, in view of cognitions and emotions, conscious and unconscious states, in response to a marketing stimulus and activities and the knowledge resulting from a neuromarketing exploration contributes to the progress and development of marketing theory and the planning and execution of marketing strategies and commercial marketing goals.

What neuroscientific methods exist for neuromarketing?

Neuroscientific methods use the tools and techniques which measure, map, and record brain and neural impulses during the human behavior and generate neurological representations of that impulse for understanding explicit responses in the brain and nervous system as a result of exposure to a particular stimulus. They allow neuroscientists to observe in real time the neural processes that occur during a particular behavior. Neuroscientific methods that record neural activity inside the brain are:

Electroencephalography (EEG)

EEG tests and records electrical activity inside the brain using electrodes placed onto the scalp of a person (Solnais, Andreu-Perez, Sanchez- Fernandez, & Andreu-Abela, 2013). It detects the changes in electric currents in the form of brainwaves, that are recorded when a person is exposed to a marketing stimulus. EEG offers neuroscientists in marketing how the resolution is made through the brain activity at relatively low costs and thus helps them assess the value of a marketing stimulus. But EEG is limiting the recording of brain stimuli in small subcortical areas, such as the amygdala (Amygdala is to regulate emotions, such as fear and aggression. The amygdala is also involved in tying emotional

meaning to our memories. reward processing, and decision-making.) (Plassmann, Yoon, Feinberg, & Shiv, 2011).

Magnetoencephalography (MEG)

MEG tests and store magnetic activity in the brain by a helmet with more than 100 and up to 300 sensitive superconducting quantum interference detectors that is kept on the head of a person (Solnais et al., 2013). It detects the changes in magnetic fields induced by electrical brain activity when a person is exposed to a marketing stimulus. MEG detects a brief change in brain activity and asses the value of marketing stimulus (Bercea, 2012; Morin, 2011). The marketing situations need to be simulated in a laboratory setting rather than in an actual marketplace setting.

Steady-State Topography (SST)

SST tests and records brain activity with 64 electrodes that is placed onto the head of a person while they watch audio-visual material and carry out a psychological task with a sinusoidal visual flicker appeared in the visual periphery to depict an oscillatory brain response in the form of steady-state visually evoked potential (Vialatte, Maurice, Dauwels, & Cichocki, 2010). SST detects task-related changes in brain impulse and measures the variations in the phase marketing stimulus which indicates an increase in synaptic excitation. SST offers scientists the benefits of tracking rapid changes in brain activity in decision making.

Functional Magnetic Resonance Imaging (fMRI)

fMRI maps brain activity through the recognition of changes connected with blood flow using an MRI scanner (Huettel, Song, & McCarthy, 2009). It tests subject lie on a bed with their head surrounded by an MRI scanner that uses the atom particles in the head to support with the magnetic field. The MRI scanner tracks blood oxygenation in the brain which correlates with the neuronal activity. MRI scan gives a three-dimensional picture of the brain with coordinates that denote the areas in the brain (Bercea, 2012; Zurawicki, 2010). When a test subject is exposed to a marketing stimulus, some parts in the brain receives more oxygenated blood than usual, all of which are captured in the MRI scanner (Morin, 2011). MRI scanner allows neuroscientists to analyze the changes of the signals by displaying colored areas overlapping the gray-scale image of the brain (Bercea, 2012; Zurawicki, 2010). It also allows the neuroscientists to investigate structures in the brain which is useful for understanding emotional responses (Morin, 2011; Zurawicki, 2010).

Positron emission tomography (PET)

PET is an invasive method uses battery of detectors that is kept on the head of the person to mark out radiation pulse to detect the metabolism of glucose in the brain (Bercea, 2012; Zurawicki, 2010). It allows inference of the blood flow or metabolic rate within the brain from exposure to the marketing stimuli (Kenning & Linzmajer, 2011). The neuroscientists have the advantage of high spatial resolution that analyses the changes in chemical composition and flow of fluids in structures in the brain.

Eye tracking (ET)

ET is the study of eye movements provides specific insights into what really catches our attention which is used to analyze what influence person's behavior, emotions and decision-making. A sensor which is connected to the computer is used to know where a person is looking, detect the presence, attention and focus of the user. ET records eye positions and movements using eye trackers (Vidal, Turner, Bulling, & Gellersen, 2012). It analyzes cornea and pupil using infrared light that evokes corneal reflection (Venkatraman et al., 2015). ET helps the neuromarketers to record neural activities to explain human behavior in reaction to a specific marketing stimulus, and it is an answer neurological marketing-related questions. ET provides realistic confirmation of what a consumer likely to look at, and it is effective method for neuromarketers to appraise marketing effectiveness.

