APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN COMPANY MANAGEMENT, E-COMMERCE, AND FINANCE: A REVIEW

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Abstract

Artificial intelligence (AI) has been used to improve customer experience, supply chain management, operational efficiency, and mate size in the e-commerce and financial industries, with the primary goal of developing standard, reliable product quality control methods and exploring new ways to reach and serve customers while keeping costs low. In artificial intelligence, deep learning and machine learning are two of the most extensively used approaches. Individuals, organisations, and government agencies use these models to predict and learn from data. In the food business, machine learning models for the complexity and diversity of data are currently being created. This article discusses the applications of machine learning and artificial intelligence in e-commerce, business management, and finance. The most often used applications are sales growth, profit maximisation, forecasting, inventory management, security, fraud detection, and portfolio management.

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

Introduction

Artificial intelligence focuses on creating artificial human minds that can learn, plan, perceive, and process natural language. 1It is the study and development of computer systems capable of doing tasks that need human intelligence, such as vision, speech recognition, decision-making, and language translation. 3 Artificial intelligence (AI) is a subfield of information technology that focuses on robots that behave like humans. "The scientific and technological expertise of constructing clever computer programmes in particular," according to AIs father, John McCarthy.

Deep learning and machine learning are two of the most often utilised Artificial Intelligence (AI) approaches. Individuals, businesses, and government agencies utilise these models to forecast outcomes based on data. Machine learning models for the food industry's complexity and diversity of data are currently being developed.2

In e-commerce and financial services, the hunt for innovative ways to reach and serve consumers while keeping costs down has necessitated the use of AI to deliver a better customer experience, effective supply chain management, enhanced operational efficiency and decreased mate size.

This article discusses e-commerce, business management, and finance applications of machine learning and artificial intelligence. Sales growth, profit maximisation, sales forecasting, inventory management, security, fraud detection, and portfolio management are just a few of the primary uses.

Machine learning and artificial intelligence techniques

The fundamental AI approach is machine learning. Figure No.1 depicts the relationship between machine learning and artificial intelligence. This section discusses some of the most well-known machine learning techniques.
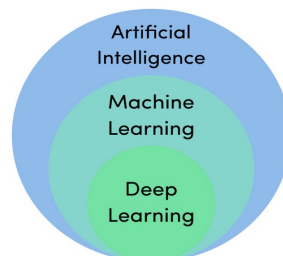

Figure No. 1. There is a link between artificial intelligence, machine learning, and deep learning.

Machine learning (ML) 4 is a new field of data mining that allows computer software that improve its accuracy at forecasting events without physically creating them. Unsupervised learning approaches use unlabeled data to find existing hidden patterns, whereas supervised learning techniques use labelled training data for inference (classification, regression) (clustering**)**.

Classification is the process of converting a set of input examples P into a distinct set of qualities Q, often known as target attributes or labels. Classification techniques such as decision tree classifiers, Bayesian classifiers, artificial neural networks, nearest neighbour classifiers, random forest, and support vector machines are utilised 5. The learning algorithm that each method employs is at the center of it.

Using a decision tree to solve classification problems is one of the simplest and most fundamental classifiers. The values of features are sorted into categories in a decision tree, and the occurrences are then categorised. The decision tree comprises nodes and branches, with each node indicating a classification instance and each branch representing a possible value for the node. In the decision, instance categorization begins at the root node and is followed by instance sorting based on feature values.

In this case, other factors such as smoking, alcohol use, and maybe heredity are likely to put most people who eat healthy meals and exercise regularly at risk of developing heart disease. The classification model is built on prominent heart disease features in these cases, which cannot provide accurate information. In such cases, describing probabilistic relationships between the attribute collection and the class label is required, and the Bayesian classifier is all about explaining such responsibilities 6.

An artificial neural network (ANN) is a computer programme based on biological neural networks used to design animal brains. Because it comprises connected nodes and directed links, ANN is also known as a connectionist system. Each connected connection is given a weight and is in charge of transmitting a signal from one node to the next. When a node receives a signal, it processes it before passing it on to the next node in the chain.

In ML classification, there are two techniques to developing a learning model. One of them is that the model starts learning as soon as the training set is available; enthusiastic learners are such models. Another model looks at all training examples but only classifies the test instance if its attributes match any training examples precisely. The term "lazy pupils" is used to refer to these students.8

The Nearest Neighbour (NN) classifier interprets each sample as a data point in a d-dimensional space, where d is the feature number. The distance between the specified test example and all of the data points in the training set is calculated. All of the points closest to the data point X are included in the k-Nearest Neighbors of the X.

The data point is subsequently classified according to its neighbours' class labels. If a data point has other than one class labelled neighbour, the class label with the most class labels is assigned to the data point. It is necessary to determine the exact value of k's nearest neighbours. It may misclassify if the value of k is too low due to noise in the training data. If the value of k is very high, however, there is a danger of misclassification since the collection of nearest neighbours may contain data points distant from the test attribute's neighbourhood.

