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CUSTOMER PREDICTIVE ANALYTICS USING ARTIFICIAL INTELLIGENCE

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This conceptual paper exclusively focused on how artificial intelligence (AI) serves as a means to identify a target audience. Focusing on the marketing context, a structured discussion of how AI can identify the target customers precisely despite their different behaviors was presented in this paper. The applications of AI in customer targeting and the projected effectiveness throughout the different phases of customer lifecycle were also discussed. Through the historical analysis, behavioral insights of individual customers can be retrieved in a more reliable and efficient way. The review of the literature confirmed the use of technology-driven AI in revolutionizing marketing, where data can be processed at scale via supervised or unsupervised (machine) learning.

Keywords: Artificial intelligence; big data; business automation; customer targeting; segmentation.

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1. Introduction

Many companies have recently resorted to data analytics using large datasets in order to understand their target audience better. For instance, taking the case of the global artificial intelligence (AI) market, American companies have increased their spending on data analytics and business intelligence software, which was expected to reach up to USD 191.60 billion in the United States alone by 2025.[1] Following the immense growth of consumer-driven digital data and the subsequent need to extract strategic critical information, the services sector accounts for the largest share of the predictive analytics software market. Undoubtedly, the demand for intelligent virtual assistants would continue to rise. In this digital era, marketing strategies have also started to make use of technologies to organize and process complex datasets of customers to target a specific market for their products or services. As these data outputs serve as intelligible insights for numerous brands, the motto "customer is king" can be usefully extended into digital marketing, where customers are served like a king by satisfying their demands personally at any time. Optimized marketing campaigns must work with customer sentiment in real time. With that, communications can be adjusted according to the behavioral insights of the customers' emotions and preferences.

Fundamentally, target marketing focuses on identifying a realistic approach to fit the products and services for the customers. Companies may develop different strategies according to how they define their markets — the more appropriate their target market, the more effective their strategies. Segmenting customers is very vital to develop effective and efficient marketing programs. Marketers divide a large market into different subsets of customers with common needs, interests, and priorities before strategies to target each segment are designed. Targeting specific customers would require efforts and can be rather costly given the need to involve marketing institutions to analyze the markets. However, with the development of technologies, AI can now be used to define the market into specific targets. Through data science and machine learning, marketers can accurately make highly nuanced targeted decisions. The AI-driven marketing machine can utilize sensory inputs to deduce market conditions and even analyze visual inputs such as facial, object, and gesture recognition. This clearly demonstrates the importance of machine learning as an AI tool that can create human behavioral profile in this digital era.

AI has the capabilities to imitate the human brain to provide data by identifying the target audience based on the behavioral insights historically. In particular, AI retrieves, analyses, and presents data in a reliable and efficient way for marketers to acquire a specific marketing plan. AI can make a profile of human that covers the capabilities of image, recognition, and voice via machine learning and semantic search when the customers search and click certain websites to find the required information. In this era of online shopping, such capabilities greatly benefit marketers in identifying the right customers for their products or services.

[1] https://www.marketwatch.com/press-release/artificial-intelligence-market-segmentation-application-trends-opportunity-forecast-2018-to-2025-2018-10-09.

Despite several studies on the role of intelligence in marketing (Stalidisa *et al.*, 2015; Boisena *et al.*, 2018), AI-driven segmentation, specifically to predict the behaviors of customers, remains underexplored. This may be attributed to the limited applications of the AI systems to manage industrial marketing issues over the past decade. Therefore, this paper exclusively focused on the role of AI in organizing the customers into specific targets for marketers, including an overview of the applications of AI techniques in customer targeting when it comes to market segmentation. The database of any related websites was used to carry out the literature search, which covered publications up to December 2019 using the term "artificial intelligence technique" in the title, abstract, and keywords. A structured discussion of how AI can identify the target customers precisely despite their different behaviors was presented in this paper. Considering that certain industrial marketing topics are yet to be explored, this paper on segmentation and targeting was regarded as the first to explore how AI can help marketers to target specific customers. Through AI, segmenting customers would be easier since it provides supporting data on the key elements of a marketing plan, such as positioning to achieve specific objectives of the developed marketing plan. In view of the above, AI-related issues with the emphasis on customer targeting were discussed. Following that, the review of key literature is presented in the subsequent section. The next section discusses how AI can be applied in customer targeting and the applications of AI in the services sector with the emphasis on the applications that are relevant to market segmentation. Finally, this paper presents the conclusions of this discussion.

