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Application of Machine Learning to Improve Consumer Devices and Services

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Abstract: Machine learning is a subtype of artificial intelligence in which computers use algorithms to learn from data and discover patterns, a capacity that businesses may exploit in various ways to improve customer service. Machine learning (ML) is improving nearly every function and process automation by enabling operational optimisation. As a result, it improves customer service, speeds up work, lessens errors and improves accuracy. Customer service is one area of the company that might benefit from machine learning. Natural language processing and sentiment analysis are two technologies that can help businesses better understand how to respond to consumer comments and queries. The current study is being carried out to have a better knowledge of the ML. The researcher also examines the application of ML to improve consumer services and devices. The researcher uses secondary data to analyse every element of ML in this study. In order to get reliable findings, this article employed the descriptive research approach. Secondary data from research articles and peer-reviewed papers, and a literature review were employed in this study.

Keywords - Automation, Machine Learning, Consumer Satisfaction, Artificial Intelligence, E-Commerce, Prediction, Marketing.

1. INTRODUCTION

Artificial Intelligence (AI) is becoming increasingly prevalent. Machine Learning (ML), in which computers, software, and gadgets act via cognition, is one of the most prominent applications of AI. It is not wrong to say that machine learning act as a brain. In today's business environment, providing excellent customer service is more crucial than ever to compete effectively in the market. One of the most effective methods to aid these efforts is through machine learning-enhanced technology. Machine learning has the potential to improve corporate processes and provide more finely tuned and adequate levels of customer services

while also allowing companies to tailor exclusive experiences for every prospect to consumers [1]. In addition, machine learning is a cost-effective option that may be accessed through Google Cloud Services and Amazon Web Services.

Machine learning gives businesses numerous advantages; for example, before ML, online personalisation meant inserting a person name into the field. Now, with ML, it's simpler to create tailored experiences for consumers and prospects.

In addition, Machine learning may be used to evaluate all previous contacts with a prospect and use this critical data to deliver more tailored experiences to consumers, enabling greater customer engagement and making them feel heard and appreciated. Thus, machine learning assists businesses in scaling their engagement operations and providing more fruitful experiences [2]. In addition, Machine learning takes consumer data and analyses it to anticipate behavioural patterns and trends. Machine learning algorithms can recognise when a consumer needs assistance when buying on an eCommerce site to complete the sales process without any issues and problems. Hence, it improves the sales as well as the overall customer experience.

Machine learning enables programmes to record and learn from previous consumer interactions. As an outcome, companies are constantly improving their customer service abilities. Algorithms are tweaked over time, and high-quality customer service is maintained. This is far more convenient and profitable than retraining human employees. Therefore, Machine learning is an essential tool for offering more effective customer service at all levels, from increasing overall security to delivering highly customised levels of support. Machine learning assists company owners worldwide in more efficiently marketing products and services, providing faster responses to client questions, and identifying potential leads [3]. Consequently, the application of ML not only enhance customer services but also generate potential leads. ML also assist customer directly through virtual personal assistants such s include Siri, Alexa, and Google Now, to name a few. They aid in the search for information over the phone or voice over. Machine learning is significant due to its vast range of applications and remarkable capacity to adapt and give answers to complex issues quickly, effectively, and efficiently.

The current study was conducted in order to have a better understanding of applied machine learning. In addition, this paper also evaluates how ML improve customer service and devices.

Table 1: Evolution of Machine Learning

Years	**ML usage in business**
2010	5 percent
2011	7 percent
2012	10 percent
2013	12 percent
2014	15 percent
2015	20 percent
2016	25 percent
2017	50 percent
2018	65 percent

(Source: Self-made)

