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The Usage of Artificial Intelligence in Marketing Automation : Potentials and Pitfalls

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Abstract: Marketing automation, neuro marketing, and users' personalization have been booming with the rise of Internet revolution and digital marketing. Due to the accumulation of rich consumer data generated from social engines, the AI-based marketing application is now taking a wide leap. This article attempts to address the prominent use of Artificial Intelligence (AI) in marketing in term of its potentials in becoming a pervasive part of today's competitive world. The basic concept of AI is presented so that thorough understanding on its application in marketing can be grasped. Dealing with the dynamic nature of marketing and people's sensitive data, despite of the opportunies offered, the pitfalls of AI in marketing automation should be taken into consideration. The security issues concerning the users' privacy and possible malicious activities are highlighted in this article.

Keywords: Artificial intelligence, marketing automation, marketing strategy, users' privacy

1 Introduction

Advances in Artificial Intelligence (AI) technology currently opened up new opportunities for progress in critical areas such as health, economic, environment, education, energy, and social welfare. It is forecasted that rapid progress in the field of specialized artificial intelligence will continue to reach and exceed human performance on more and more tasks.

AI offers tremendous potential in improving current marketing tactics, as well as entirely new approaches of presenting and distributing value to customers. The use of software to automate marketing processes such as customer segmentation, customer data integration and campaign management is known as marketing automation. The correct implementation of the right marketing automation solution is capable to accelerate sales, with far less human resource and at much lower costs. Resources such as social network services (SNS), TV programs, retail websites among others can be accessed without the constraints of space and time.

The integration of AI with programmatic advertising and social media marketing provides a more comprehensive view of customer behavior, predictive analytics, and deeper insights. New marketing tools like biometrics, voice, and conversational user interfaces offer added value for brands and consumers alike. Respond to customer demands and generation of appropriate responses is enabled by the identification of human emotions and communications by devices with embedded AI. Product searches can be performed in a smarter way with the integration of certain tools such as chatbots.

2 Potentials of AI in Marketing Automation

AI technology can optimize and speed up many different marketing tasks, improving customer experiences [1 - 4]. Using AI, human speech can be easily turned into text. The text then could be futher

be analyzed to predict the content of the speech and what kind of respond should be given. Not only that, the collected user data can be used to target a specific user and personalize product or service recommendation. The main technologies related to the application of AI include voice processing, image and pattern regognition and processing, text processing and so on. Table 1 shows the examples of AI applications in marketing automation using various technologies.

Table 1: Examples of application of AI in marketing automation [5]

Technologies	**Examples**
Voice processing	• Voice purchase requests made through a device • Task execution supported by virtual assistants
Text processing	• Guided-walk through a shopping centre by virtual assistant • A virtual assistant embedded in a mobile bank app, handles client requests alone by responding to their inquiries • A GPS navigation system – show the route to the selected destination, suggests attractions found nearby or on the way to the destination
Image recognition and processing	• Recognising the condition of face skin, followed by an individual selection of the type of face cream based on an analysis of one's photo and data, including information about the current weather • Based on a photo as a medium to search for items online, the search results return in the identical items, and offer similar or complementary items • Electronic mirrors in a clothing shop – match the collection to the client's appearance, style, and taste
Decision-making	• Development of individual savings plan based on an analysis of the funds available on one's account, receipts, amount of expenses and spending • Travel destinations (specific districts and attractions) to match the user's profile matched individually based on the traveller's preferences • Chatbot – to prepare recipe based on the consumer's preferences by using the ingredients available at home • Dynamic matching of prices based on users' shopping record and visited websites • Synchronisation of customer data from all possible points of contact with the brand (social media, website, e-mail, phone conversation)

AI can be categorized into three categories; (1) Weak AI [6], Strong AI [7] and Superintelligent AI [8]. Weak AI which is Artificial Narrow Intelligence (ANI) [9], works on something specific, Strong AI, which is, Artificial General Intelligence (AGI) [10], is capable to mimic human-level intelligence, while Superintelligent AI (ASI), is capable to surpass the human-level intelligence through creative and scientific thinking [11], [5]. Weak AI is implemented numerously in the marketing domain such as by Google and Amazon, whereby Strong AI provides marketing through visual and voice recognition, language processing and intelligent computing.

With the implementation of various technologies paired with AI, the automated marketing is recently capable to provide more effective interaction with customers at minimal cost, which will be the basis for personalized marketing. The details of potentials of AI in marketing automation are explained in the following subsections:-

A Reaching More People by Search Engine Optimization

Efficient marketing can be achieved through highly-targeted content. A vast pool of data, such as customers' interests, transaction data, buying habits, and past interactions (involving not just numeric but also text, voice, image, and facial expression data), can be collected, combined, analyzed and filtered down to likely targets [12]. Email marketing, ad content, social media marketing and search engine optimization all benefit from the intelligent analysis of customer data. The integration of AI into search algorithms not only can identify misspellings, but can suggest alternatives ("did you mean…") and this may be influenced by customers' past browsing or shopping behavior.

