A REVIEW OF THE USE OF ARTIFICIAL INTELLIGENCE IN FINANCE, E-COMMERCE, AND COMPANY MANAGEMENT

Korke P S[1], Melge P P[2]

Assistant Professor, E&TC Dept., BMIT, Solapur, India[1]

Assistant Professor, E&TC Dept., BMIT, Solapur, India[2]

Abstract: Artificial intelligence (AI) has been applied to enhance operational efficiency, supply chain management, and consumer experience as well as mate size in the banking and e-commerce sectors, with the main objective being the development of standardized, trustworthy procedures for product quality control and the investigation of novel approaches to contact and assist clients at a minimal expense.

Deep learning is a branch of artificial intelligence and machine learning are two of the most widely applied methodologies. These models are utilized by individuals, organizations, and governmental bodies to forecast and get insights from data.

Machine learning models for the complexity and diversity of data are presently being developed in the food industry. The applications of artificial intelligence and machine learning to banking, corporate management, and e-commerce are covered in this article. Applications for forecasting, inventory management, fraud detection, sales growth, profit maximization, and portfolio management are the most often utilized ones.

Keywords: Artificial Intelligence, Machine Learning, Financial Industries, E-Commerce, Deep Learning.

I. INTRODUCTION

The goal of artificial intelligence is to create human-like artificial minds that are capable of language processing, perception, learning, and planning. It is the research and creation of computer systems that can do activities like speech recognition, decision-making, vision, and language translation that require human intelligence. Information technology has an area called artificial intelligence (AI) that focuses on human-like robot behaviour. John McCarthy, the father of AI, describes it as "the scientific and technological expertise of constructing clever computer programs in particular."

Two Artificial Intelligence (AI) methodologies that are most frequently used are deep learning and machine learning. These models are used by people, companies, and governmental organizations to project outcomes based on data. Currently, machine learning models tailored to the complexity and diversity of data in the food business are being developed.

AI is being used in e-commerce and financial services to provide improved customer experiences, efficient supply chain management, increased operational efficiency, and smaller customer sizes as a result of creative ways to reach and serve customers while lowering costs.

This article covers the use of artificial intelligence and machine learning in banking, corporate management, and e-commerce. Among the main applications are portfolio management, fraud detection, inventory control, sales forecasting, profit maximization, and security.

Artificial intelligence and machine learning methods

Machine learning is the cornerstone of AI. The link between artificial intelligence and machine learning is shown in Figure No. 1. Some of the most well-known machine learning methods are covered in this section.
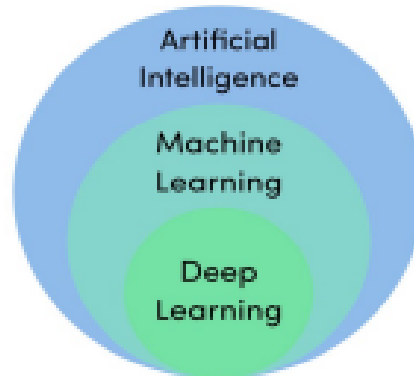
Figure No. 1: Deep learning, machine learning, and artificial intelligence are related.

A recent development in data mining called machine learning (ML) enables computer programs to foresee events more accurately without actually creating them. While supervised learning approaches employ labelled training data for inference (classification, regression) (clustering), unsupervised learning approaches use unlabelled data to identify hidden patterns already there.

The process of classifying involves transforming a set of input instances P into a unique set of characteristics Q, also referred to as target attributes or labels. Various classification approaches are employed, including decision tree classifiers, Bayesian classifiers, support vector machines, random forests, artificial neural networks, and closest neighbour classifiers 5. The core of each approach is the learning algorithm that it uses. One of the most basic and straightforward classifiers is the decision tree, which can be used to solve classification problems. A decision tree is used to categorize the values of the features, and the occurrences are then classified. The decision tree is made up of branches and nodes, where a branch represents a potential value for a node and a node indicates a classification instance. In the choice, instance sorting based on feature values comes after instance categorization at the root node.