Neurotransmitter (NT)

NTs are electrochemical substances that transmit the neurological signals from one neuron to another target neuron. They are released from vesicles in synapse and received by receptors of the target neuron. The decision making process is influenced by the chemical composition of the neurotransmitters. The stimulation of the neurotransmitter will work as the catalyst for the emotional appraisal of the buying behavior of the customer. When used together with other neuroscientific methods that record neural activity inside and outside the brain, neuromarketers will be able to test for the necessity, sufficiency, and association of neuropsychological processes
and consumer behavior (e.g., trust) with marketing stimuli under study(Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005; Plassmann et al., 2012).

Contributions of Neuromarketing to the modern marketing

Marketing theories and applications can be scrutinized with the contributions of the neuroscientific methods and can understand human behavior for marketing theory and practice is noteworthy or not. Neuroscientific methods explain change in the consumer emotions in advertising elasticity or success (e.g., attention, affect, memory, desirability) beyond baseline traditional measures (Barnett & Cerf, 2015; Venkatraman et al.,2015). The work of Couwenberg et al. (2017)

found out that the functional and experiential executional elements of advertisements which activate different brain regions associated with lower- and higher-level cognitive processes to influence advertising effectiveness.

Brand associations that happen in the minds of consumers and the properties of brands that consumers are thinking about can be reliably predicted from patterns of neural activations in the brain. Neuroscience data can be used to specify brand traits that correspond to preference and to determine representation and attention, learning, predicted and experienced value, remembered brand value, brand choice, brand negation and brand switching behavior (Al-Kwifi, 2016). Research in the neuroscientific methods also contributes to measure the intensity and valence of experienced brand value from a neurological perspective or scrutinizing the dynamic nature of implicit and explicit brand memories.

Product packaging and presentation is another area where the neuromarketing influences can be traced. Neuroimaging studies on product packaging and presentation reveals many prominent insights for the marketer, (Reimann, Zaichkowsky, Neuhaus, Bender, and Weber, 2010). found that products with aesthetic packages notably increase the response time of consumers' choice and encourage consumers to select such products over well-known brands in standardized packages, even when they are priced high. The attractive packages evokes the intensive activity of brain with positive emotions, (Hubert, Hubert, Florack, Linzmajer, and Kenning, 2013). Strong impulse for buying is predicted by stimulating neural activity in brain regions associated with positive emotions and with impulsive and reflective processes. Neuroscientific data is used to optimize the design of product packaging and presentation for neural activation.

Pricing is another area which needs the neuroscientific attention that consumers who view products on price produce evaluations strongly related to product attractiveness and try to make alterations in the cognitive process of valuation of overall evaluations of a product's monetary worth. Neuromarketing investigations lend support that price evokes general considerations of worth regardless of whether products are known or unknown before consumption. The cognitive dissonance (Davvetas & Diamantopoulos, 2017), and certain emotions like happiness, pleasure, pain, regret as a result of pricing are psychological based.

Decision making is another area which needs the attention of neuroscientific analysis. Marketing scholars can analyze and observe the behavior and decision making as a result of a biological mechanism. The variation is the neurotransmitters in the brain as well as attention, heart, and respiratory rates in the neural system, which can produce significant implications for understanding consumer behavior for marketing theory and practice (Alexander, Tripp, & Zak, 2015).

ARTIFICIAL INTELLIGENCE

AI "refers to programs, algorithms, systems and machines that demonstrate intelligence" (Shankar 2018) AI is the intelligence that machines exhibits as of human intelligence" (Huang and Rust 2018), it is nothing but machines having "intelligent human behavior". It consists of several key technologies, such as deep learning, rule-based expert systems, machine learning, natural language processing, neural networks, IOT etc. Using these tools, AI interpret external data correctly, learn from such data, and exhibit flexible adaptation (Kaplan and Haenlein 2019). AI has emerged as the backbone of the modern business by the use of its marketing and business applications, such as automating business processes, insights for decision making from data, or engaging customers and employees. For the better future it is needed to learn from the present and predict the future. Human potentials backed by the technology are for better future. High tech / high touch is required for the effective use of the modern business strategies.

Artificial Intelligence can be defined as a computer-based logical analytical process that seeks to create computer systems to arrive at conclusions like the human intelligence. The essence of AI is nothing but the complex computer solutions and algorithms that closely monitor everyday digital life and based on that collected data based on human behavior the machine act as an intelligent human. The expert systems are the most important part of artificial intelligence. It is trying to imitate the human way of thinking, including thinking and optimization. Knowledge is generated through the conditional statements like "if-then" rules. Multiple alternatives are analyzed through the computing process and artificial intelligence is generated. It can become a important instrument in the development and execution of company marketing strategies.