2. Literature Review

AI refers to the ability of a digital computer to perform tasks that are commonly linked to humans, such as the ability to reason and generalize, discover meaning, or learn from past experience.[2] In other words, AI is a machine that is capable to learn and imitate or simulate the intelligent behavior of humans. Meanwhile, machine learning is a branch of AI that applies algorithms to synthesize the underlying relationships of data and information. The machine learning system can be used to convert automatic speech into a semantic structure expressed in the form of words. In addition, machine learning improves the efficiency of marketing functions in every step taken by the customers. To make prediction of customer behavior, supervised learning is needed to provide a learning basis for future data processing. Supervised learning is a learning model built to make prediction, given unforeseen input instances (Kotu and Deshpande, 2019). It has algorithm to response to the dataset and make classification model to generate future data processing. Therefore, with the help of machine learning and supervised learning, AI can provide valuable data to predict their behaviors in real-time process using automation.

Although the terms "AI", "automation", and even "robotics" are interchangeably used, these terms are different. In particular, AI mostly uses algorithms to learn a process and involves logical reasoning, learning, and problem solving whereas automation and robotics

[2] https://www.britannica.com/technology/artificial-intelligence.

use sensors and manual programming (Oswald and Mascarenhas, 2018). The main purpose of AI is to develop software to imitate a human mind just like how humans handle general problem solving, learning, and decision making in specific ways through an expert system and computer vision. The role of AI in increasing the efficiency of companies was explored in several past studies. For instance, López and Casillas (2013) explored the potential of AI-based systems in the marketing context whereas Cao *et al.* (2015) highlighted the potential of AI in bringing automated negotiation for e-commerce. On the other hand, Vanneschi *et al.* (2018) developed a model to predict the probability of default when it comes to payment in e-commerce. Meanwhile, Omoteso (2012) stressed on the development process of AI systems in auditing. Besides that, the adoption of AI to assess internal control systems and monitor the effectiveness of audit committees was also reported (Lo and Campos, 2018).

Notably, AI is important for businesses to analyze the behaviors of customers for the development of specific marketing strategies. Studies have demonstrated the positive influence of applying IoT solutions on the process of developing long and successful relationships through engagement insights. For instance, Radaceanu (2007) examined the potential use of AI to reproduce specific actions that must be validated by the human factor in terms of productivity, quality, and competitiveness. In education, Bajaja and Sharmab (2018) proposed a framework of tool on multiple learning models and AI techniques to determine the most suitable of learning styles for a particular environment. For medical purposes, AI is believed to minimize human error and subsequently, improve the reliability of imaging interpretation (Fazala *et al.*, 2018). Meanwhile, Fujii and Managi (2018) observed a shift from biological- and knowledge-based models to specific mathematical models and AI technologies, particularly in the United States and Japan.

When it comes to customer targeting, personalization is very important given the significance of niche markets. Segmentation is a process of dividing the market into specific parts with similar behaviors (Cahill, 1997). Through segmentation, companies can gain competitive advantage as they can optimize their resources on the target customers. In the past, the availability of quality data was limited and dominated by demographic information from the field reports. Without AI, segmentation can be rather costly given the need to collect a large customer database from many different areas. Nowadays, AI has made segmentation easier and cheaper, as it is designed like the human brain to recognize and solve problems. Moreover, in this digital era of AI technology, marketers are able understand their customers on a deeper level.

Therefore, marketing has begun to treat different customers differently at a lower cost for its data storage with more effective technology solutions, general advancements in know-how, and the ability to reach customers through digital channels. As indicated in Table 1, traditional segmentation mainly involves analyzing customers manually using simple tools and data. Recently, using the power of AI, such as predictive analytics, marketers can predict the behavioral patterns of customers with the combination of their demographic information to identify the appropriate target customers. Based on the prediction output, marketers would be able to understand the customers' behaviors,

Table 1. Comparison Between Traditional Segmentation and AI Segmentation

Characteristics of Segmentation	Traditional Segmentation	AI Segmentation
Resources	Mostly humans	Mostly AI
Time Availability	Less tight	Very tight
Cost	High	Low
Customer Behavior	Relatively difficult to predict	Relatively easy to predict
Targeting Ads	Difficult	Easy
Data Usage	Relatively smaller amount	Large amount of historical data

motivations, and expectations in order to deliver relevant messages. This would help them to create an optimized and targeted campaign for the target customers.