2. LITERATURE REVIEW

[4] report that Personalisation and recommendation systems are a popular application of machine learning to the consumer experience. Hybrid recommender systems—apps that incorporate several recommender strategies—have grown considerably more prevalent in recent years. Many hybrid recommender systems draw on various data sources and vast volumes of data, and deep learning models are commonly used. While it is customary for suggestions to be based on models that are only retrained regularly, sophisticated recommendation and customisation systems will require real-time processing. Companies are creating recommendation systems that continually train models against live data by using reinforcement learning, online learning, and bandit algorithms.
[5] State that Fraud detection is another area where machine learning is being absorbed. Fraud detection is becoming more common. Fraud is no longer done by people; it is instead done by machines, such as a bot that buys up all the tickets to events so that scalpers may resell them. Criminals may easily infiltrate social media by building a bot that responds to discussions automatically. It's far more challenging to find and block those bots in real-time. However, it is possible from ML.
[6] describes that Speech technology and emotion detection advances will significantly minimise friction in automated consumer interactions. Earlier customers had to wait in long phone lines using the old call system, which causes irritation and makes things more unpleasant for them and the company. With ML, customers can use natural language and words to explain what help they need. Natural language processing (NLP) technologies can assist computers, and artificial intelligence (AI) in better comprehend, interpret, and control human language and communication, allowing them to solve problems more rapidly and efficiently.
[7] assert that Predictive customer service analytics makes use of data from prior customer service encounters to forecast future quantitative outcomes. In order to continuously improve customer service, quantifiable data are required. Hence, machine learning assists add a predictive aspect to support metrics. Customer service businesses that seek to provide better experiences might benefit significantly from having these insights. In addition, customer recommendation engines, to improve the customer experience and deliver tailored experiences, are powered by machine learning. For example, Amazon and Walmart use recommendation algorithms to customise and speed the buying experience.

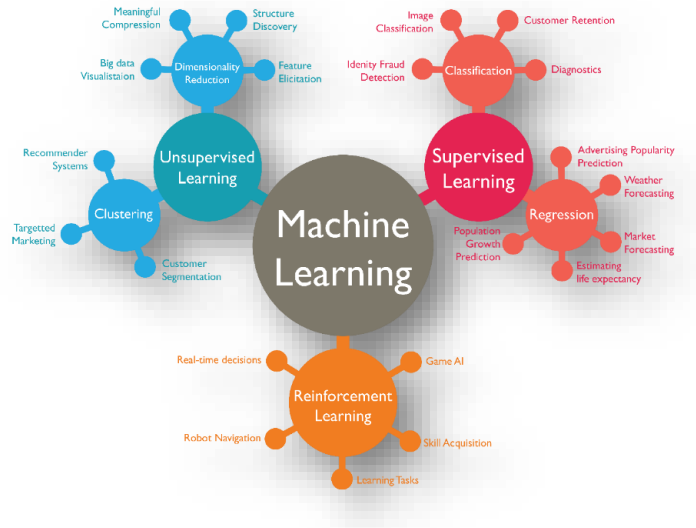

Figure 1: Application of Machine Learning
(Source: Wordstream.com. 2021)

3. METHODOLOGY

The descriptive research method has been used in this paper to obtain reliable results. The current article provides a critical outline of the application of ML to improve customer services and devices. The data used in this study is secondary data from research articles and peer-reviewed papers, literature reviews. The abundance of data on the Internet makes it possible to examine trends in the use of associated topics.

Machine learning systems that demonstrate their ability to meet consumer expectations are needed in many industries [8]. Machine learning plays a vital role in monitoring the corporate environment, locating consumer needs and executing appropriate solutions. As a result, it bridges the gap between customer demands and the availability of effective or high-quality services. ML opens up new opportunities, resulting in significant changes in the business environment. For example, it leads to big data trends and enhanced product design to match the needs and preferences of customers. The growing use of machine learning to improve the efficiency and quality of services has benefited e-commerce the most. ML aids in the reduction of difficulties that may arise as a consequence of human mistakes [9]. Hence, machine learning is a decisive driving factor behind the growth and success of e-commerce. Network marketing, electronic payments, and control of the logistics involved in getting items to clients are all possible with ML systems in e-commerce.