Artificial Intelligence for future

Market analysis and research is the most important factor required for predicting the future market. Large- scale data has to be analyzed for knowing the trend in market. Artificial intelligence, machine learning is there to help the corporate operations and marketing teams have wide scope to convey massive value to AI's potential data. AI equip the machines to execute intellectual tasks like problem solving, learning, creativity, reasoning, perceiving and interacting with the environment. AI-powered marketing solutions is reducing the responsibility of marketers and assigning tasks to machines to focus on three major areas to exploit the benefits of Marketing and Data Strategy, Data Expertise. AI helps the marketer to have easy Customer Segmentation. Right information to the Right individual at the Right point of time, to complete this marketer prefer customer

segmentation through easy clustering the customers on certain factors which are similar at that time. AI helps marketers in creating a long-lasting customer relationship management. Artificial Intelligence is for the future market operation especially in personalization, forecasting and automation. Automation is nothing but the process of making decisions by the use of machine intelligence or helping human-decision makers by giving multiple recommendations. Forecasting is the creation of business models for future by finding some patterns recorded data. Personalization is for the usage of outcomes developed for different customer segments and for finding out the potential customers.

Marketing and AI

Artificial Intelligence Marketing (AIM) uses technology and data to increase the customer's experience and choice. Techniques used to achieve such task are Big Data Analytics, machine learning and gaining insights of targeted subset of customers. The 'AI Marketing Era' which brings radical transformation in the pattern of traditional marketers to interact with their customers, plans the strategies to accomplish market leadership. If the current trend is analyzed it will be provable that AI has a substantial impact on marketing as well as communications and relations with the customers better than social media. Today marketing is the 4th largest user of AI concerning capital spent, and the 6th largest business adopter of AI technology, with around 2.55% of the total industry having invested in it. (Bughin, J., Hazan, E., Ramaswamy, S., Chui, M., Allas, T., Dahlstrom, P., & Trench, M. (2017).

AI Tools Used in Marketing

Profound Hunting: With the help of technology, customers can easily find out whatever they are looking for at any time with the help of search engines (Google, Bing, Yandex etc.). AI helps marketers in analyzing customers' search patterns and schedule and determining the key areas where they must focus their efforts.

Genius Advertisements: AI solutions can evaluate a customer's habit of searching and social profiles and help in creating personalized advertisements using the available data and marketer can create effective online advertisements. The brands who are using the genius are Amazon, Starbucks, Nike Etc.

Filtered Content: Customer search analytics can help marketers to understand individual customer. AI helps to find out the potential buyers and create customized and personalized content which will be relevant for the potential customers groups.

AI Bots: Customer retention is the most important factor in the marketing and it is as important as the creation of new customers. AI act as a major driver for

customer relationship and retention. AI Bots are used to have chat functions and direct-to-consumer engagement. The introduction of chat bots saves marketers a lot of time on social conversation and high customer experience. Marketers are also experimenting smart chat bots that can communicate with people using real-time, originally generated responses, with human like conversation.

Content recommendations: Marketing is an attempt to satisfy the needs and wants of the customer. 76% of customers expect companies has to understand the needs and expectations. AI helps the marketers to understand who exactly their target audience and customers is what their expectation is, thus creating a personal experience for customers. Amazon, Netflix and using the AI give highly relevant and personalized products in the search of the customer.

Relevance AI in marketing

Marketers can analyze massive amount of marketing data, from web, social media, emails and search engine comparatively faster. The conclusions they receive from the analysis will boost the performance and Return on investment (ROI). Marketer can recognize and understand customer needs and their expectations in terms of products as well as services by the use of the AI which helps marketers to identify their target audience and can create a personal experience for customers. With the help of AI marketer can understand customers' behavior and generate customer insights and enhance Customer Targeting and Lifetime Value, Customer Engagement, Customer Experience and Customer Loyalty.

Big Data can be considered the basic concept of collecting a huge amount of data of customers' purchase patterns as well as new customers' purchase preferences. It can also be referred as marketer's competence to aggregate and segregate extensive data sets with minimal manual work. Such altered data can be used by the marketing teams for ensuring that the right message is being delivered to the right person at the appropriate time via a channel of choice.

Machine Learning in general can be referred to as building and utilizing models based on recognized patterns. Machine learning platform comes into the picture when marketers try to retrieve significant information from huge data repositories. This can help in recognizing and understanding trends or common instances and successfully anticipate the insights and reactions, helping marketers in understanding the major factor and probability of certain actions repeating.
Powerful Solutions the end result, provided by artificial intelligence marketing truly conceive the world in a similar manner a human would. The platforms provided by AI can recognize the significant concept and themes across huge data sets astonishingly fast. While considering the technical aspects AI solutions also interpret communication, feelings and desires like a human which make this platform widely accepted.