Moreover, AI can provide data at a more granular level and predict the behavior of customers based on their past behavior. Data of customers who engage with specific brands benefit marketers. For example, the transactions of a female customer who browses and purchases bags of specific brands contain information on her age, gender, marital status, and income. AI using machine learning with a larger amount of data can deliver better personalization on customer behavior, which differs from the kind of data the marketers used to acquire. The machine would model each customer and then predict suitable products and brands for the target customers based on its learning of various behaviors. Therefore, marketers can identify their target customers for segmentation with ease by referring to the outputs of machine learning. In the past, demographic information was previously used as an indicator of human behavior instead. Today, the customers' needs, motivations, and online behaviors (particularly their digital activities) are more appropriate indicators for AI systems to conclude these customers' interests. With the help of predictive audience segmentation technology, marketers can have access to valuable information of customers.

3. Customer Targeting with AI

One of the powerful features of AI lies in its machine learning capabilities, specifically in computing the growing data volume and enhancing the development of data for use. The interactions of customers across different e-commerce platforms can be analyzed using AI to produce certain predictive behaviors of whether they would repeat their purchase for specific products. The patterns can be used for the final identification of the target customers. Defining a target audience is very crucial for companies, as it can lead to higher revenue at a lower cost. Search engine provides keyword-driven data based on the users' needs. With the help of AI, the machine continues to become smarter. AI can figure out the content and conclude the results based on the keywords used, semantic index, and synonyms (Figure 1). In addition, AI can automatically understand the intensity of users in order to track their behaviors and future predictions. Unlike the traditional segmentation, AI aims to create intelligent machines to deliver highly personalized insights of customers

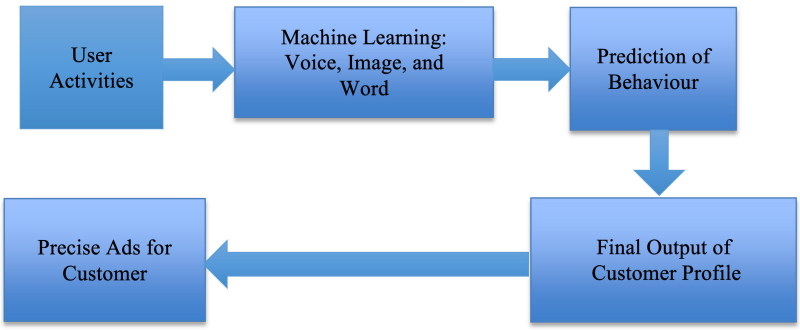

Figure 1. How AI Targets Customers

at a lower cost, as every single interaction of customers with Internet access can be utilized for product optimization.

Machine learning has a specific method to analyze and predict the historical behavior and repeat behavior of customers to identify the target customers for marketing and promotional campaigns. Through AI, companies can maintain a close relationship with their customers at every stage of the process based on their interests and demographic profile. Instead of creating an ad campaign to reach all customers, companies are able to create personalized content according to each targeted segment of customers without the need to spend additional resources to increase their sales and profits. In fact, they can minimize their consumption of resources since they can truly identify their target customers. In short, companies can use AI to understand, anticipate, analyze, and develop smarter campaigns and allocate their time and resources for other more demanding tasks. AI revolutionizes marketing by presenting quality data through the use of machine learning. It also does not need any human operators to command the outputs and effectively functions based on a trial-and-error basis. As a result, marketing strategies can be more effective since customers are categorized into distinct groups that allow highly targeted niches. Basically, the procedure of AI in marketing can be simplified as follows: taking the case of a transaction of Customer A and Customer B, where Customer A uses Google as the primary search engine to browse relevant websites for new phones directly and Customer B uses Chrome to find out how to fix a broken phone on Youtube instead, AI can detect the needs of Customer A and Customer B despite the use of different devices and methods.