In this instance, the majority of people who eat healthily and exercise frequently are probably at risk of having heart disease due to additional variables including smoking, drinking alcohol, and possibly inheritance. The categorization methodology is based on salient aspects of cardiac disease in these instances, which is insufficient to yield precise data. In these situations, it is necessary to describe the probabilistic correlations between the attribute collection and the class label; this is what the Bayesian classifier primarily explains 6.

A computer programme called an artificial neural network (ANN) is used to simulate animal brains. It is based on biological neural networks. ANN is also referred to as a connectionist system since it consists of directed linkages and connected nodes. Every linked connection has a weight assigned to it and is responsible for sending a signal from one node to the next. A node processes a signal before forwarding it to the subsequent node in the chain.

There are two methods for creating a learning model in machine learning classification. One of them is that eager learners are models that begin learning as soon as the training set is made available.

Each sample is interpreted by the Nearest Neighbour (NN) classifier as a data point in a d-dimensional space, where d is the feature number. The calculation determines the separation between every data point in the training set and the given test case. The k-Nearest Neighbours of the X contain all of the points that are nearest to the data point X.

The data point is then categorized based on the class labels of its neighbours. The class label with the greatest number of class labels is applied to the data point if it has more than one class-labelled neighbour. Finding the precise value of k's closest neighbours is essential. If there is noise in the training data, the system might misclassify if the value of k is too low. However, there is a chance of misclassification if k is really high since data points that are far from the test attributes neighbourhood may be included in the collection of nearest neighbours.

To start, Random Forest is a type of supervised machine learning consisting of several decision trees built with random vectors creating a forest of judgments. Issues with regression and classification can both be handled with this method. Since the random forest's result is correlated with the number of trees it combines, increasing the number of trees in the forest increases the likelihood of obtaining higher accuracy. It's critical to keep in mind that growing a forest is distinct from building decision trees [8].

Random forests and decision trees vary primarily in that random forests classify feature nodes randomly whereas decision trees identify the root node randomly. Random forest classification is well-known due to its benefits. One of its many benefits can be applied to both regression and classification. If there are enough trees available, this strategy also prevents over fitting. A random forest classifier can be modelled and used to manage missing data in the case of categorical data.

Applications for random forest classifiers can be found in the stock market, banking, e-commerce, and medical industries. In banking, random classifiers are employed to distinguish between honest and dishonest consumers. Physicians may choose which medications they recommend. Clinicians may choose which medications to give and diagnose ailments by utilizing a machine learning algorithm called Random Forest in conjunction with a patient's medical history. In the stock market, Random Forest classifiers are used to track a stock's movement and identify gains and losses. Random Forest can be used to forecast user-generated product recommendations in e-commerce.

The Support Vector Machine is the supervised learning model (SVM) utilized for categorization. A lot of excitement has surrounded the categorization industry. The vector space of the SVM model contains a sizable gap that divides data into different groups. Upon receipt of a new sample, it is mapped into the vector space that has been previously established, and based on its position on the gap, a label is assigned to one of the categories. You may perform non-linear classification in an SVM by using the kernel technique.