B Customer Retention with Improved Personalization and Recommendations

AI enables companies to bring customers tailored content, personalized recommendations, and providing one-on-one human-like assistance with chatbots and virtual assistants [13]. Using AI-enabled analytics, what a customer is likely to buy can be predicted, and targeted digital advertising in real time can be deployed.

C Increasing Efficiency at Reduced Human Resource Cost

Messaging applications such as Telegram, Facebook Messenger and WhatsApp have become a popular and convenient communication way for customers and companies. However, ensuring the accounts are constantly managed and monitored 24/7 by the customer service agents can be expensive. With the advances of AI language processing algorithms in recent years, it is now possible for machines to replace human agents in customer service and sales roles. Virtual assistants like Siri, Google Assistant, Alexa, and Cortana offer advantages beyond just 24/7 availability. These AI bots (chatbots) [14, 15] not only have lower error rates, but also they free up human agents to deal with more complex cases or questions. By being programmed to provide set replies to frequently asked questions, chatbots can deal with common customer queries and provide instant replies at any time, day or night. Further, AI algorithms can also automate business processes by performing well-defined tasks with little or no human intervention, such as transferring data from email or call centers into recordkeeping systems. The general architecture of a chatbot is represented in Figure 1. As shown in the figure, the overall chatbot system receives the user's input in text, image and voice via multimodal interface. A chat manager component in the system dispatches the input to proper modules, for the purpose of understanding the input and later generating the output. Different scenarios cause different skills to be invoked by the chat manager. The user's request is sent to corresponding skill components, whereby the response is later obtained. At final stage, the chat manager coordinates relevant modules to generate the output that matches the context of the current conversation.

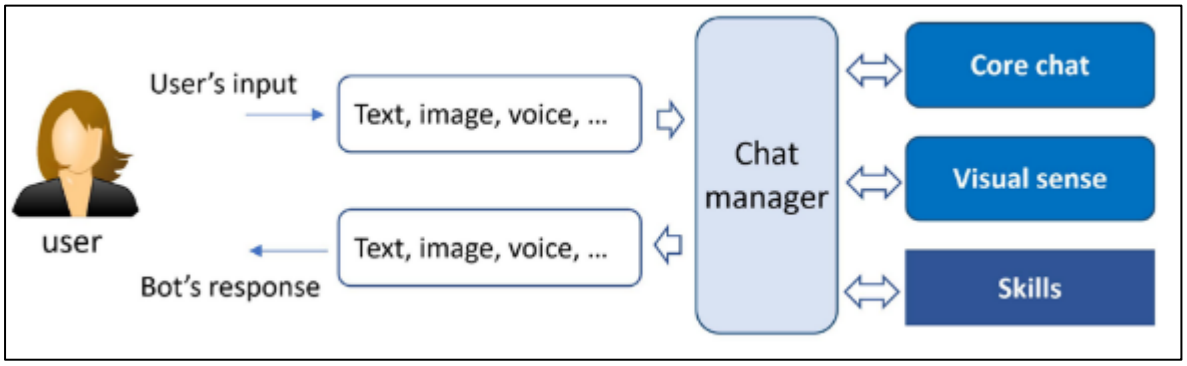

Figure 1 : The architecture of a chatbot [15]

3 Methodology

Generally, automated marketing can be referred to as the process of using software and technology to optimize and automate the online marketing tasks. Apart from knowing the marketing goals and marketing processes to be automated, the main point to know before implementing automated marketing processes is what are the steps involved in it. There are three main steps in automated marketing:

- Proper keyword identification [16]

A good strategy for keyword search is to see the evolution and seasonality over the year by checking the popular searches done by everyone in Google Trends [17]. As the number of AI-powered devices and assistants continues to grow, voice search is increasing all the time and expected to continue doing so. Thus, in addition to proper keywords identification, the integration vocal search is important. Long or ambiguous phrases spoken with many accents can become an obstacle in finding the products / services that are desired. AI is capable to interpret complex patterns in speech and to recognize meaning from spoken search queries, which are obviously different from traditional typed searches.

- Patterns identification [18] based on the data received

A system (equipped with application in personalization, behavioral targeting, Internet retailing, social networking, affiliate marketing, and online advertising) is used to collect website visitor activity for the purpose of profiling visitor interests. The content of the website can then be dynamically modified to better match the visitor's profile. The visitor activity data (such as the page identifier, page links, and the previous page identifier) is collected directly from the visitor's client browser or from the website's own web log information. The collected data is later stored in a database. In most cases, data collected about all customers allow the generation of empirical values. Data are combined and by way of data analysis, inferences can be drawn. This in turn leads to the creation of “new” data, i.e. the creation of information that have not been collected, but calculated by means of processing those collected data.

