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# Digital Marketing Analysis on Social Media Using Machine Learning

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**ABSTRACT-** The field of machine learning has received insufficient attention. Because of their superior Artificial Intelligence, machines that are capable of deep learning have the potential to push the boundaries of what is possible in digital marketing. This study intends to uncover the outcomes from the study of Indian customers' responses across a variety of demographics to machines and their capacities to sell, which may very well be the future of digital marketing. We have found that software developers need to construct the architecture in conjunction with digital marketers. These digital marketers utilize machines with deep learning to take into consideration the attitudes of customers as well as their behaviors and choices. As a result, in the not-too-distant future, marketers will have convenient access to correct information regarding clients, which will unlock enormous benefits for the companies. A causal model that makes use of regression models is used to explain how the performance of the machines is likely to change depending on the circumstances. SPSS version 24 and R software were used for the analysis of the data. Data regarding the customer's behaviors, their choices, and emotions are collected, and fuzzy-set qualitative comparative analysis (fsQCA) approach is used to determine how they can be influenced to use the services of the machine.

**KEYWORDS-** machine learning, digital marketing, social media, fuzzy set

## I. INTRODUCTION

People are increasingly using social media apps like Facebook, Instagram, LinkedIn, and Twitter to interact. This improves their attitudes and behaviors toward all social media technology. Thus, social media applications have had a significant impact on most elements of people's lives, including social, commercial, business, educational, and political.

Social media helps companies achieve their marketing goals, notably in consumer engagement, relationship management, and communication. From the standpoint of national governing authorities, social media could strategically improve two-way contact between enterprises and customers, thereby strengthening customer brand loyalty. Social media can also display content visually, vocally, or in a mix of all three. Over time, corporations have used social media to help customers find information, connect, promote, and change their buying habits[1] . Thus, companies have evolved several interactive techniques and procedures to boost brand identity and marketing performance. In reality, a lot of effort and resources have been spent on this sector to attract more clients for involvement or online customer relationships.

Practitioners and researchers have studied social media to learn how to successfully adapt and use it. This is due to the need to learn about the primary requirements for successful deployment of such technology and how much investment in such applications is viable. In this regard, strongly advocated the importance of analyzing social media's role in different contexts to increase awareness of such significant social media issues. In the same vein, attributed the importance of addressing social media issues to the innovative nature of these technologies and the fact that research in this area is still in the exploratory stage, requiring further interest and understanding. In their recent review study, they argued that while many studies have examined social media and its applications in various fields, a theoretical model covering the most important dimensions that could affect the success of such systems is still needed [2].

Social networking vs. social media is crucial. Social networking is "an electronic service, application, platform, or site used by individuals who have a common interest, beliefs, attitudes, culture, activities and really life relationships," according to Wikipedia. According to Wikipedia, social media allow people to broadcast, reach more people, and influence them [3].

According to [4], social media applications include "social networking sites, consumer review sites, content community sites, wikis, Internet forums and location-based social media." defined social media as ‘‘new media technologies facilitating interactivity and co-creation that allow for the development and sharing of user-generated content among and between organizations (e.g. teams, government agencies and media groups) and individuals (e.g. customers, athletes and journalists)’’.

Social media is used in many areas. However, the current study's focus is social media's commercial implications, thus marketing viewpoints are needed.

Social media marketing is "a dialogue often triggered by consumers/audiences, or a business/product/services that

circulate amongst the stated parties to set in motion a revealing communication on some promotional information so that it allows learning from one another's use and experiences, eventually benefitting all of the involved parties. The usage of social media tools, channels, and software is to produce, communicate, deliver, and trade services that have value for an organization's stakeholders [5].

## II. LITERATURE SURVEY

Machine learning, a game-changing digital marketing method, captures, analyzes, and reuses brand clicks and comments to learn brand emotions. This data allows marketers to adapt sales tools for each customer and tailor sales calls. Machine learning categorizes customers' clicks to brands to engage them more personally. Deep learning helps understand digital clients by categorizing and analyzing the huge amount of data collected daily.

The study used judgemental sampling in India to identify 1,250 digital customers to evaluate machine learning in digital marketing on multiple machine abilities to understand customer behaviors, choices, and emotions.

Digital marketing literature recommends more study of machine learning. Machine learning is opening new doors for digital marketing. This study gives service clients digital marketing opportunities. Facebook and Amazon demonstrate how machine learning can improve digital marketing. From selling books to developing a platform where employers and employees can meet [6].