To begin, Random Forest is a kind of supervised machine learning that consists of a forest of judgments created by many decision trees constructed using random vectors. This approach may be used to address both classification and regression issues. The outcome of the random forest is linked to the number of trees it combines in the forest; therefore, as the number of trees in the forest grows, so does the possibility of achieving more accuracy. It is important to remember that developing the forest is not the same as creating decision trees [8].

The primary difference between decision trees and random forests is that the root node is identified at random in random forest classification, and the feature nodes are separated at random. The advantages of random forest classification have made it famous. It has several advantages, one of which may be used for both classification and regression. Another benefit of this method is that it avoids overfitting if enough trees are available. In the case of categorical data, a random forest classifier may also handle missing data and be modelled.

Random forest classifiers are utilised in various fields, including medicine, banking, e-commerce, and the stock market. Random classifiers are used in banking to determine loyal and dishonest customers. Doctors may determine which drugs to prescribe

and diagnose illnesses using a patient's medical history and a machine learning system called Random Forest, doctors may determine which drugs to prescribe and diagnose illnesses. Random Forest classifiers are used in the stock market to monitor a stock's behaviour and detect profit and loss. In e-commerce, Random Forest may be used to predict user product suggestions.

The supervised learning model used for classification is the Support Vector Machine (SVM). There has been much hype about the categorising business. The SVM model has a considerable gap in vector space that separates samples of various categories. When a new sample is received, it is mapped into the established vector space, and its label is given to one of the categories depending on its location on the gap. 9. The kernel approach may be used to do non-linear classification in an SVM.

Clustering, often called cluster analysis, is the process of grouping items so that components in one group are more similar. The clustering increased as the similarities between items in one group and the differences between things in other groups grew. Clustering is a crucial component of data mining, and it may be used in a variety of applications, including image processing, data compression, computer graphics, machine learning, and more.

Other object categorization procedures, including classification, segmentation, and partitioning, can be combined with clustering. When comparing clustering to classification, we may say that clustering is an example of unsupervised learning. Cluster analysis differs from classification because classification keeps class membership, whereas clustering does not. In addition, in the case of classification, fresh samples are placed into known classes, and in the instance of data pattern-based cluster analysis, groupings are proposed 9
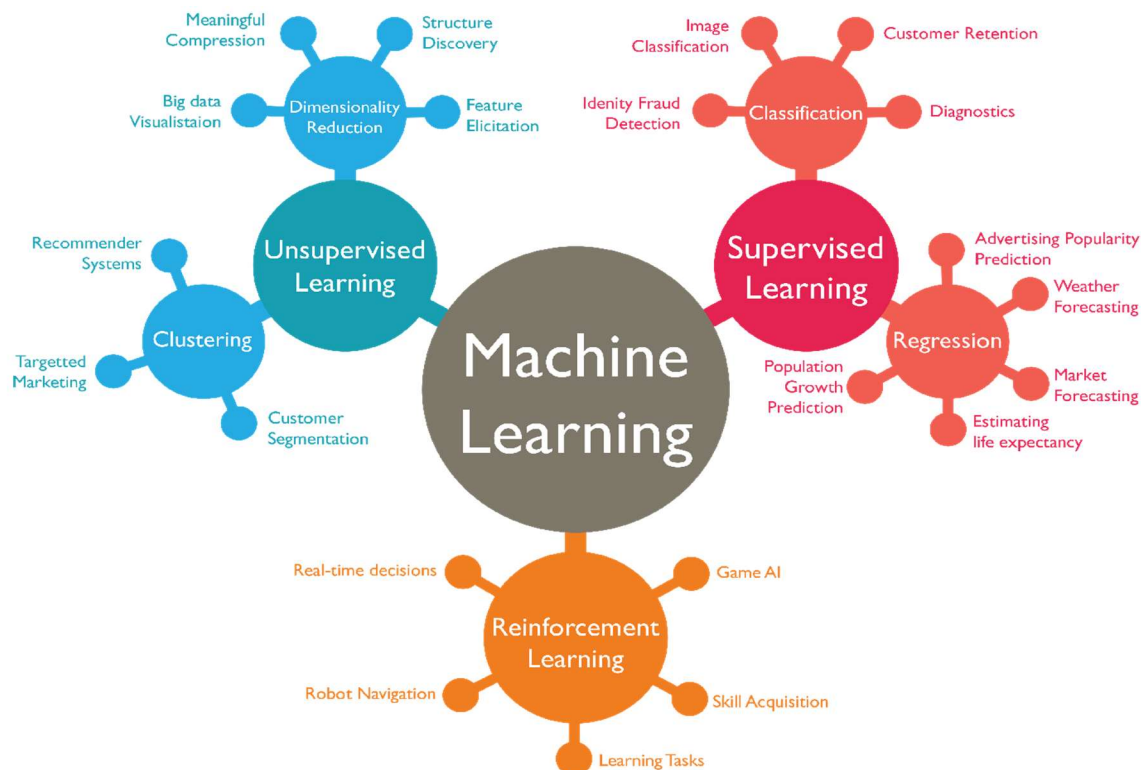

Figure No. 2 Types of AI Machine learning Models

Applications of Artificial Intelligence (AI) in business management, e-commerce and finance 1011121314
This section discusses Artificial Intelligence and Machine Learning applications in business management, e-commerce, and finance.