- Decision making and prediction

Based on the amount of information collected, the visitors are profiled. The visitor's response to the items presented on the web can be predicted and recommended to the visitor. The information resulted from profiling process are diverse and sometimes might seem a bit random, such as an estimated guess of a person’s age, marital status, income, place of residence and other socio-demographic data. Yet, even more complex fields of data with a differing degree of sensitivity, such as life expectancy of a specific person, performance at work, health (health status, medical history, likelihood of contracting specific diseases), personal interests (e.g. for specific kinds of products or brands, or different types of sports), behavioural patterns and many more, can be obtained. These information allow marketers to understand current and prospective customers and to predict their behaviour [11,5]. The simplified process of profiling visitors interests is shown in Figure 2 below.

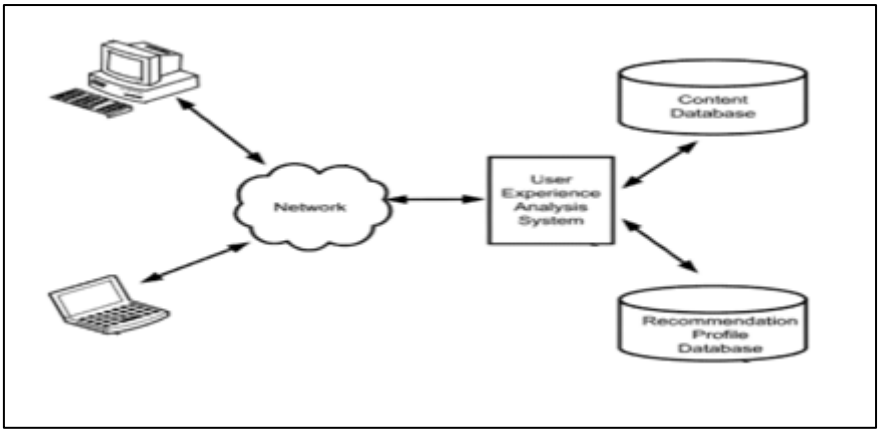

Figure 2: Automated marketing process

An example of the development of the recommendation system from collected, combined, and analyzed personal social network services (SNS) data and eye-tracking data to derive intuitive and precise user preferences can be found in [19,20]. Personal SNS data of users was collected using web crawling [21, 22] and web scraping [23] technology, targeting the users who actively used SNS [24].

The eye-tracking technology and equipment (such as the webcam on smart TVs and smartphones) that analyzed the user's gaze is used to obtain the area of interest (AOI) during web surfing. The preferences for the gaze tracking stimulus is obtained by calculating the fixed time and the average fixed time for the AOI by comparing the gaze fixation time, the gaze flow, the line of sight, and the coordinates of the AOI [19, 20]. The collected data is later combined with the user's weblog to gain more accurate and objective interests of a particular user.

The analysis of the user's behavior determined their interests and tendency toward the classification. The similarity between users based on their biometric data (amount of activity) can be measured and the users can be grouped on the basis of their derived classifications and preferences. Recommendations are then provided based on similar user preferences and information. Figure 3 depicts the whole process of bio-data and preference-based user modelling.

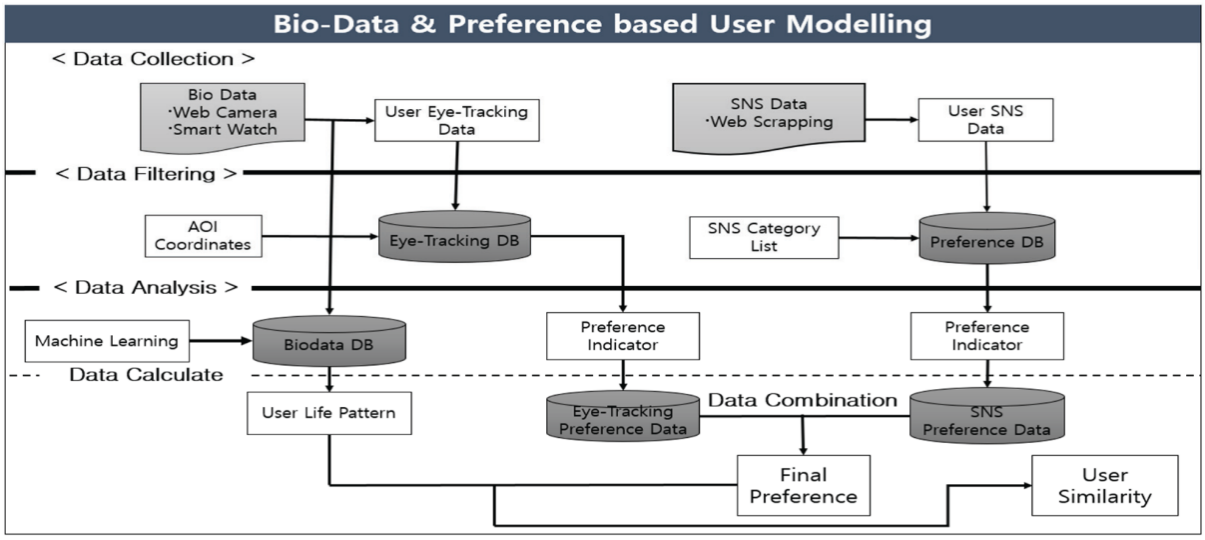

Figure 3: Bio-data and preference-based user modelling [24]

