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USES OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN MARKETING AREA

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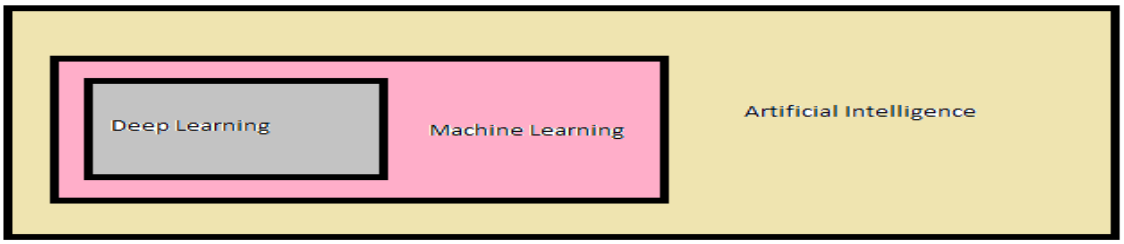
Abstract:

Artificial Intelligence (AI) influences several components of life inside the shape of clever devices and smart applications, designed to apprehend consumer behaviour, desires, and alternatives on the way to supply custom-designed stories. AI has been one of the primary drivers of innovation in marketing. Marketers are already leveraging the blessings of AI to advantage precious insights into clients, competition, and markets. Except, AI automates tasks, reduces fees, and improves workflows. This paper examines the contemporary and capacity applications of AI inside marketing with the aid of offering a comprehensive evaluation of present academic research.

Index Terms: machine learning, marketing intelligence, smart application.

1. INTRODUCTION

Artificial Intelligence (AI) is a crucial tool for marketers. Mainly in the generation of huge information, where the one-of-a-kind format of a huge quantity of facts is generated each 2d, without AI, it would be not possible to get an insight of treasured information in real-time. On the alternative side, customers have high expectations for a more personalized experience. Consequently, to get closer to the purchaser, and deliver the right message at the proper time, marketers want to put into effect a few AI applications (e.g. catboats, private assistants, smart applications). What sincerely makes advertising and marketing successful nowadays is the utility of system getting to know (ML) algorithms. ML represents the main pillar of synthetic intelligence that consists of diverse mathematical fashions (e.g. facts, probabilistic, neural networks). These models are applied on huge datasets to be able to identify patterns in statistics, to learn, or to expect output values. recently, with deep gaining knowledge of (DL) algorithms, laptop's potential to analyse and gather new knowledge has become a fact.



The position of ML and DL in artificial intelligence

The most common AI applications in the market are: the creation of content, voice searching, product analysis, evaluation of score, targeting, and dynamic pricing. With these AI applications, marketers can analyze customers based on their movement and behavior over time in order to achieve dynamic micro-segmentation and forecast their future movement. With all this specific information marketers can focus on the specific needs and create a long-term relationship with the brand. Micro-segmentation is helping brands to communicate in person with each customer and to improve loyalty and lifetime value. Brands are using the power of AI for the personalization of email/SMS marketing campaigns, which provides better connection, and transformation of these users into clients. Digital advertising is the area with the most successfully adopted AI. Facebook and Google are good examples of AI and machine learning usage. They analyze the user's information, interests, demographics in order to learn and detect the best audience for their brand. Predictive analysis is the usage of data, statistical algorithms, and machine learning techniques with the goal to identify all the future conclusions based just on data history. Besides, AI can lower production costs, increase competitiveness and profit. Therefore, AI does not exist to replace the jobs of marketers, or advertisers but to help them to develop their creative and strategic potential. In addition, they should learn to use the advantages of AI. In this article, the comprehensive analysis of AI and ML application in marketing is given.