The technique of arranging items into groups based on greater similarities between their components is known as clustering, or cluster analysis. As the similarities and contrasts between the elements in one group and other groups rose, so did the clustering. Among its many uses are image processing, data compression, computer graphics, machine learning, and more. Clustering is an essential part of data mining. Clustering can be used in conjunction with other object categorization techniques like segmentation, partitioning, and classification. We might state that clustering is an example of unsupervised learning as compared to classification. Classification and cluster analysis are different in that the former maintains class membership while the latter does not. Furthermore, new samples are classified into known classes in the case of classification, and groupings are suggested in the case of data pattern-based cluster analysis
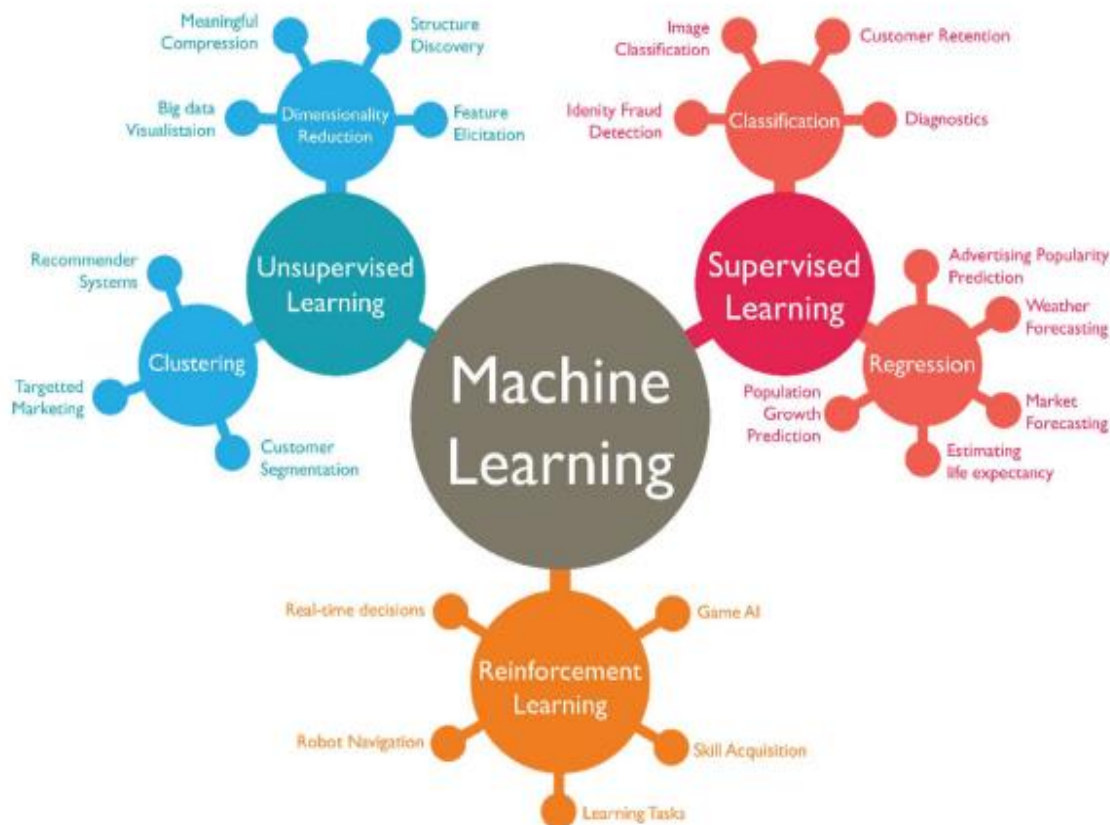

Figure 2: AI Machine Learning Model Types

Artificial Intelligence (AI) applications in banking, e-commerce, and business management
Applications of AI and machine learning in banking, e-commerce, and business management are covered in this area.

Chatbots
Chatbots are used by the majority of e-commerce and financial websites to improve customer satisfaction and service quality. These chatbots were created using machine learning and artificial intelligence techniques. They can behave like people. These chatbots may learn from their experiences and offer their customers the finest recommendations based on historical data that is available.

Image Lookup
A website for online sales uses artificial intelligence to find photos. Techniques for image processing are important to it. It helps to improve the quality of customer service. Clients have the option to look for products by using their visual representations. Searching for an item using keywords is not required.

Managing Client Information
E-commerce involves a massive volume of data. Algorithms that use machine learning can examine past data related to marketing, sales, HR, and customer purchase trends. This analytical result may be useful for profit maximization, sales maximization, and resource optimization. It helps financial and e-commerce companies refine their products for a certain customer base.

Recommendation System
Machine learning algorithms have the ability to analyse historical customer behaviour and preference data. They are able to accurately gauge customer preferences and provide or suggest the best products to them. It helps banking and e-commerce companies increase revenues and improve customer happiness.

Online safety
In order to maintain the security of an e-commerce platform, machine learning algorithms can identify system vulnerabilities and suggest suitable security fixes. Algorithms for machine learning are also useful in identifying and stopping financial institution fraud.