Through AI, marketers can recognize customers' purchase behavior through their actions therefore the obtained data can be used to generate customer insights for marketing strategy development. This valuable information is instrumental for the companies to develop a personalized relationship with their target customers that was previously challenging and costly to perform. Fundamentally, there are four main progressions to capture the customers' top-of-mind attention and nurture values throughout different phases of customer lifecycle:

(1) **Customer targeting and value enhancement.** Customer targeting that is linked to AI and machine learning sets up marketers and developers on their preferred engagement

and projected growth. Its purpose is to achieve business goals through more value-added user experiences and personalized offers to drive profits. Such initiatives trigger desirable and meaningful engagement with the target customers. For example, businesses can employ AI and machine learning to collect such data to predict specific behaviors and decision-making for effective interactions with high-value or niche customers.

(2) **Customer engagement.** Key insights into the customers' purchase patterns and behaviors are among the most important aspects that determine the success of sales and marketing strategies. AI can provide the retailers with suggestions or recommendations on the product displays and cataloguing based on the customers' preferences.

(3) **Customer experience.** AI can significantly strengthen customer experience in three different ways: (1) by automating simple interactions with customers, such as sending an informative article to customers through a bot; (2) by augmenting the abilities of an agent in predicting customers' poor shopping experience; (3) by automating the internal tasks, such as forwarding the customers' request to the right department or agent.

(4) **Customer loyalty.** The attention span of customers becomes shorter by the day. Consequently, it has become increasingly vital for marketers to capture the customers' attention at the right time and in the right way. For instance, AI can be used to analyze the purchase data of a particular product and find out when the customers may require the same product again in order to send an automated SMS as a reminder for them to top-up or reorder the product. In today's marketing, effective use of data is crucial to improve purchase experience, customization or personalization of services, customer targeting, and brand loyalty.

In short, consolidating, organizing, and analyzing data of a large scale to determine specific patterns were once tedious and laborious without the use of AI modules that are now built for such complex organizational and recognition processes. AI can identify "timely intent" with the emphasis on the target customers, where there is a window of opportunity to approach customers before a commitment to a media buy is made. For instance, through the programmatic advertising application, the analysis of related datasets can determine the best time of the day to advertise (to maximize the ad spends), the likelihood of an ad converting (i.e., effectiveness), or the probability of a reader clicking an advertisement that appears in the middle of an article or blog.

Propensity modeling is a type of data analytics modeling that uses machine-based (supervised) learning algorithms to process a large amount of historical datasets. It can create accurate predictions based on the tendency of customers to act in a certain way, including their purchase behaviors. These models can be used in different applications and website personalization features as well as the automation of manual tasks, such as lead scoring. Basically, the applications of AI can be extended beyond retaining the existing clients.

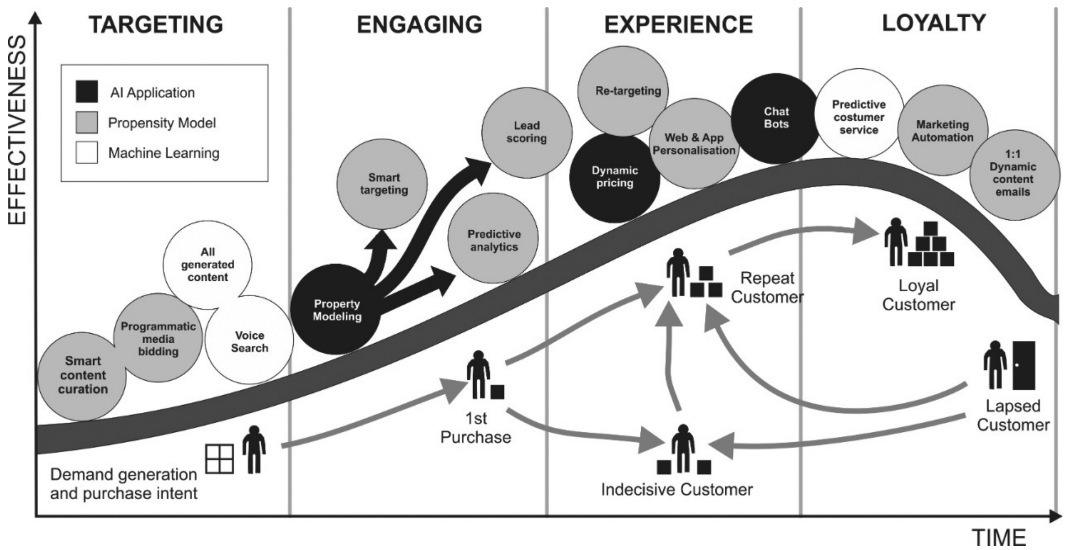

Figure 2. Effectiveness Scale of Customer Targeting Throughout the Customer Lifecycle Allen (2017).