2. Machine Learning Algorithms and there in Marketing

Artificial intelligence and Machine Learning the applications are field of AI really came into existence with the evolution of computers around the 1940s and 1950s. In the earlier period of its development, attention was clearly focused on getting computers to do things. [3] In the period of 1960s and 1970s, there was a real philosophical discussion about how close the human brain and computer could be. The next decade from the 1980s to the 1990s brought a whole new approach. Artificial computer brains had opened up possibilities and created a completely new set of questions. The next decade has brought advanced software intelligent agents. An intelligent agent is software with the possibility to assist people and to act on their behalf. Agents can automate repetitive tasks, remember things that the user forgot, learn from the user, or can make recommendations. [4] AI could be intelligent in its own way now: there is a potential to be bigger, faster, and better. People realized that artificial brains could outplay the human brain. AI technologies are used in numerous internet tools: search algorithms, a recommendation system, and systems for creating websites. [5] AI is unsurpassed by the human brain nowadays. AI applications in the finance, military and manufacturing sectors are something that the human brain cannot compete with. Artificial brains now have their own bodies. Three capabilities of AI are: to sense, comprehend and act. They are supported by the ability of the AI to learn from experiences and adapt over time. The first capability includes images, sounds, and speech. Facial recognition is the latest practical proof of improving productivity. Natural language and inference engines make better comprehension of collected information. AI systems can take different actions through technologies in the physical world. Auto-pilot in cars is the best example. [6] There are two types of AI: Strong and Weak AI. Strong AI can be also called artificial general intelligence. It includes all the machines with consciousness, mind, and sense, and they are applied not in only one specific area. Weak AI, also known as artificial narrow intelligence, has focused on a very specific task (self-driving car). Behind AI, machine learning, or more specifically deep learning are algorithms with the aim to imitate the structure and function of the human brain. [7]Artificial

intelligence relies on Machine Learning (ML) algorithms that are applied on large datasets so as to spot patterns in data, to learn, or to predict output values. According to Samuel (1959), ML is a computer's ability to learn without specifying a set of program instructions. [8] Lately, with Deep Learning (DL), which is artificial neural networks algorithms, a computer's ability to learn and acquire new knowledge has become reality. The relationship among these fields is shown in Fig. 1. There are several types of ML such as supervised, semi-supervised, and unsupervised and reinforcement. In supervised learning, smart applications are taught by example. It means that the dataset consists of inputs and desired outputs. Some supervised learning models are classification, regression, forecasting. For example, emails can be classified as spam or not spam, and classification algorithm should look at existing observational data and filter the email accordingly. In unsupervised learning, since there is no target value, algorithms analyze data i.e. focus on their relations, structures, and interconnections. Some unsupervised learning models are clustering, and association. An association model is often used for market basket analysis in order to identify relationships between the products or services that people buy, and according to that to understand and predict their future behavior. Marketing intelligence AI is reshaping marketing today. Marketing Intelligence includes all kinds of information that companies collect about a specific market in which they want to enter. Companies collect and analyze external data before entering and investing in this area. The information can be about population age or about their spending habits. Marketing intelligence is there to help to break down the data into smaller subsets before the relevant company department gets them. Each department needs different information. There are four the most important parts of marketing intelligence. [9] Competitor intelligence

- Product intelligence
- Understanding Market
- Understanding Customer

Together with Machine Learning, it can help us to predict all the customers' digital actions, to target the right customers with the best content just across the perfect channel, and all this at right time. NeuroMarketing (NM) refers to designing the content to elicit particular neurological reactions that are associated with buying or emotions linked to buying. NM studies the brain (neural networks) responses to advertising and branding (e.g. emotion recognition) and the adjustment of those messages. Technologies, such as functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) measures specific types of brain activity in response to advertising messages. With Neuro Marketing companies learn why consumers make decisions, and what parts of the brain are motivating them to do so. Recently, NM is getting more attention from scholars in different settings. [10]

