

# **Artificial Intelligence and Machine Learning: Current Developments and Applications**

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**Abstract:** The rate of change is accelerating as a result of the quick technological advancements taking place nowadays. One of the fastest-growing fields of technology is machine learning (ML), a sort of artificial intelligence (AI) that is frequently used. Although technology trends and new innovations are Because of the COVID-19 epidemic and other emerging technologies, a lot has changed this year, and IT workers have realized that their job in the contactless society of the future won't be the same. being similar. The many AI and ML applications that are now popular will be examined in this article.

**Keywords:** Artificial intelligence, Machine learning, Deep Learning, Natural Language Processing.

## **1. INTRODUCTION**

The current hot subjects include artificial intelligence and machine learning. With the introduction of various shabots, including bots for sports, news, weather, and other things. Right now, a lot is happening in the field. [1] As a result of the digital transformation, more businesses are turning to machine learning solutions to automate, streamline, and simplify their processes as workplace requirements, goods, and services evolve. What then is the state of machine learning technology today and where is it going in the future? [2] A machine may mimic human behaviour thanks to artificial intelligence. A subtype of artificial intelligence called "machine learning" enables a system to automatically learn from prior data without having to be explicitly programmed.

AI seeks to tackle complicated issues by creating intelligent computer systems that resemble humans. Making a computer, robot, or other thing think intelligently is referred to as artificial intelligence. Artificial intelligence (AI) is the study of how the human brain makes decisions, learns, and thinks in order to solve problems. The study also suggests clever software systems. Artificial intelligence has a subcategory called machine learning (AI). Machine learning frequently aims to comprehend data structure and incorporate that data into models that people can comprehend and apply. The ability of a computer or computer-controlled robot to carry out tasks that would typically need human intelligence and decision-making is known as artificial intelligence (AI).

Due to company digitization, globalisation, expanding industry 4.0 chain architectures, and increased demand for information efficiency, the commercialization of AI is accelerating. For the

purpose of boosting production and satisfying demand in the global industrial sector, several nations are investing in AI and machine learning technology. For instance, the UNCTAD study states that Chinese AI companies raised their investment in 2018 by US\$ 31.7 billion, or nearly 75% of the US\$ 43.5 billion global total. China is a global leader in the use of AI and ML technology, particularly in the fields of autonomous driving and healthcare.

**2. Application of AI**

Artificial intelligence has various applications in today's society. At present, it is becoming indispensable as it can effectively solve complex problems in various industries such as healthcare, entertainment, finance, education, etc. AI makes our daily life more convenient and faster. Following are some sectors which have the application of Artificial Intelligence:



**2.1. AI in Astronomy**

Complex problems in the universe can often be solved extremely effectively by artificial intelligence. AI technology can be useful for understanding the universe, including its origin and workings.

**2.2 AI in Healthcare**

Artificial intelligence is being used in the healthcare sector to diagnose patients more quickly and accurately than humans. In order to provide medical care to a patient prior to hospitalisation, AI can assist clinicians with diagnosis and report on the deterioration of a patient's condition.

**2.3. AI in Gaming**

AI can be applied to video games. AI machines are capable of playing strategy games like chess, which require a lot of location-based thinking on the part of the machine.

**2.4. AI in Finance**

The finance and AI industries make the ideal partners. Automation, chatbots, adaptive intelligence, algorithm trading, and machine learning are all being applied to financial processes in the finance sector.

**2.5. AI in Data Security**

Every business must priorities data security, and in the digital age, cyberattacks are increasing significantly. Your data can be made more secure and safe with AI. Examples like the AEG bot and AI2 Platform are used to more accurately identify software defects and cyberattacks.

**2.6. AI in Social Media**

There are billions of user profiles on social media platforms like Facebook, Twitter, and Snapchat, all of which need to be saved and handled very effectively. Massive volumes of data can be managed and organized by AI. A lot of data may be analyzed by AI to find the newest hashtags, trends, and user needs.

**2.7. AI in Travel & Transport**

The demand for AI in the tourism industry is growing rapidly. AI is capable of carrying out a variety of tasks relating to travel, including booking accommodations and recommending to consumers the best flights, hotels, and itineraries. The travel industry is utilizing AI-powered chatbots that can interact with clients in a human-like manner for better and quicker response.

**2.8. AI in Automotive Industry**

For better efficiency, some automotive businesses are embracing AI to offer its users virtual

assistants. Talbot, an intelligent virtual assistant, was unveiled by Tesla, for instance. Self-driving cars are now being developed by a number of industries, which can make your trip safer and more secure.

### **2.9. AI in Robotics:**

In robotics, artificial intelligence plays a noteworthy role. Typically, general robots are programmed to carry out various monotonous activities, but with the use of artificial intelligence, we can build intelligent robots[ 9]that can carry out tasks based on their own experiences rather than being pre-programmed. The best examples of artificial intelligence in robotics are humanoid robots. Recently, the intelligent humanoid robots Erica and Sophia were created, and they can speak and act in human-like ways.