4 Pitfalls of AI in Marketing Automation

This section briefly highlights the pitfalls and dangers marketing managers need to be aware of when implementing AI for automated marketing. The most common issues are personalized phishing, stolen private data, threat of impersonation and fake social media accounts [25, 26].

A Personalized Phishing

Personal data can be defined as any information relating to an identified or identifiable person (known as 'data subject') in particular by reference to an identifier such as a name, an identification number etc. It is indeniable that the intelligent processing of personal data, in particular the combination and analysis of different data sets, might open up very sensitive details of individuals' lives. With the advanced of AI, the phishing [27] strategies also become increasingly complex and harmful. Thus, privacy concerns are crucial. With the capability to process and analyze data in real-time, AI can be manipulated by unauthorized person to gain access to highly sensitive information. As an example, a scammer that obtains data on customers' past shopping histories could easily create convincing, personalized phishing schemes that finally lead to larger numbers of customers forfeiting their financial information [28].

B Hacking Activity and Stolen Company Private Data

Similar to the above situation, AI increases the susceptibility of brand of products getting hacked. The scammers even have greater possibility and power to steal private information from companies, which indirectly affects the trust of their customers [29]. For example, a company's database being hacked multiple times may cause its customers to be apprehensive or reluctant in using its online shopping platform. Finally, to the worst case, the company might even lose its customers.

C Threat of Impersonation

The threat of impersonation [17, 25] is one with incredibly destructive consequences if executed properly. Paired with the AI advancements capability (i.e image recognition, facial recognition, speech recognition) in creating realistic sound and video clips, fabricated stories and accusations about people, companies or brands could be created with great accuracy and bring horrific damage. Falsifying events using fake pictures, audio, or video could even raise serious public relation issues between customers and companies.

D Fake Social Media Accounts

Far-reaching effects could be seen in the fabrication of fake social media accounts to inflate perceptions, scam individuals, or sway public opinion, making it even more difficult to delineate what is real and what is fabricated. To certain extent, people could be tricked into purchasing a brand that is not marketing what it is selling [30].

In reducing the negative impact of previously mentioned activities, legislation that enforces strict punishments for malicious use of AI could be considered. This should be supported by highly encrypted security systems that are capable of detecting fraudulent AI activity. For this purpose, permanent record of activity on social media platforms should be maintained to locate the source of fraudulent activity in the first place.

5 Conclusion

The fourth industrial revolution (IR4.0) has been powered by digitization, information and communications technology, machine learning, robotics, and artificial intelligence; and will shift more decision-making from humans to machines. AI is viewed as a "competitive advantage" to facilitates and systematizes interaction between marketing stakeholders. This article highlights many incorporated AI technologies that seem to be currently under-investigated (although not completely overlooked) in marketing strategies. To effectively implement the technology, transferring tacit knowledge into AI machines is required to alleviate the immense need for data, that would be essential to design complex, complete, and accurate managerial objective functions or tasks in marketing. The ability to transfer knowledge constructs that have been autonomously generated by AI algorithms back to humans would be equally important to build trust, enhance control, and create a positive feedback loop at the business organization.

The greatest impact of automation and technology in sales has been and continues to be, on all routine, standard and repeatable activities. In many cases discussed above, AI technology acts as a supporting role to make the selling functions more efficient. Going forward, perhaps the greatest impact of digitalization in sales will be in all the activities and efforts that go into understanding customer behavior to design and deliver highly customized offerings. Besides, in the future, the technology will act as an active decision-facilitator, maybe even a decision-maker in some cases, that can act in close collaboration with the salesperson to enhance the latter's effectiveness. Some examples of customer behavior are the development of consideration sets, development of preferences and utilities from consumption, social influence, and, buying patterns. This understanding is critical to the success of sales strategies.

Last but not least, the impact of malicious AI activities should not be ignored. Research related to secured algorithms to be paired with AI should be put under consideration while aiming at successful marketing automation. In conclusion, the advent of the IR4.0 and the increased use of machine learning and AI algorithms have a great influence on user's experience, products' value as well as organization and data processing capabilities. We hope that this article will be an impetus for future research in the area of AI marketing automation strategies.

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