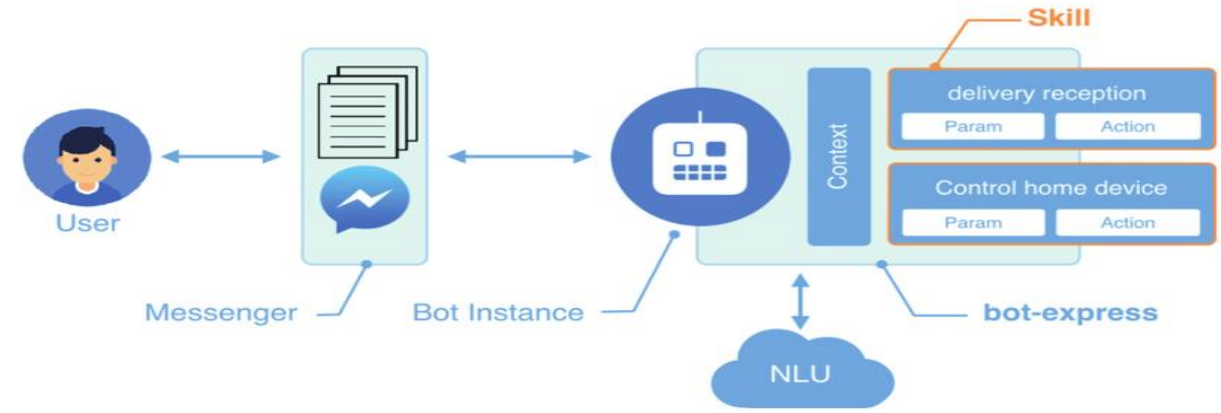
3. LITERATURE REVIEW

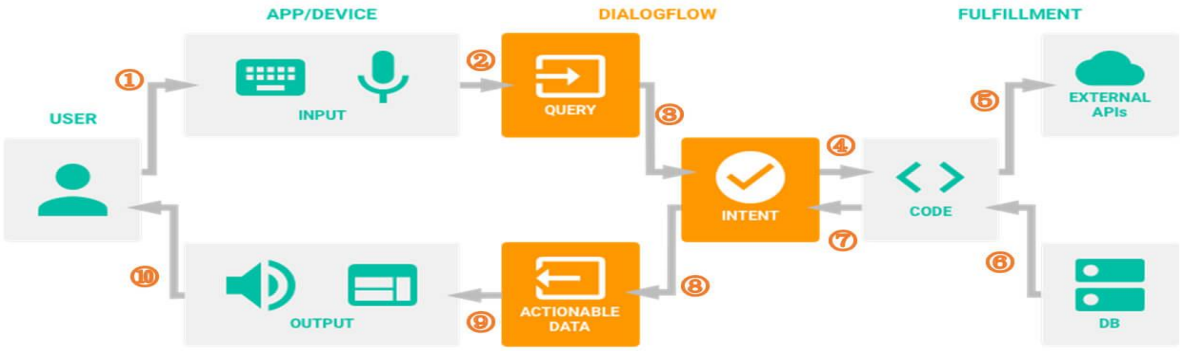
Choudhury & Nur (2019) [11] have implemented several ML algorithms, such as logistic regression, decision tree, support vector, random forest, and multilayer perceptron classifiers in order to analyse customer's purchase behaviour for a retail superstore. They used dataset of 9259 customer sales data over the three months. To analyse customer purchase behaviour, they explored the quantity of each item that customer has bought. The results show that with multilayer perceptron 99.41% of accuracy has been achieved. Lagree et al (2019) [12] have introduced a novel algorithm, titled GT-UCB that relies on probabilistic upper confidence bounds on the expected number of nodes, in order to find influential users in a graph. The goal is to maximize the spread of information on social media as part of the online marketing strategy. This type of online marketing is called influencer marketing, in which the sub-population of influential people is targeted instead of the entire base of potential customers. With proposed algorithm they showed that it leads to high-quality spreads. A. Ajuri et al, (2018) [13] have shown how ML can help organizations to have more customers in their loyalty program. They described how discounts can make an influence on customers' decisions. They also think that managers should be involved in creating these programs because more loyal consumers will bring bigger revenue. Hospitality

organizations should make loyalty programs with brands or with partners just because their costumers' experience will be improved and it will lead to increased loyalty.