### **2.10. AI in Entertainment**

Our daily lives now include certain AI-based applications that work with entertainment services like Netflix or Amazon. These services display suggestions for programmes or shows using ML/AI algorithms.

### **2.11. AI in Agriculture**

For the best results, agriculture requires a variety of resources, work, funds, and time. Today's agriculture is more digitized, and AI is becoming more prevalent in this industry. AI is being used in agriculture for robotic farming, crop monitoring, and predictive analysis. AI in farming can be highly beneficial to farmers.

### **2.12. AI in E-commerce**

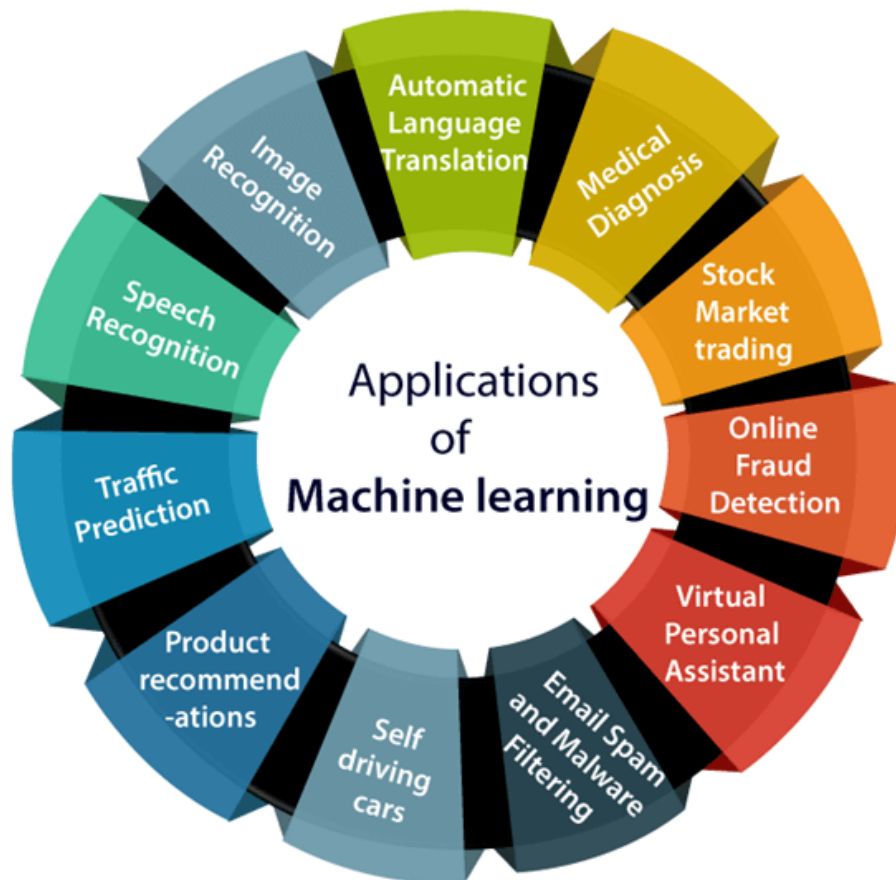
The e-commerce sector now has a competitive advantage thanks to AI, which is also growing increasingly important to the sector. AI is assisting customers in finding related products with suggested size, colour, or brand.

### **2.13. AI in education**

Grading can be automated by AI, giving the instructor more time to educate. A teaching assistant AI chatbot can interact with pupils. Future AI may serve as a convenient personal virtual tutor for pupils, available at any time and location. [5]

## **3. APPLICATION OF MACHINE LEARNING**

Today's technology has made machine learning a buzzword, and it is developing very quickly. Without without realising it, we use machine learning every day in applications like Google Maps, Google Assistant, Alexa, etc. The following list of the top machine learning real-world applications includes:



### **3.1. Image Recognition**

One of the most popular uses of machine learning is image identification. It is used to identify things like digital photos, people, places, and items. Automatic Friend Tagging, based on the Facebook project "Deep Face," which is in charge of facial identification and people recognition in the image, is a well-known application of image recognition and face detection.

### **3.2. Speech Recognition**

When using Google, we have the option to "Search by voice," which is a well-liked machine learning technology and is located under text recognition. Speech recognition, often known as "Speech to text" or "Computer speech recognition," is the process of turning spoken commands into text. Many voice recognition applications currently make use of machine learning algorithms. Alexa, Siri, Cortana, and Google Assistant all use speech recognition technologies to carry out voice commands.

### **3.3. Traffic prediction**

When we wish to travel to a new location, Google Maps comes in handy because it offers us the quickest route and anticipates traffic conditions.

