

Role of Artificial Intelligence in Different Sectors of Society

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Abstract

It was in 1956 that the concept of artificial intelligence came into existence. John McCarthy and Marvin Minsky hosted the Dartmouth Summer Research Project, and here they coined the word “artificial intelligence.” The workshop laid the foundation for the field of artificial intelligence. Back to the current timeline, few studies believe that artificial intelligence will contribute 15.7 trillion dollars to the world economy by the year 2030.

A branch of computer science that commands machines to simulate human intelligence, artificial intelligence is bringing a paradigm shift in each sector of society.

The smart machines working on the concept of deep learning, are capable of performing tasks and making decisions that only a human mind can. These software systems operate in such a manner that they adapt to the situation. Artificial intelligence has the potential to make society even better by bringing positive changes in healthcare, education, governance, policy formulation and implementation, technology, resource management, innovation, etc.

Artificial intelligence holds the potential to make human lives better in thousands of ways. Today, if we look around, we are already using AI in our daily lives in some way or another. Artificial intelligence technology in smartphones has grown rapidly in recent years. Google Assistant, Siri, and Alexa are a few examples of AI personal assistants that make our daily tasks easier. Not only do these solution-driven technologies follow commands, but they also learn from experience to provide better services.

Today, artificial intelligence is reshaping and redefining industries. It is bringing about a revolution in technology and impacting the global economy. Artificial intelligence can solve complex problems in a limited amount of time and with enhanced accuracy.

Keywords

Artificial Intelligence, policy formulation, global economy, solution-driven, deep learning.

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The application of artificial intelligence can yield better results in healthcare, education, science, governance, agriculture etc., and a few applications of artificial intelligence in different fields can be as follows:

Health Care

The COVID-19 outbreak made it clear how ill-prepared we are for the pandemic. Our health infrastructure needs a revolution, and artificial intelligence holds that potential.

Collection and analysis of medical information, early warning of a disease outbreak, diagnosis of a disease using medical images, predicting the population's probability of being impacted by communicable or non-communicable diseases, tracking of infections and recovery rates in real-time, and better management of healthcare resources—there is a lot for AI to offer. Powerful artificial intelligence software can aid in personalized treatments. The software can run diagnostic tests and prepare lab reports. They can help in the identification of a pandemic and study the patterns of a disease outbreak. With enough learning, this software might be able to identify a crisis in the future.

Artificial intelligence has been producing even more accurate diagnostic results. AI can analyze the medical history of a patient in a fraction of a seconds, which is impossible for the human mind to perform in such a short period of time. In an emergency, such an analysis of medical history can turn out to be a life-saving step. AI-powered machines can study large amounts of medical data in a very short period of time, and these powerful machines are being taught to make patterns and predictions about any future medical crisis.

These machines can also learn to read medical imaging and prepare diagnostic reports. A.I. can help improve the efficiency of precision medicines. Precision medicines are designed while keeping into consideration the genetics, environment, and lifestyle of an individual. By analyzing medical records, behavior patterns, choices, and decision-making of an individual, AI-powered tools can enhance the accuracy of precise medicines. By gaining enough experience and analyzing enough data, these tools would also be able to predict what type of treatment would work and even design therapy plans for an individual.

The medical research community is a major beneficiary of the revolution that AI is bringing. Medical research requires the analysis and interpretation of massive amounts of data. AI can help with quick analysis of these complex data sets, and the machines will eventually learn to predict the outcomes of research. Medical research requires countless hits, trials of molecular interactions, and drug

tests that are time-consuming. The AI tools can help give quicker results by eliminating non-responsive trials. With enough learning, these tools would be able to perform experiments in virtual reality that could be replicated by researchers to yield fruitful results. With access to medical records, these tools can even pick up the right patients for clinical studies.

AI systems can diagnose X-rays, detect eye diseases, and read medical images. There are a few AI systems that have been programmed to examine the brain MRIs of infants to detect and diagnose autism. Autism is a condition that is very rare to detect at an early age since the traits are very complex. Early detection of autism will surely lead to better-personalized healthcare. Researchers are even developing A.I. programs that can help improve the social, emotional, and communication skills of autistic people.