In particular, predictive analytics refers to a revolutionary capability of AI that uses historical data to predict specific behaviors or events. Previously, it was only possible to determine vague trends from retrospective datasets. Using predictive analytics, marketers can now understand the customers' experiences to determine how marketing strategies are received from their perspectives and the resultant outcomes of these strategies. For instance, predictive analytics in e-commerce can analyze the customers' purchase behavior and determine when they are likely to repurchase or whether it is a replenishment or new purchase. Predictive analytics in customer service can predict high traffic volumes of calls or vehicles (e.g., logistic vessels) to ensure that phone lines or warehouses or ports can be prepared sufficiently. Besides that, predictive analytics can be used to identify customers with "flight risk" attributes or those who may defect to a competitor.

In order to gain competitive advantage, companies continuously rates lead for conversion potential. Machine learning algorithms identify with the greatest chance of conversion by associating its AI engine with a precision search tool that goes through the raw information to identify potential leads that convert well. Furthermore, predictive lead rating or lead scoring can determine the best performing channels to prioritize quality leads, rather than allocating equal efforts to all channels. A strong and effective AI-driven lead scoring component helps in choosing the lead score that should be pursued first and identifying channels that should be focused on. When these functions are integrated and executed properly, such applications can support the sales and marketing teams in prioritizing leads and accelerating the sales cycles.

For digital marketing, the basic metrics for targeting ads are cost-per-acquisition (CPA) and cost-per-click (CPC). For marketers to achieve sophisticated levels of personalization, they target data segments at a more granular level by drawing on the data that can be as simple as gender and age or as complex as past behaviors and purchase behaviors. Machine

learning algorithms can be trained to distinguish important variables from common characteristics and categorize different elements for specific personalization or customization of ad delivery. AI and machine learning algorithms are deployed to optimize these metrics by analyzing a large volume of data to detect user trends or best traffic for these ads. These applications range from images or product promotion to duration of exposure, which can be used to identify traffic areas for a specific demographic group. AI engines scrutinize the behaviors of customers by tracking their behaviors with specific promotions or ads (Manthei, 2018). Based on the historical webpage visits, specific ads can surface relating to web information related to bring to the customer relevant ads that they need. Accordingly, dynamic pricing models are helpful in the demand-based price changes, such as the variation of hotel room rates according to the season or day of the week. Prices can be determined and optimized at a whole new level of precision, as AI algorithms process the right data into a pricing matrix. Apart from pricing, there are other decisive factors, such as facilities, proximity to certain services, and accessibility. Furthermore, additional insights on the customers' preferences and purchase behavioral patterns, including what they consider when it comes to special offers, can be gained through the use of machine learning. Data-driven insights allow businesses to target their customers more effectively and even determine the precise offer required to generate sales.

Besides that, dynamic pricing can also be used to capture market data to compare the competitors' pricing as to what they offer to ensure that their offers are well received by customers as intended. For example, Airbnb has built and refined an extremely sophisticated dynamic pricing system to help property owners to determine the price that they should list for their property according to the type, size, and location of the property as well as the property facilities, nearby events, photos of properties, reviews, and time-to-booking date. Meanwhile, as customers do not often display constant or unchanging choices, they may have different choices at different times for different reasons based on their mood or evolving preferences. In this case, dynamic segmentation is an AI application that considers how emotions can be factored in the behaviors of customers. For example, dynamic segmentation is required when a male customer browses items as a gift for his female friend. Dynamic segmentation would classify these new actions as an independent dataset under a new and appropriate segment according to the current purchase behavior using real-time data. With that, the most relevant current offers can be presented and outdated data for targeting can be avoided.

4. Tech Giants and AI

Large companies such as Amazon, Apple, Google, and Facebook have decided to implement AI because they are aware of how technology reshapes marketing and affects various business aspects. Big data and connectivity are the main factors for these companies to rapidly improve their product offerings in order to stay ahead of the competition. These companies have access to a large volume of data given the high traffic and users, which allow them to improve their products and services according to the needs of their customers. For example, Google uses AI technology to provide better and more relevant

data than any other companies. Google continues to monopolize the service engine market due to its ability to deliver more relevant results and identify destination pages that most likely serve their users. Another example includes Facebook that sees AI as a vital technology to power many of the core features of its main platform. For instance, Facebook News Feed is underpinned by AI that predicts what content each user may want to see. Apart from detecting unwanted or harmful content, Facebook also developed AI that can analyze images, videos, texts, and even facial recognition. When these companies continue to have access to these valuable data to provide better products and user experience, they would eventually gain monopolistic power. For instance, Amazon and Alibaba can track and access their customers' every click for products and purchase or removal of products in their shopping cart for the last couple of years. These companies take advantage of these data models and AI ability to synthesize and apply the findings to the general population. Consequently, with enough data to form a good sample model, they are able to target specific customers, even without their personal data.