### **3.4. Product recommendations**

Amazon, Netflix, and other e-commerce and entertainment businesses frequently utilise machine learning to recommend products to users. Because of machine learning, once we look up a product on Amazon, we start seeing advertising for it while using the same browser to surf the internet. By utilizing a variety of machine learning algorithms, Google recognizes the user's needs and proposes products that meet those needs. As a result, recommendations for sports programmers, movies, etc. are displayed when we use Netflix, and this is also accomplished with the aid of machine learning.

### **3.5. Self-driving cars**

Self-driving automobiles are one of the most intriguing uses of machine learning. In self-driving automobiles, machine learning is crucial. The most well-known automaker, Tesla, is developing a self-driving vehicle. In order to train automobile models to recognize people and objects while driving, unsupervised learning is used.

### **3.6. Email Spam and Malware Filtering**

Every new email that we get is immediately classified as important, common, or spam. Machine learning is the technology that enables us to frequently receive essential emails in our inboxes with a distinctive logo and emails in our junk folder. For email spam filtering and virus identification, some machine learning methods are utilized, including Multi-Layer Perceptron, Decision tree, and Nave Bayes classifier.

### **3.7. Virtual Personal Assistant**

Virtual personal assistants like Siri, Cortana, Alexa, and Google Assistant are widely available. They assist us in finding information through voice direction, as the name would imply. Our voice commands, such as "Play music," "Call someone," "Open an email," and "Schedule an appointment," can support these assistants in a variety of ways. Algorithms for machine learning are a crucial component of these virtual assistants. These assistants record our voice patterns,

send them to a server on the cloud, and decode them using ML algorithms and act accordingly.

### **3.8. Online Fraud Detection**

By identifying fraudulent transactions, machine learning keeps online commerce secure. When conducting business online, fraud may occur in a variety of ways, including the use of fictitious accounts and identification documents and the theft of funds in the course of a transaction. Therefore, the Feed forward Neural Network assists us in identifying this by determining if the transaction is legitimate or fraudulent.

Every time a transaction is true, the output is changed into a set of hash values, which are then used as the next round's input. There is a unique process for every legitimate transaction that makes room for change for fraudulent transactions; as a result, it detects fraud and increases the security of our online transactions.

### **3.9. Stock Market trading**

Trading on the stock market frequently makes use of machine learning. Because there is always a chance that share prices will go up and down, this machine learning short-term neural network is used to predict stock market trends.

### **3.10. Medical Diagnosis**

Machine learning is utilized in medical science to diagnose disorders. As a result, medical technology is developing quickly and is now able to create 3D models that can pinpoint the precise location of brain lesions. It makes it easier to discover brain tumors and other conditions related to the brain.

### **3.11. Automatic Language Translation**

These days, it is not an issue at all if we travel to a new location and do not speak the local language because machine learning can assist us by translating the text back into the languages we are familiar with. This function is offered by Google's GNMT (Google Neural Machine Translation), which uses neural machine learning to automatically translate text into user-friendly language. A learning algorithm is used to translate text from one language to another and recognize images using the automatic translation technology. [6]

## **4.TOP EIGHT AI AND ML TRENDS TO WATCH OUT FOR IN 2022**

### **4.1. An Efficient Workforce**

Since the creation of AI and ML, there have been worries and apprehensions about how these disruptive technologies may replace human employees and even eliminate some occupations. However, when companies start implementing these technologies and educating their workers on AI/ML, they begin to discover that collaborating with computers that have artificial intelligence functionality really boosts capacities and professional skill. Businesses are already utilizing AI/ML tools in marketing, for instance, to help them focus on potential leads and the volume of business they may anticipate from potential clients. Additionally, AI and ML tools in technology provide predictive maintenance, which allows industrial equipment performance and repair needs to be predicted and informed.

### **4.2. Natural Language Processing (NLP)**

One of the most popular AI technologies nowadays is NLP. Because machines are now able to grasp human languages and people can readily communicate with them, there is less need for typing or screen interaction. Additionally, AI-powered devices can already translate spoken languages into computer codes that can execute programmes and apps.

Language processing has evolved significantly with the publication of GPT-3, OpenAI's most sophisticated and expansive NLP model to date. It has over 175 billion 'parameters' and 'variables' that are used by language processing engines. A more potent version of GPT-3 called GPT-4 is currently being developed by OpenAI. According to observations, GPT4 can have 500 times as many parameters as GPT-3, or about 100 trillion. The creation of machines that can learn language and communicate indistinguishably from humans is one step closer with this achievement.

Sentiment analysis, pattern description, machine translation, automatic video captioning, and conversations are a few of the NLP technologies that are anticipated to gain prominence.