S. Dimitreska et al (2018) [14] have explained in which way AI is reshaping marketing in an era when machines really understand all the problems and can find solutions, just like people do. Technologies have an impact on companies in a way of making better, more competitive, and productive businesses. Their conclusion is that the future will bring even higher expectations from customers and that AI will help marketers to understand personalized customers' needs and wishes. Thanks to AI companies will be able to modify all customers' needs and new campaigns in real-time. Syam & Sharma (2018) [15] have made research of the fourth industrial revolution and its impact on personal selling and also on selling management. Their research was based on all seven steps which make the selling process. Their conclusion is that digitalization will have the biggest influence on the selling process because it will be easier to understand consumers' behavior and to make offers customized. They suggest to salespeople use the advantage of ML and AI to study all the activities of the buying process in order to have more satisfied customers. Olson & Levy (2018) [16] have tried to show the deeper relationship between customers and marketers and to improve that they can build lifetime value models. Their research shows some of the most attractive applications that people use and their impact on everyday activities. Microsoft has the biggest influence and it helps marketers and doctors, also biochemists, in their work by analyzing a lot of data with very useful patterns. Al-Sukkar et al, (2013) [17] have revealed what can make an effect on the process of applying AI in shaping marketing strategies. Their conclusion is a list of recommendations: the first one is a practice of developed technological programs which are based on AI. They also saw the effects of applying AI on shaping different strategies and what is their impact: cost leadership strategy – to reduce costs but to keep a quality; differentiation strategies – to attend providing the highest quality of all the products in the market; alliance strategy – joining alliances with suppliers and agents with the goal of making efficient marketing activities; diversification strategy – supplying the market with different and multiple products; direct marketing strategy – it will increase the possibility to get data basis about customers. Nordlander, T. E., (2001) [18] have tried to improve that AI has already penetrated the business market. And the result of his research was positive, he found out that Microsoft Office packages have the best influence on the working process. The main problem was the price for different and more useful programs for tracking production and the whole working process of big companies. Stalidis, G. et al, (2015) [19] have presented how advanced data analysis, knowledge representation, and neural networks technologies make together an intelligent information system for tourist destination marketing. After they added a newly developed system based on Neural Network technology, they concluded that this new system could work out. Their efforts to classify unknown testing patterns were correct and they could manage it with acceptable accuracy. **4. AI APPLICATIONS IN MARKETING**

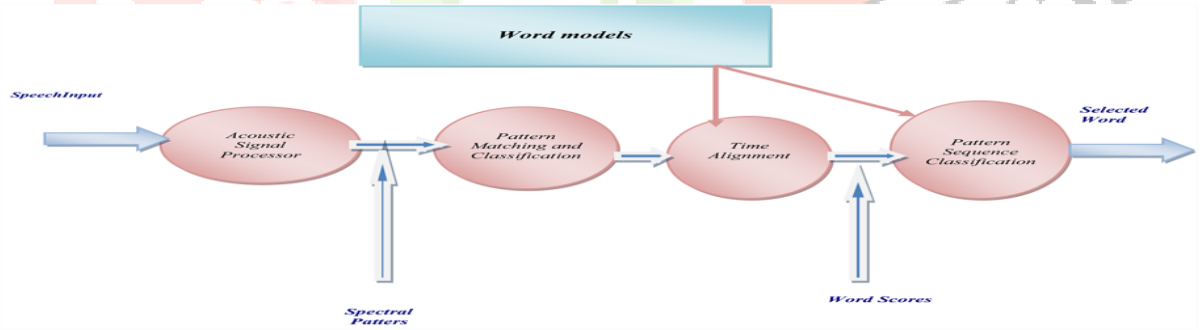
There are numerous AI applications. One of the most popular is a chatbot. A chatbot is an AI software that can help to stimulate conversations through chats with the users. It uses natural language through websites, mobile applications, messaging applications, or just through the telephone. It is shown in Fig. 2. It is described as one of the most advanced interactions between humans and machines. It is based on returning responses to questions that users have asked. It analyses all the users' requests and after that, it is trying to identify the users' intent. When the intent is identified it must provide the most appropriate response. In this way, companies get new opportunities to improve efficiency and to reduce typical costs that customer services bring. A chatbot is programmed to work independently and it can give the answer in natural language with a response the same as the human. Responses are a combination of scripts and machine learning applications. It has a huge database. Sometimes happens that the answer cannot be found and then a chatbot just deflects the conversation.