Three years ago, the world witnessed a deadly COVID-19 outbreak. According to the WHO dashboard, the disease has resulted in 7 lakh human deaths. Even in current times, there are many endemics claiming human lives in different corners of the world.

Epidemiologists are working with AI software that can successfully predict epidemics like Ebola, Zika, MERS, Chikungunya, Kyasanur forest disease, etc. And these research groups have achieved success as well. The data generated daily can be analyzed with AI tools, and models can be made that can help us understand these diseases, their origin, their spread, and how these outbreaks respond to treatment.

Agriculture

Projections show that the global population is expected to cross the 10 billion mark by 2050. The way our population numbers are increasing, traditional farming methods are never going to be enough. We need to find ways of maximizing our agricultural produce and minimizing our agri-waste while following a sustainable process.

Artificial intelligence can help detect the challenges of crop failure and overuse of pesticides and fertilizers. The apps can predict future market demands, resulting in farmers adopting better crop choices. Software can also help in increasing crop production by studying soil nutrition, climatic conditions, irrigation facilities, and the proper use of fertilizers and pesticides. Artificial intelligence can help counter the challenge of pest attacks in their early stages.

Applications of artificial intelligence in agriculture can include:

1. Robotics in agriculture

2. Crop monitoring
3. Soil monitoring
4. Future projections and predictions

An example of the use of artificial intelligence in agriculture is experimental research by a team that took up the task of teaching AI to detect disease in cassava plants. Data from 2756 plant leaves was fed into the AI system, and based on its learning, it was able to detect disease in cassava with an accuracy of 98%.

AI systems are being developed that can take care of plants and eliminate weeds. AI-powered robots are learning to identify weeds present in crops. There are cameras and sensors in these machines that precisely eliminate the weeds by applying the right herbicide without impacting the plant. Then we have robots that help farmers with harvesting, packaging, and managing agricultural produce. Agri-startup companies have developed apps that can identify nutrition deficiencies in soils. They can detect moisture content in the soil and suggest ways of improving soil quality. With the help of AI, modern techniques being used in agriculture can become even more precise and fruitful. These robots can analyze the dynamics of crops and fields and accordingly use the right amount of fertilizer.

Price fluctuation in agricultural produce is a big cause of worry for farmers. A bumper harvest is not a surety of great profit. There is a lot of weather forecast data, agriculture, mandi, demand, and supply data produced daily. A.I. software can compile this data and analyze the right time for sowing crops, choosing the right crops, predicting crop yield, and even forecasting market prices, which can help farmers maximize their profit. Companies are using A.I. technology in satellite imaging and weather forecasting to constantly monitor pest attacks and disease spread in plants and take real-time action.

Education

The world is changing as technology and innovation are reshaping lifestyles. The COVID-19 epidemic brought a shift from the traditional way of education to a hybrid mode, where schools and colleges adopted a way of teaching that involved both offline and online classes. Suddenly, our whole education system shifted from desks and blackboards to mobile phones, the internet, and tablets. Machine learning is a feature of AI-powered machines. Machine learning allows a machine to learn from past data without being explicitly programmed for the task. This is where AI can be applied in the education sector as well. AI and machine learning can speedily solve time-consuming tasks with very little human effort. What makes these AI-powered software special is the learning from feedback.

A few applications of AI-enabled technology in education can be as follows:

Robotic teachers: AI-powered humans can assist our actual teachers while delivering lectures. These humanoids can help students understand complex topics in a better and simpler way.

The robots can help clear the doubts of students. A lot of experimental subjects can become a lot simpler with the help of experiments, which these devices would be capable of demonstrating.

Individual tutoring: Each child has a different potential level when it comes to learning, and an AI software would analyze the past results, knowledge gaps, interests, and cognitive, and learning abilities of an individual and prepare a structured plan accordingly. Outside the classroom, AI chatbots can help students solve queries and other problems. There are many AI software programs that can summarize chapters and even books for students. Complex mathematical problems can be solved in a short period of time.

Creating smart content: Artificial intelligence software can be used to create different types of smart content like study guides, digi-books, animated videos, and stories that will eventually make learning a more interactive task. The textbooks can be updated regularly with the help of A.I. tools.