Focusing on Alibaba, as the world's largest e-commerce marketplace with USD 248 billion in transaction (more than Amazon as the pioneer of e-commerce marketplace), its core business involves selling goods but its operations have expanded to the most profitable tech companies in the world. In order to become a dominant global player, Alibaba announced a plan to build an AI industry worth USD 1 trillion by 2030[3] that optimizes supply chain, products, and personalized recommendations. Alibaba continues to invest in AI to optimize its supply chain, build products, and drive personalized recommendations. AI-based infrastructure of Alibaba has enhanced the precision of its product search that goes beyond the conventional experience given the application of complex machine learning to recognize data patterns. Moreover, as Alibaba has access to a huge volume of data from hundreds of millions of customers, these machines become more accurate and smarter. Jack Ma who is the founder of Alibaba revealed that the correlation of large-scale computing and big data is similar to the parents of AI. The results from nearly 500 million users of its website and applications have contributed to an extensive repository of consumer data that are continuously analyzed using AI in real time, resulting in precise predictions of customer behaviors.

Basically, Alibaba has created an e-commerce brain that builds a model to predict and update the needs of customers based on their online activities such as browsing, bookmarking, commenting, and other actions. The e-commerce brain determines the correlation between content consumption and purchase behavior; thus, a wider range of recommendations can be generated for products that customers are interested in previously and other related products and information. This brain serves as a home of predictions for different categories of products, prices, brands, product specifications, and other key parameters.

In addition, AI personalizes the online store for individual visitors that offers real-time, tailored product recommendations based on their purchase history, age, gender, geographic location, and a host of other data points. There may be many new customers with no prior data on their purchase behavior but AI algorithms can still make individual-specific

[3] https://bernardmarr.com/default.asp?contentID=1536.

predictions by matching products with the purchaser and ranking them according to the items these customers are more likely to be interested in. The entire process is instantaneous. Moreover, algorithms continuously improve as new data is fed into the system. Machine learning continues to deliver personalized shopping experience for customers based on the gathered big data in terms of their historical transactions, such as products that customers search for and purchase and their capability of accessing personal information of individual callers and continuously upgrading its capabilities by analyzing millions of customer-service interactions.

Possible Dangers of AI

The capabilities of AI to detect and predict the behavior of customers in every detail way based on their historical transactions were clearly discussed in the prior sections. However, the use of AI is also linked to privacy issue in regards to basic human rights. As many companies can easily track any individuals' online activities through the use of AI, this eventually leads to the loss or invasion of privacy and even social oppression. This latest technology gathers the users' daily activities and collects their data that may include specific behaviors or personal actions (e.g., playing a certain game, smoking, watching porn, or defaulting on loans). In other words, AI may provide valuable access to all parts of life of the target audience but this is also the prime example of the possible dangers of AI in terms of privacy issue.

5. Conclusion

AI will continue to develop and expand and a company must make use of this technology to get ahead of its competitors and succeed in the competitive market. Clearly, the applications of AI are very appealing for the marketing industry given its simplicity and robustness in analyzing the engagement patterns and masses of users' complex interactions and actions to create human-like interactions without any human intervention. Moreover, AI can process specific types of content according to the customers' preferences for enhanced user experience. Consequently, this benefits marketers in their decision making and the implementation of marketing strategies. With the help of AI, companies can save time and resources and can allocate more time to create and personalize their marketing campaigns for the target customers. As AI can assess specific movements of customers on a deeper level (e.g., the preferred brand of product) and predict accurately using micro-segmentation, marketers are also able to distinguish their customers in a more personal way and understand what contributes or motivates the long-lasting relationship between their company and customers. With that, the companies can build a direct communication with their customers, resulting in enhanced brand loyalty and lifetime relationship.

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