Digital Personal Assistant is also a software-based service which is designed to help users to complete their tasks online. It means understanding voice by the computer and answering questions or managing their schedules, playing music.

Acoustic model is created to take both audio recordings of speech and text transcription. Software with a speech recognition engine is used to transform sounds into words. Language model uses different applications and it has the aim to predict what will be next word in a speech sequence. The whole process is shown in below figure.



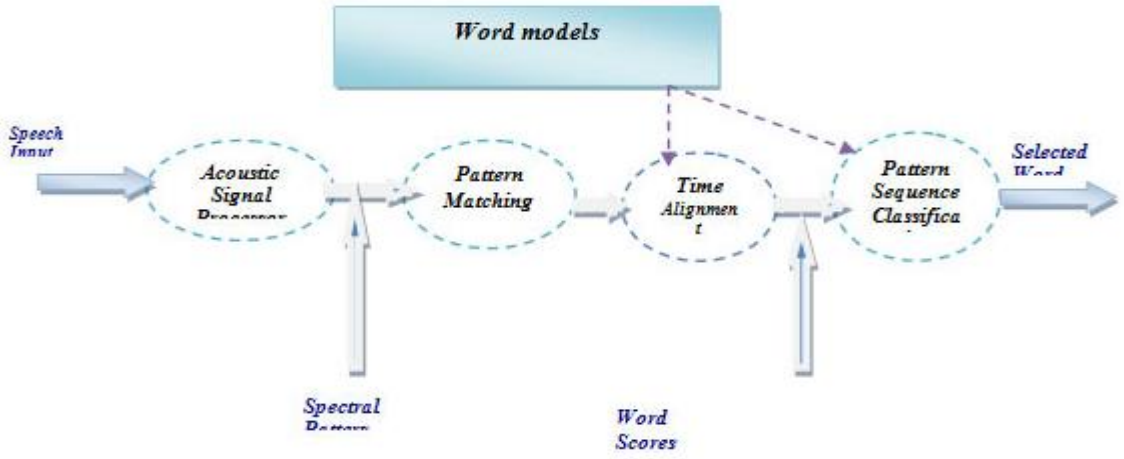


Diagram of the processing of speech signals *planning*.

Digital personal assistant leaders on the market are Google Assistant, Siri (Apple), Amazon Alexa, Microsoft's Cortana.[21] When digital assistants have users' permission they can collect different data and aggregate them all through search, mail, calendar, maps. They understand who the user is, what are his preferences, where is he, what is he doing, all of this just in order to predict what they really want. For speaker-dependent software new users first, speak to the software and it is a kind of training for it because it is important for the computer's ability to analyze how the person talks. On the other side, speaker-independent software can recognize anyone's voice, trainings are not necessary. And for better comprehension, it is more useful to say simple sentences. Digital assistants are the best helpers for making brands more popular. This is the best way to build a stronger relationship between a brand and its customers. To help brands to become faster, Microsoft has created tools for helping marketers to embed Cortana into their devices and services and also improved Cortana's skills for better extension of their brands. They now have up to 145 million users per month. [22]

5. CONCLUSION

Applications of AI and ML in marketing positively affect customer satisfaction and revenue growth, in general. Marketers have a better understanding of marketing, and sales qualified leads, have insight into customer preferences, can optimize marketing campaigns, improve the precision of pricing, and forecast the sales in a more accurate and faster way. Marketing evolved from traditional, via digital into intelligent. New terms such as marketing intelligence and neuromarketing appeared lately. With new versions of artificial neural network algorithms, smart applications in marketing become more personalized and even better reflect customer needs. Besides academic research in this field, the major benefits of AI application in marketing are also discussed in this paper. Google will soon become a semantic search engine; IT companies are running in smart application development, (e.g. Siri, Cortana, Alexa), chatbots, robots, and all the other AI applications have many advantages in marketing.

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