In addition, a company may use machine learning to collect a wide range of data and analyse consumers in order to provide them with high-quality services [10]. This allows e-commerce platforms to better understand the elements that impact the purchase decisions of their existing and future customers. It uses chatbots and messengers to increase connections between e-commerce firms and their consumers. In addition, ML also assist businesses in tracking assets in warehouses and improving the rankings of their pages or websites. Machine learning algorithms assist e-commerce businesses in learning from generated data and developing answers to problems they may face. As a result, machine learning models are being utilised to tackle a variety of economic issues.

It has been found that Companies are faced with the difficulty of meeting ever-changing client expectations. As a result, businesses are devising strategies to stay competitive by providing more than just what customers want. A company that appears to be removing the pain associated with purchase processes will attract more customers. This type of company uses machine learning to create a model that improves efficiency based on information about the market and the competitors. Further, to connect with targeted people in the most effective way, the application of ML ensures that the information supplied is correct and customised. As a result, ML will improve the relevance of the offer, increasing consumer engagement and interest.

Marketing is an essential part of every business since it persuades clients to prefer certain items from certain companies over others [11]. ML offers a lot of potential for changing marketing in the present and future. ML brings new and dynamic marketing techniques and new and enhanced methods of communicating with clients. Attitudinal segmentation is possible with machine learning, making marketing tactics more sustainable. Furthermore, ML guarantees a complete approach to studying consumer behaviour, resulting in marketing that is tailored to win over specific company buyers [12]. For example, in marketing, machine learning enables altering user interfaces. Customers will be more likely to buy a product if it is available across

many platforms. One crucial factor that impacts client demand in business is the hyper-personalisation of marketing, which is aided by machine learning. In this way, Machine learning significantly improving customer service.

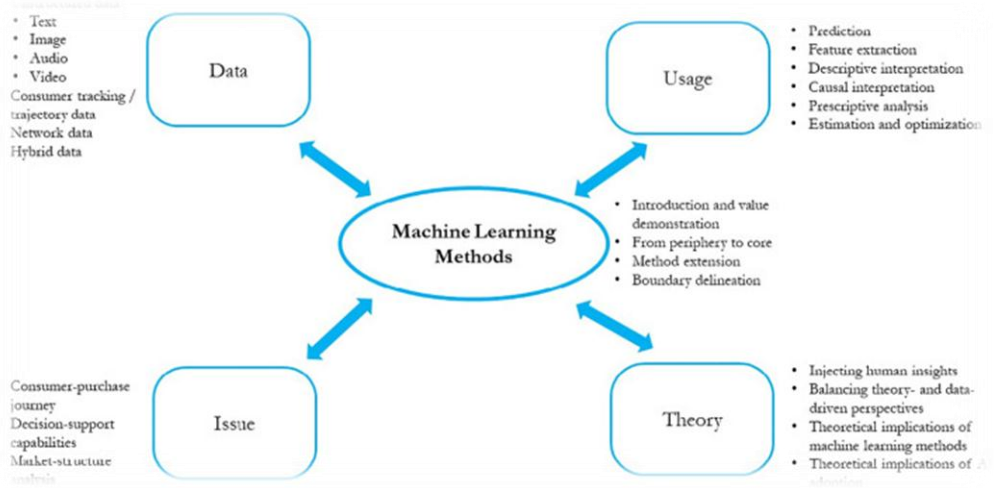

Figure 2: Application of Machine Learning to improve customer service (Source: 2021)

Apart from this, there are numerous devices of ML which assist consumers. As such Automatic Friend Tagging Suggestions in Facebook or any other social media site is one of the most frequent Machine Learning applications. Face detection and image recognition are used by Facebook to automatically locate a person's face that matches its database, and it then proposes that person tag that person using DeepFace. It is a Facebook Deep Learning project that recognises faces and determines who is in the photo.

Another application of ML is used in transportation and commuting, for example, uber cab. Based on the user's history and patterns, it automatically recognises the user's location and offers choices to travel home, workplace or any other frequent destination. It is possible only with the technology of ML. For example, it makes a more accurate ETA forecast by layering a Machine Learning algorithm on top of Historic Trip Data [13]. They noticed a 26 percent increase in accuracy in Delivery and Pickup after implementing Machine Learning. In addition, Virtual Personal Assistants assist in finding helpful information when asked via text or voice. For example, Speech Recognition, Speech to Text Conversion, Natural Language Processing, and other critical Machine Learning applications. It has been observed that Personal assistants have recently been employed in Chatbots that are being used in different food ordering applications, online training websites, and commuting apps.