## III. RELATED WORK

The Any study of marketing should begin with an examination of the customer from a psychological perspective. Marketers who design strategies based on consumers are able to modify offers and set the number of exposures and timings of advertising to close sales. Because there are numerous digital platforms, each of which has millions of individual customers, it is necessary for marketers to find the suitable digital platform in order to reach these customers with relevant material and data. In order for machines to successfully give marketing presentations, it is vital for the machines to understand the digital life of the customer and to create meaning for it, customers' spending habits are significantly impacted by their participation in online brand communities. The behavior of these communities can be understood by machines, and they may be categorized based on many parameters into a variety of groups according to things like their spending power and their interests. Deep learning is used by the machines to supply information on the communities in question, and it also analyzes the personalities of those communities, since those personalities are constructed by the communities themselves. Machines are equipped with a variety of analytical tools that may analyze digital customers in order to personalize digital advertisements to individual customers. The computers collect data on marketing mix, and based on the stage at which the prospective clients are, the advertisements are customized accordingly [7].

According literature [8] "deep learning by machines goes through various layers of data on customers, from being a prospect to an existing customer," and this helps to offer different items to individuals in accordance with the requirements of each unique customer. According to Bhimani et al.'s research, in the not-too-distant future, machines will be able to go so far as to create products with the assistance of customers and make recommendations for what to buy and when to acquire it.

An Analysis of Behavior, machines are analytical, human-like, and can be customised. The analytical component of the machine uses logic and intelligence to decode the behavior of online customers. This behavior, which is driven by huge data of previous customer activity, can be decoded by the machine. The applications of machine learning that are currently being employed in India are restricted to analytics that are used to determine the behavior of customers. Machines in marketing have not progressed beyond the personalization of message and have not improved upon targeting. Customers in India are presented with a multitude of brands on a daily basis, and there are machines that are supported by artificial intelligence that are working on evaluating the behavior of customers in relation to each brand on digital platforms. The social media platforms are an accurate mirror of the preferences of the customers, and machines are able to crawl through them to determine the preferences of the customers with regard to brands. Robots use social media as a source of big data to learn about the behavior of customers online in relation to different businesses. The robots are capable of easily decoding and recording descriptions of online behavior, which may then be used for further research and application [9].

Customers' clicks, likes, and shares can be used by automated sales and marketing technologies to create a profile of a customer's activity. This profile can be used to better serve the consumer. This provides the humans operating the computers with information about the expectations that customers have based on the customer's behavior while using the website. Because of the capabilities of the machines to engage in deep learning, there has been a rise in the utilization of tools that analyze the behavior of online customers.

The robots are able to distinguish the likes and shares that occur on social media platforms. It is possible to perform an analysis of the behavior of customers with regard to retail brands by employing this behavior online. The potential of computers with deep learning is far more than how it is currently being used since these machines can delve further to examine the patterns of clicks, the changes in the patterns, and behaviors extremely effectively in the future. The study suggests that software developers should create machines with the ability to discern between actions over time and the categorization of likes based on brands and items. This recommendation is based on research that was conducted.

Additional machines have the ability to forecast future demands even before the client is able to recognize such needs for themselves, which enables the customer to receive assistance while making decisions. The computers are also capable of developing algorithms that can correlate the exposure of a brand to the prospect and time that the brand is purchased by customers. This allows the machines to cross-check their predictions and match them with the behaviors of customers.

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The researcher conducted an analysis of the percentage of brand exposure that translated into sales. Machines that are unable to understand the behavior of the client online based on the likes and shares on social media platforms are not efficient because they are unable to provide the appropriate product advertisements at the appropriate moment [10].

## IV. PROPOSED APPROACH

A multi-pronged strategy was used to explore the Indian clients' comprehension of the machines that are supported by artificial intelligence. India is a varied nation that is home to a wide range of cultures as well as ongoing demographic shifts. In order to accomplish its goals, the research utilized interview techniques and survey approaches. During the interviews, an attempt was made to determine the amount of expertise of machine learning possessed by digital marketers. Interview methods are the primary source for gathering qualitative data in the social sciences. These approaches collect information directly from the participants. For the purpose of the study, interviews were conducted with a total of 110 digital marketers hailing from various IT centers located all over India. The information acquired in this way was put to use in the formulation of questionnaires for the clients who make online purchases.

Surveys are an extremely effective tool of research for analyzing the behavior of consumers. The clients and the practitioners were asked a variety of questions, the majority of which fell into one of two categories: behavior and choices based on machine learning led by artificial intelligence. The respondents were divided into several groups according to their degree of education and their experience with different types of marketing machines. The questionnaire was developed with the assistance of consultants who were engineers working on Artificial Intelligence in the countries of India and South Korea.

After that, the questionnaire was distributed to digital customers, digital marketers, and social media marketers in three different cities in India. Only 47 people did not answer out of a total of 1 297 consumers and marketers.