Multilingual learning: According to census data, we as a nation are home to 19,500 mother tongues. Our linguistic diversity is very wide, and at times, these languages have become barriers to communication between various regional areas. A.I. tools that rely on deep learning networks can help break these barriers by helping people with different linguistic backgrounds understand each other. This software can convert entire textbooks to any different language, which will definitely give a better academic result. A lot of students at higher education levels suffer because of such language barriers. Engineering and tech research papers, writings, and books from any corner of the world can be provided to students in a suitable language. Research scholars can use AI tools to study, compare, and summarize research that is available on the internet. There are a number of AI tools that make grammatical corrections in your written documents, make them interactive, and even check for plagiarism.

Policy Making and Governance

Policymaking is a complex process and recently the increasing role of AI in policymaking has shifted legislation from the top-down to more inclusive and smarter decision-making. AI brings about tremendous changes in how policy is made. The benefits of using AI in policy-making range from facilitating and informing quicker

and more rigorous decisions by policymakers to the inclusion of citizens in such decisions. Some examples of the integration of AI in policymaking can be seen in the health sector. like the deployment of the AI-based Arogya Setu app while responding to the COVID-19 pandemic. It uses AI-driven algorithms, GPS, and Bluetooth for contact tracing and disseminating important health updates.

In 2018 Niti Aayog released the National Strategy for Artificial Intelligence. The strategy laid down a road map for the government to adopt AI to provide better services in real-time and enhance its working machinery. Recognising the potential of AI government is in collaboration with private players to promote the adoption and development of artificial intelligence.

Our cities generate thousands of GBs of data daily and it is impossible for a human to even collect it. At the same time AI has the potential to not only collect the raw data but analyse and generate enough information to aid governance. AI can be used to monitor real-time uses of resources like power, water, and internet services. Monitoring of these services will help with the prevention of loss. Solar-driven street lights can be a great beneficiary of A.I applications.

Recently the government Deregulated the Geospatial sector, which means private sectors can bring in state-of-the-art technology that can redefine geospatial mapping and management of traffic flow in the cities. A.I can ensure a smoother traffic flow in the cities

AI-based systems can help reduce the number of accidents that happen daily. data like place of accident, road conditions, traffic flow, and weather conditions can be analyzed to form an algorithm that can detect the hotspots with higher frequency of accidents. Based on such analysis the right care and support can be deployed in these hotspots.

AI-powered drones can help in the identification of untreated sewage waste, landfills and dumping sites. Facial and image recognition software can be of great help to law enforcement and security agencies. The AI systems can analyze hundreds of hours of footage and images in short durations and suspects can be identified quickly and many crimes and acts of terror can be averted. Many government departments and municipal corporations can deploy chatbots in their customer helpline services that can address public calls and queries.

Problems and Way Forwards

Recently the Indian Prime Minister emphasized on the ethical use of AI and called for a global framework to implement ethics in AI. Artificial intelligence needs to work within well-defined ethical guidelines that maintain fundamental values and are non non-discriminating and non manipulative in nature.

There have been cases of misuse of AI in the form of deep fake videos. Advanced AI systems have been used to create fake audio and videos called deep pics that can tarnish the image of an individual. A.I. systems rely majorly on the available data and incomplete or biased data can lead to a biased decision-making. At the same time when the world is running on the internet, AI systems can be prone to cyber attacks and a compromised AI can be a serious threat.

The power that AI possesses can bring in efficiency in all aspects and at the same time if the use is not wise enough it can create havoc. As a way forward we need to prepare our people for the AI era which means there is a dire need for capacity building among public servants as well as the masses. We need training programs at academic and professional levels to equip our population with the required skill set to handle Artificial Intelligence. We need to set parameters and implement proper guidelines for the just and ethical use of artificial intelligence. As AI is expanding its horizon, research and innovation that makes the technology more accurate, efficient and responsible are needed. The role of artificial intelligence is to help, not replace human intelligence. What we need is a better human-AI collaboration that would enhance the efficiency and productivity of various sectors of the society.

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