One of the great applications of ML is self-driving cars. Machine Learning is critical in the development of self-driving cars, for instance, Tesla. NVIDIA, a hardware manufacturer, is the market leader, and their current Artificial Intelligence is based on an Unsupervised Learning Algorithm. The model employs Deep Learning and gathers data from all of its cars and drivers. It makes use of internal and exterior sensors, which are part of the Internet of Things. Machine learning allows organisations to complete activities on a scale and breadth that was previously unlikely [14].

In addition, all businesses rely on data to function. Data-driven choices are increasingly determining whether a company keeps up with the competition or falls further behind. Machine learning has the potential to uncover the value of corporate and consumer data and enable companies to make decisions that keep them ahead of the competition [15].

4. RESULT AND FINDINGS

The findings of the results highlight essential aspects regarding the concept of the application of machine learning in the consumer experience. This study's researcher has attempted to give a critical summary of the main ideas of applying machine learning to enhance customer services and devices and a comprehensive insight regarding the role of ML in addressing the needs of consumers in the business industry. It has been found from the study that in numerous scientific disciplines, such as computer vision, computer graphics, natural language processing, speech recognition, decision-making, and intelligent control, machine learning has had a lot of success. It is accurate machines don't make decisions, people do, but ML gives reliable data and information that makes it easy.

Table 2: Application of Machine Learning

Benefits of ML in business	**Benefits of ML to consumer**
Optimise internal business operations	Make better decisions
Create new opportunities	Easy communications
Optimise external processes like marketing and sales	Quick Responses to issues and problems
Pursue new markets	Easy approachability
Enhance the features, functions and performance of the business function and products	Detailed/ Expert decisions
Reduce human mistakes and errors	24-hour availability
Enhance customer satisfaction	Perennialization products

(Source: Self-made)

5. CONCLUSION

This current paper focuses on providing an overview of the application of machine learning to improve customer services and devices. The researcher examines the use of machine learning applications in this article. It has been found that Machine learning is changing the corporate sector at a breakneck. The application of machine learning to consumer services enables the business to gain in-depth analytics. Machine Learning (ML) has seen a meteoric rise in applications that solve issues and automate processes across a wide range of industries, especially in consumer devices. This is primarily due to the boom in data availability, substantial advancements in machine learning techniques, and advancements in computing power. A system can use machine learning to quickly examine data and derive knowledge. However, it is more than just learning or extracting information; it also entails using and developing it through time and experience.

It has been seen that Machine learning is a major driving force behind the development of e-commerces and success. In e-commerce, ML systems enable network marketing, electronic payments, and control of the logistics involved in shipping products to customers. In addition, Consumer data is analysed by machine learning in order to predict behavioural patterns and

trends. For example, machine learning algorithms may detect when a customer requires assistance when purchasing on an eCommerce site, ensuring that they can finish the transaction without difficulty. As a result, it boosts sales as well as overall consumer satisfaction.
Machine learning is a critical tool for providing better customer services at all levels, from enhancing overall security to delivering highly customised help. Machine learning helps business owners all over the world promote their products and services more effectively, respond to client inquiries more quickly, and discover prospective leads. Further, the study describes numerous applications of ML is defined such as Automatic Friend Tagging Suggestions in Facebook, Speech to Text Conversion, Natural Language Processing, self-driving cars and more.

Future work

This paper has made an attempt to cover the significant applications of machine learning to improve customer service. The current study may serve as a 'template' for the explanation of the application of ML that characterises customer experience and services. However, this does not mean that the study does not require a future scope. Future studies are needed to examine the need and role of ML systems in business as well as to evaluate consumer devices. Despite the recent wave of success of machine learning for networking, there is a lack of machine learning literature regarding its applications to consumer services, which this survey aims to address.

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