AI and the extraction Emotional Data

Intelligent computing has changed the business scenario of the world and the blended intelligence of man and machine has influenced modern marketing. Machines are programmed in such a way that they are able to extract and measure consumer's emotions when exposed to marketing stimuli as Feel Data or Emotional Data. Facial expressions recognition, eye-tracking, and EEG, emerged as an important factor of Neuromarketing, which helped the marketers to focus their analytical efforts on consumer's emotion as emotions are overpowers the reason in decision making process (Boz, H., & Kose, U., 2018). Algorithms and technologies have created AI based systems have been for the extraction of emotions from facial expression and eye tracking and they are seems to be effective to use in the field of marketing.

AI and Neuromarketing

Academicians and professionals are skeptical on Neuromarketing, that it is a science of with limitations. Taking into consideration of the emergence of AI, the combination with Neuromarketing, the limitations may disappear and the tools and methods would be more accessible. Neuromarketing will be helpful in the formulation of the algorithm for AI and the future of the amalgamation is promising. The neuropulses and activities monitoring systems like EEG, Eye-tracking would tend to be more helpful for conducting marketing studies. The tools for the neuromarketing help to understand his/her emotional reaction to marketing stimuli, with helps to establish an accurate consumer's judgment, bias-free (Ritty&.,Reena 2016). Consumer's cognitive processes help AI to draw the conclusions from the data given by the neural pulses and record facial expressions, and emotions. (Etzold, V., Braun, A., & Wanner, T. 2019).

Human behavior is sophisticated and complex, so too the consumer behavior. In order to explore the secrets of neuroscience, psychology, computer science, give marketers new tools for exploring and formulate strategy for the niche market. Into that new, enriched field come another tool, artificial intelligence, and it has the ability to analyze millions and billions of data for arriving at the most favorable conclusions, patterns and commonalities. The consumer behavior is emerged into the digital consumer's behavior that is, most of us in this digital age leave personal information and data in our wake like so much detritus. Online purchase, social media postings, memberships, online forms fillings and sign ups, payment options, surveys, spew out personal information permanently encoded in the cloud, and artificial intelligence (AI) programs can retrieve and reconstruct them. There are services available for the development of the AI supported with neuroscience. (www. sorter.com - a company building technology that combines artificial intelligence, data science, and psychology to improve human communication). AI tries to intrude into the behavior pattern and

the personal information of a customer and the privacy has becoming an illusion, at least for those who have sacrificed it to the ease of digital accessibility.

The marketer should understand the individual personality types of consumers, and to target their marketing to those types. Different consumers respond in a different way to marketing strategies, according to the personality profiles that they fit into. Consumer will find certain kinds of advertising more pleasant and appealing to encounter, so to identify that response through AI and target that the advertising to that consumer enhances the shopping experience. When the purchases are based on personality tailored experiences, the consumer will be happier. The ultimate aim of advertising is nothing but to sell product and a make consumer happier by giving the right product to the right person and AI will help by analyzing the requirement of a customer and sort the products accordingly and give the advertising through the social media. Customized advertising for the customized product to the customized customer.

IMPLICATIONS AND CONCLUSIONS

Behavior patterns define the culture and civilization of the world. AI is the new civilization which changes and defines the life style today and it s the way we interact with the world around and organizations are conscious about such emerging changes. The integration of AI in Neuromarketing studies using the scientific data provides deeper understanding of consumer's behavior toward advertising, branding and the appreciation of the product/service in all its components, and it will especially help building bias-free judgments and conclusions (Gwagwa, A., Kraemer-Mbula, E., Rizk, N., Rutenberg, I., & De Beer, J. 2020). AI can assist marketers in daily struggle with complicated marketing concerns. The combination of AI with the neruomarketing can only be a win-win relationship, as the latter is known to be a mixture of quantitative and qualitative problems that can be more accurately solved relying on AI based systems which represents for AI a unique opportunity to demonstrate its power. Marketing requires innovation and creativity for the success. There are no absolute marketing plans in the world. The behavior patterns of the customer changes from time to time and AI is helpful to understand the changes happen in the customer through the scientific analysis. AI based tools are helpful in extracting and analyzing consumer's emotions in front of marketing stimuli, also eye-tracking tools can be used for that matter.

The emergence of artificial intelligence has paved the way for the possibility that machines in some segments are increasingly influencing people. The development of AI could open up new opportunities, such as new jobs. Data analysis and data processing has become more and more efficient, as marketers need not spend more time analyzing data, but therefore have more time to search

for answers to the problems they face. Technology based infrastructures which support artificial intelligence and machine learning helps business people to understand, analyze and anticipate human behavior. By using the artificial intelligence, traders can find out consumer habits and preferences, and they can offer contents according to their taste and preference. Smart apps can recognize the behavior through the neural impulses of using visual content and analyze ads that attract audiences most. AI is a conscious activity that the programmer creates with the algorithm. But human decision making is influence by conscious and unconscious elements. Neuromarketing helps to explore the subconscious consumer responses and the brain activity and reaction to marketing tools, even though consumers are unaware of it.

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