Inventory Control
Artificial intelligence algorithms are beneficial for inventory management in e-commerce businesses. By analysing historical sales data, these algorithms establish a connection between current and future sales. It helps managers plan for future sales and keep inventory levels appropriately.

CRM
CRM used to rely on employees to gather and manage a lot of data. However, artificial intelligence can now foretell which clients will make the best purchases and provide the finest service. Programs utilizing artificial intelligence can assist in identifying trends and structuring processes around them. Advanced CRM may grow and develop over time with the use of machine learning algorithms.

Human resources
AI engines for human resources determine which source is best for locating candidates. Using screen resumes, NLP could also assist in selecting candidates. Video interviews are being conducted with AI bots, including initial screening. This could expedite the hiring process and save time. But HR's responsibilities don't stop at hiring and choosing. AI has the potential to assist in the area of employee devotion.

Sales
The process of getting new customers is the initial stage in sales. Using a variety of data sources, AI is able to assess our company's objectives and suggest the most effective customer acquisition strategies. AI and machine learning can be used to optimize prices in order to maximize profit. AI and machine learning may also improve market basket analysis and consumer recommendations in order to increase sales.

Credit Scoring, Loan underwriting and Portfolio Management
Machine learning algorithms can categorize historical data and predict possible data based on historical data analysis. Credit Scoring, Loan Underwriting, and Portfolio Management are all aided to some extent by these algorithms. It aids in the reduction of risk in businesses.

When implementing machine learning technologies, financial companies face various obstacles.
Insufficient familiarity with business KPIs Financial services companies are eager to capitalize on this enormous potential, but they often fail to do so because of unrealistic expectations and a lack of knowledge about the workings of AI and machine learning (and why they are necessary).

R&D expenditures are high - Financial services firms usually struggle with data management because of the fragmented parts of data that are held in multiple locations, such as CRMs, regional data centers, and reporting tools. Businesses must invest a lot of time and money to prepare this data for data science projects.

Together, these problems lead to inflated estimates that blow through the project's whole budget. For this reason, financial organizations should set realistic expectations for each machine learning services project based on their business objectives.

Machine learning applications in finance
Here are some instances of potential applications of machine-learning algorithms in the banking industry:
Financial monitoring, investment making, process automation, safe transactions, financial advisory, risk management, algorithm trading, customer data management, decision-making, raising customer service standards, customer retention initiatives, and marketing.

Finance and Machine Learning
In addition to the widely recognized uses of machine learning in e-commerce, banking, and finance, there are a number of other exciting prospective uses for this technology. While some of these are still under development, several of them have active uses today. Better customer service, enhanced security, customer sentiment analysis, and recommendations or sales of various financial commodities are made.

II. CONCLUSION

In the financial and e-commerce sectors, artificial intelligence (AI) has been utilized to enhance mate size, operational efficiency, supply chain management, and customer experience. Developing standardized, dependable procedures for product quality control and investigating novel approaches to consumer outreach and service while minimizing expenses are the main objectives. The two most popular AI techniques are machine learning and deep learning. These models are used by people, companies, and governmental organizations to forecast and get insights from data. Due of the complexity and diversity of data in the food business, machine learning models are now being developed for it. The applications of artificial intelligence and machine learning to banking, corporate management, and e-commerce are covered in this article.

Among the most widely used applications are portfolio management, fraud detection, inventory management, sales forecasting, profit maximization, and security.

Asset management, risk assessment, investment advising, financial fraud detection, document authentication, and many other areas of the financial ecosystem are using machine learning.

ML algorithms cover a wide range of tasks, but they always learn from vast volumes of data and bridge the gap by bringing the financial system closer to complete automation.