Using the iterated weighted least squares method, linear models were fitted to the data in order to examine the demographic differences regarding these respondents and to analyze their expertise about machine learning. The fuzzy sets approach of qualitative comparative analysis was utilized in the development of the software that would eventually be produced. The study investigated the causal configurations of behavior and choices that led to the findings that showed us the customers' interest in utilizing machine learning in the buying process. The causal conditions fuzzy sets qualitative comparison analysis approach is matched to find groups inside antecedent conditions. On this basis, we create the capabilities of machines for the future.

The customers were understood based on their shares and likes, their decision making, the ability of the machine to accurately recommend products, analyze the price variations, map previous purchases, identify repeat purchases, etc.

The purpose of behavior analysis is to gain an understanding of the preferences of customers in regard to a variety of offerings, reactions to brands, discounts, and so on. Machines are able to recognize the locations of the customers' purchases, tie those purchases to their comments, and comprehend the customers' behaviors. The choice analysis is utilized in order to ascertain the purchase, the return visits to websites, the reaction to newly introduced brands, and the comments regarding the promotions.

Due to the fact that India is such a culturally diverse country, there is no symmetrical relationship between the factors. Culture can change within just a few kilometers.

When non-native combinations of casual conditions were utilized, the scores ranged anywhere from 0.25 to 1.00. The calibration was performed by utilizing one to describe the whole association, another to demonstrate that there is no association, and the precise boundary between the two.

To analyze machine learning, two factors, attitude and behavior, were chosen. Digital marketers and customers alike were asked to rate how knowledgeable they were about machine learning in their respective fields, and the results were analyzed using a rating scale ranging from 1 to 5.

A grading scale from 1 to 5 was utilized to evaluate how effectively they employed machine learning software when selling as digital marketers and when buying as customers. More than half of the respondents regularly use devices that are supported by artificial intelligence, whereas twenty percent of them have never used it. The remainder reported making occasional usage of the product. The amount of knowledge regarding machines that was supported by artificial intelligence was evaluated automatically and referred to as variable X. Ordinal values are represented by X. In order to determine the linear model that exists between the variables that serve as explanations and the variables that serve as responses, we employ multiple linear regression.

After that, we conduct a comparative analysis between our findings and the results of machine learning research conducted across Europe.

The objective of the study is to determine the nature of the connection that exists between X, which serves as the dependent variable, and the other demographic characteristics that serve as explanatory factors. These factors were categorized using the questionnaire, and for the remaining independent variables, a number method was used in which m levels were converted to m 1 variables based on binary levels.

The variables that come after the numbering system are presented in Table 1. The variables denoted with an asterisk (*) will remain unchanged, but the variables denoted with a pair of asterisks (**) will no longer be used. There are ten constant variables that can explain the data, and they are denoted by the letters A 1 through A 10.

Table 1: Predicted Outcomes of Parameters for the Model

| Variable | Value | Std. error | *t*-Value | *p*-Value |
|---|---|---|---|---|
| Male | −0.2937 | 0.3974 | −0.6875 | 4.132-01 |
| Age | −0.4112 | 0.4895 | −0.7629 | 4.1456e-01 |
| City 2 | −0.3019 | 0.4165 | −0.6756 | 4.1567e-01 |
| City 3 | 1.0172 | 0.4765 | 2.1278 | 7.8453e-03 |
| Position | −0.1925 | 0.3986 | −0.3956 | 7.4329e-01 |
| Experience | −1.0276 | 0.5976 | −2.0125 | 1.8356e-02 |
| Usage | −4.8346 | 0.6875 | −6.9879 | 2.8564e-13 |
| 1/2 | −5.6274 | 0.8745 | −5.9856 | 1.7886e-10 |
| 2/3 | −3.1897 | 0.7186 | −4.0137 | 3.1504e-06 |
| 3/4 | 0.3678 | 0.6845 | 0.5170 | 5.1243e-01 |

## V. CONCLUSION

We are able to reach the conclusion that the cultural issue that exists inside the nation has a very significant role in the evaluation of the level of awareness regarding machine learning. The respondents' line of work is a significant factor in whether or not they are willing to accept machine learning. Every respondent who participated in the research has the potential to become a customer of machine learning in the future. In addition, the study provides guidance to software developers working on machine learning so that they can construct models for cross-cultural and professional profiles. Beta testing, which collects the user experience in order to optimize the development process further, could eliminate the bottlenecks that now exist in the process of building machine learning. However, the software is developed by the developers in collaboration with the digital marketers, with the latter's primary focus being on analyzing the customer's mindset, actions, and decisions.

## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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