Chatbots

Most e-commerce and financial websites to increase client happiness and deliver better services are using Chatbots. Artificial intelligence and machine learning techniques were used to construct these chatbots. They can act human-like. These chatbots are capable of learning, and they can provide the best advice to clients based on the availability of previous data.

Image Search

Artificial intelligence is used in search of images on an e-commerce website. Image processing methods are at the heart of it. It contributes to the enhancement of customer service. Customers may search for items based on their visual representations. It is not necessary to conduct a keyword search on an item.

Handling Customer Data

The amount of data involved with e-commerce is enormous. Machine learning algorithms may analyse historical data in sales, human resources, marketing, and customer purchasing patterns. Profit maximisation, sales maximisation, and resource optimization may benefit from this analytical finding-this aids e-commerce and finance businesses in finalise their offerings for a particular user segment.

Recommendation System

Machine learning algorithms may analyse historical data about a customer's preferences and behaviour. They can successfully estimate client preferences and offer or recommend the most appropriate goods to customers. It aids e-commerce and banking firms in boosting sales and improving client satisfaction.

Cybersecurity

Machine learning algorithms can discover system flaws and propose appropriate security solutions to keep an e-commerce platform safe. Machine learning algorithms are also helpful in detecting and preventing fraud in financial institutions.

Inventory Management

E-commerce enterprises benefit from artificial intelligence algorithms in inventory management. These algorithms analyse sales data from the past and discover a link between the present and future sales. It aids managers in forecasting future sales and properly maintaining inventories.

CRM

CRM formerly relied on personnel to collect and service a large amount of data. On the other hand, Artificial intelligence can now predict which customers will buy and serve them best. Artificial intelligence programmes can help discover patterns and arrange operations around them. With machine learning algorithms, advanced CRM may learn and improve over time.

Human Resources

AI Engines identify the appropriate source for obtaining the candidate. Using screen resumes, NLP may also help pick applicants. AI bots are now being used for video interviews, including first-tier screening. This can help in saving our time and improve our hiring process. However, HR's work does not end with recruiting and selection. Employee dedication is another area where AI may help. Innovative training approaches can be proposed by machine learning.

Sales

Customer acquisition is the first step in the sales process. AI can evaluate our company's goals using different data sources and recommend the best client acquisition options. To maximise profit AI and machine learning may be used to optimise prices. To boost sales, AI and machine learning might also help enhance customer suggestions and market basket analysis.

Credit Scoring, Loan underwriting and Portfolio Management

Machine learning algorithms can categorise 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.

Finance companies encounter several challenges when it comes to deploying Machine Learning technology

Inadequate knowledge of business KPIs - Companies in the financial services industry want to take advantage of this great potential, but they frequently fall short due to excessive expectations and a lack of understanding of how AI and Machine Learning function (and why they need it).

R&D costs are high - With fragmented portions of data kept in numerous locations such as reporting software, regional data centres, CRMs, and so on, financial services businesses typically suffer from data management. Companies have a time-consuming and costly burden in getting this data suitable for data science initiatives.

These issues combine to produce unrealistic projections, which consume the project's whole budget. That is why, based on their business objectives, financial organisations should set reasonable expectations for each machine learning services project.

Finance-related applications of machine learning
Here are a few examples of how machine-learning algorithms may (and are) being applied in finance:
Financial monitoring, making the investment, process automation, secure transactions, Risk Management, Algorithm Trading, Financial Advisory, Customer Data management, Decision Making, Customer Service level improvement, customer retention program and marketing.

Machine learning in Finance: What the Future Holds
Apart from the well-known applications of machine learning in banking, finance and e-commerce, Machine Learning technology has several additional intriguing applications in the future. While many of these have active applications today, others are still developing. Recommendations or sales of various financial goods are made, Enhanced Security, customer sentiment analysis, and better customer service.

Conclusion
AI has been used to improve customer experience, supply chain management, operational efficiency, and mate size in the e-commerce and financial industries. The primary goal is to develop standard, reliable product quality control methods and explore new ways to reach and serve customers while keeping costs low. Two of the most used AI approaches are deep learning and machine learning. Individuals, businesses, and government agencies utilise these models to forecast and learn from data. Machine learning models are now being developed for the food industry's complexity and diversity of data. This article discusses the uses of machine learning and artificial intelligence in e-commerce, business management, and finance. Sales growth, profit maximisation, sales forecasting, inventory management, security, fraud detection, and portfolio management are just a few of the most popular uses.

Machine Learning is being used in various sectors of the financial ecosystem, including asset management, risk assessment, investment advising, financial fraud detection, document authentication, and much more.

While ML algorithms deal with a wide range of activities, they continually learn from massive amounts of data and close the gap by moving the world closer to a fully automated financial system.

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