REFERENCES

[1]. Paulraj Prabhu, Neelamegam Anbazhagan, 2014. Improving Business Intelligence Based on Frequent Itemsets Using k-Means Clustering Algorithm. In: Meghanathan N., Nagamalai D., Rajasekaran S. (eds) Networks and Communications (NetCom2013). Lecture Notes in Electrical Engineering, vol 284. Springer, Cham, ISSN 1876-1100, ISBN 978-3-319-03691-5, ISBN 978- 3-319-03692-2 (eBook), DOI: 10.1007/978-3 319-03692-2_19, pp 243-254.
[2]. P. Prabhu, N. Anbazhagan, FI-FCM Algorithm for Business Intelligence. In: Prasath R., Kathirvalavakumar T. (eds) Mining Intelligence and Knowledge Exploration. Lecture Notes in Computer Science, vol 8284. Springer, Cham, pp 518-528 ISSN 0302-9743(Print ISBN 978-3-319-03843-8), (Online ISBN 978-3-319-03844-5), 2013. DOI: 10.1007/978-3-319-03844-5_52 December 2013
[3]. R. Manne, S.C. Kantheti, Application of artificial intelligence in healthcare: chances and challenges, Curr. J. Appl. Sci. Technol. 40 (6) (2021) 78–89, https:// doi.org/10.9734/cjast/2021/v40i631320.

[4]. R.S. Ganesh, K.J. Jausmin, J. Srilatha, R. Indumathy, M. Naved, M. Ashok, 2021, April. Artificial Intelligence Based Smart Facial Expression Recognition Remote Control System. In 2021 5th International Conference on Computing Methodologies and Communication (ICCMC) (pp. 1056-1061). IEEE.

[5]. R. Kamal, A. Karan, V.S. Arungalai, ''Investigations on E-commerce Data for Forecasting the Efficient Promotional Platform Using Supervised Machine Learning,'' 2019 4th International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), 2019, pp. 939-943, DOI: 10.1109/RTEICT46194.2019.9016688.

[6]. P. Szabó, B. Genge, ''Efficient Conversion Prediction in E-Commerce Applications with Unsupervised Learning,'' 2020 International Conference on Software, Telecommunications and Computer Networks (SoftCOM), 2020, pp. 1-6, DOI: 10.23919/SoftCOM50211.2020.9238344.

[7]. S.C. Bilow, Introduction: AL and machine learning, SMPTE Motion Imaging J. 129 (2) (2020) 14–15, https://doi.org/10.5594/JMI.2020.2964182.

[8]. M. Ferdous, J. Debnath, N.R. Chakraborty, ''Machine Learning Algorithms in Healthcare: A Literature Survey,'' 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), 2020, pp. 1-6, DOI: 10.1109/ICCCNT49239.2020.9225642.

[9]. S. Nandhini, J. Marseline K.S., ''Performance Evaluation of Machine Learning Algorithms for Email Spam Detection,'' 2020 International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE), 2020, pp. 1-4, DOI: 10.1109/ic-ETITE47903.2020.312.

[10]. N. Soni, E.K. Sharma, N. Singh, A. Kapoor, Artificial Intelligence in Business: From Research and Innovation to Market Deployment. Procedia Comput. Sci. 2020, 167, 2200–2210.

[11]. A.Di Vaio, R. Palladino, R. Hassan, O. Escobar, Artificial intelligence and business models in the sustainable development goals perspective: A systematic literature review. J. Bus. Res. 2020, 121, 283–314.

[12]. Di Vaio, F. Boccia, L. Landriani, R. Palladino, Artificial Intelligence in the Agri-Food System: Rethinking Sustainable Business Models in the COVID-19 Scenario. Sustainability 2020, 12, 4851.

[13]. T. Kumar, M. Trakru, The Colossal Impact of Artificial Intelligence. ECommerce: Statistics and Facts. Int. Res. J. Eng. Technol. (IRJET) 2020, 6, 570–572. Available online: https://www.irjet.net/archives/V6/i5/IRJET-V6I5116.pdf (accessed on 3 December 2020).

[14]. N. Soni, E.K. Sharma, N. Singh, A. Kapoor, Impact of Artificial Intelligence on Businesses: From Research, Innovation, Market Deployment to Future Shifts in Business Models. arXiv 2019, arXiv:1905.02092.