### **4. 3. Enhanced Cybersecurity**

The World Economic Forum recently stated that cybercrime poses a greater threat to society than terrorism. Cybercrimes proliferate as increasingly complicated, intelligent devices that are connected to a wide network take over every part of our lives, and cybersecurity solutions also become more difficult to implement. The use of AI and ML techniques can be crucial in solving this problem. AI/ML systems, for instance, may monitor high-level network data and identify patterns in any kind of virtual process. Some of the most significant advancements in AI/ML technology are projected to occur in this field by 2022.

### **5.**



#### **4.4 The Metaverse**

Users can collaborate and have fun together in the virtual environment known as the Metaverse, which is similar to the internet. Since Facebook CEO Mark Zuckerberg discussed combining virtual reality (VR) technology with the Facebook platform, the idea of the metaverse has been a popular issue.

Without a doubt, AI and ML will be the metaverse's lynchpin. With the aid of these technologies, the business will be able to build a virtual environment where its users will feel comfortable interacting with AI bots. These artificial intelligence (AI) virtual beings will aid users in selecting the best goods and services or assist them in relaxing and unwinding by playing games with them.

#### **4.5. Low-code and No-code Technologies**

The implementation of AI technology in many businesses is significantly hampered by the scarcity of qualified AI developers and engineers. Technologies with no code and little code come to the rescue. In theory, these methods seek to provide straightforward user interfaces for building extremely sophisticated AI systems.

These days, users can quickly create web sites by dragging and dropping graphic pieces together using web design and no-code user interface (UI) tools. Similar to this, no-code AI technology enables developers to build sophisticated AI systems by combining a variety of pre-made modules and feeding them data that has been granted permission by the company. Additionally, NLP, low code, and no code technologies will eventually allow us to create sophisticated machines using just our spoken or written commands. These developments will lead to the "democratisation" of data, machine learning, and AI.

#### **4.6. Hyperautomation**

By 2022, more firms will be automating highly automated yet repetitive activities requiring significant amounts of information and data with the use of AI and ML technology. Many businesses adopting robotic process automation (RPA) and intelligent business process management software will experience an increase in automation in the upcoming years (iBPMS). Businesses may lessen their reliance on human labour while increasing the precision, speed, and dependability of each operation thanks to the AI and ML trend.

#### **4.7. Quantum AI**

Businesses of today will soon begin utilizing quantum computing-powered AI to resolve difficult business issues more quickly than they could with conventional AI. Data analysis and pattern prediction using quantum AI are faster and more precise. As a result, it aids numerous firms in locating unexpected problems and developing workable solutions. Quantum AI will therefore transform numerous industrial fields, including chemistry, finance, and health.

#### **4.8. The Domain of Creativity**

Everyone agrees that creativity is a talent exclusive to humans. But in the modern era, manufacturing is increasingly being done by machines. This indicates that machine learning and intelligence are merging. AI can already be used to produce works of art, music, games, and even video games. The introduction of GPT-4 and Google Brain in 2022 will expand the potential of AI and ML technologies in the field of creativity. From our artificial intelligence companions, greater physical creativity is now to be anticipated. The majority of AI-related artistic endeavours nowadays are actually expressions of the technology. But as artificial intelligence (AI) technology permeates daily creative endeavors like writing and graphic design, the situation will substantially shift in 2022.

### **5.CONCLUSION**

Machine learning and artificial intelligence are both vibrant, unending disciplines. Combining the two will produce outcomes that are above expectations and more uses for the entire business. Companies must invest more in AI in order to get the best clothing. making them more intelligent than their rivals. Visionary, a startup that develops artificial intelligence solutions for businesses today. Strong local expertise in computer vision, machine learning, and deep learning technologies underpins our awards.

The year 2022 will be significant as artificial intelligence (AI) and machine learning (ML) continue to progress toward becoming the most revolutionary and impactful technology ever created. According to Google CEO Sundar Pichai, the influence of AI on the evolution of humanity as a species will be even more significant than that of electricity or fire. Although it may be an optimistic claim, the power of AI is evident in the way it has been applied to cancer research, climate change mitigation, and space exploration. Through 2027, the AI/ML market is anticipated to expand at a CAGR of 33%. By 2022, it is predicted that corporations would be implementing at least 35 AI programmes.

The year 2022 will be crucial as machine learning (ML) and artificial intelligence (AI) advance toward becoming the most ground-breaking and significant piece of technology ever produced. The impact of AI on the evolution of humans as a species, in Sundar Pichai's opinion, will be even greater than that of electricity or fire. Even though it seems overly hopeful, the strength of AI is demonstrated by the ways it has been used in fields like cancer research, preventing climate change, and space exploration.

The AI/ML market is projected to grow at a CAGR of 33% from 2017 to 2027. At least 35 AI programmes are expected to be implemented by businesses by 2022.

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