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Artificial Intelligence and its Implications for Future

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ABSTRACT

As defined by John McCarthy, father of Artificial Intelligence (AI), AI is the science of making intelligent machines, especially intelligent computer programs. It is the ability of a computer or robotic system to process information and produce outcomes in a manner similar to human beings.

In other words, the computers follow the way in which human beings learn new things, take decisions and solve problems. The goal of technical experts working on artificial intelligence is to create systems that are able to tackle non-routine and unconventional problems like human beings who use experience and expertise to solve problems. An advance in Artificial Intelligence has attracted attention from companies across the world.

With more companies working on artificial intelligence and generating intelligent devices which do not require human intervention, it is creating tremors across the world. The heated debates on impact of artificial intelligence on society are becoming common at colleges, workplaces and public places. The present paper seeks to observe the advantages and disadvantages of artificial intelligence and suggest measures to leverage it to help the mankind.

1. Introduction

According to Techopedia, Artificial intelligence (AI) is an area of computer science which deals with development of intelligent systems that work and respond like human beings. Artificial intelligence enabled systems can perform functions like Speech recognition, Learning, Planning, Problem solving, etc.

According to the venture capital company CB, in July 2016, Apple, Google, Intel, Microsoft, Twitter and other top IT companies have acquired more than 125 start-up companies working on Artificial Intelligence. Microsoft developed Xiaobing - a robot that can respond instantly to people's questions and participate in social conversations. It acquired LinkedIn and is gaining from the rise in number of people interested in building relations through social and professional communities over Internet. IBM developed Watsonsystem using AI. It is used to screen millions of records of cancer patients to track their histories of cancer treatment. This is leading to improvement in oncotherapy and clinical diagnosis. Google used AI for developing Google glasses that capture live recordings of surroundings automatically, for self-driving cars and other such projects.

Google developed AlphaGo, a game-playing program which trains itself in improving game strategies. In 2016, AlphaGo defeated Sedol Lee, the world Go champion.This victory of system over man shocked the world. It attracted global attention to AI. Some critics opined that further developments in AI could lead to the destruction of human race. Many people are apprehensive of these developments. They opine that robots will replace human beings in many fields with the help of advanced Artificial Intelligence and threaten the very survival of human beings in future.

2. History of Artificial Intelligence

In 1956, Professor J. McCarthy from Stanford University and his contemporaries in various other universities and R&D departments of corporate firms (M. L. Minsky, H. Simon, C.E. Shannon, A. Newell and N. Rochester) developed the concept of "artificial intelligence."

They defined AI as the capacity of machines to understand, think, and learn like human beings. Since 1970s, the leading companies began to spearhead their research in areas like machine learning, pattern recognition, expert systems and robotics.

In 1982, the Ministry of International Trade and Industry of Japan initiated the project of developing fifth-generation technology. The project aimed at incorporating into the machine listening and speaking abilities. Also the project sought to develop machines that can understand and process knowledge.

The project consumed 850 million US dollars but there was no breakthrough. In 1984, professors at Stanford University tried to develop an encyclopedia of knowledge (Cyc) that contained all common-sense knowledge possessed by average human beings. Their objective was to equip Cyc with capability to make meaningful inferences from available information. However, the scientists observed that the capability of the big data was more than that of Cyc. They learnt that knowledge should be gained by systems from the environment automatically.

3. Emergence of Artificial Intelligence

In 2015, AlphaGo program developed by DeepMind successfully defeated professional Go (one of the world's toughest games) player. Later, it defeated world champions as well. AlphaGo has ability to learn and develop its capabilities as well as uses "intuitive sense" at crucial times to take a decision. DeepMind also developed software to control refrigeration system, fans, lights and windows of the data center of Google. This improved power efficacy of the company by 15%. To solve power-related problems, new

technologies for the transformation of big data into useful knowledge can be undertaken across the world.

It is observed that astonishingly intelligent capabilities are exhibited not by individuals but by large groups of people over internet. The EyeWire game developed at Princeton University demonstrated that Internet crowd intelligence computing can greatly enhance the knowledge base available to human society.

Cross-media intelligence is a concept that involves the integration of information attained from various forms of perception like pictures and letters that we see, sounds that we hear, the feel of the things that we touch, etc. The information is then used to teach system to recognize, interpret, and predict possibility of various events. The Pokemon Go, a game developed by Nintendo and Niantic, and other similar games like Genesis, Ingress, Dragon, Father.io, utilize the cross-media technology. The technology combines 3D graphics with live streaming video on mobile phones to entertain players.

Cross-media intelligence allows systems to recognize and respond to their external environment. This will form an important field of AI in future. The synthesis of computer and human capabilities will lead to development of hybrid intelligence systems which will result in synergy. Many systems like wearable devices, intelligent- driving vehicles and human-robot collaborative surgeries have been developed. This is an indication that the advanced hybrid intelligence systems have vast potential in future. Unmanned aircrafts and vehicles are being used extensively in the US military forces.

The autonomous-intelligence systems are economical and efficient and have wider implications in manufacturing and defense industries across the world. Thus, further development in Internet crowd intelligence, autonomous intelligence, cross-media intelligence, and human-machine hybrid-augmented intelligence will lead to emergence of AI 2.0 technology. AI 2.0 will enable us to deal with macro problems like urban development, ecological protection, economic management and financial risk as well as micro problems like medical treatment, product design, safe driving, and saving energy.

4. Positive Impact of Artificial Intelligence

The following are some artificial intelligence systems developed by organizations to perform specific functions intelligently:

- **Sophia:** It is a beautiful looking female robot that can talk and express feelings like anger, sadness, happiness, etc. It can socialize with human beings by reacting immediately to the questions posed by other people. It has good sense of humor as well. When someone asked her whether artificial intelligence will create problems for human beings she commented that the person must have been watching too much of Hollywood movies. The robot has even the distinction of obtaining citizenship from Soudi Arabia. It is the world's first robot to achieve citizenship status.

- **Siri:** Known as Apple's personal assistant, Siri is the friendly voice-activated computer. It helps us find information that we need, gives us directions to carryout various tasks, send messages to selected contacts, add important events, days, dates etc. to our calendars, give reminders on those days and so on. Siri can be considered as an artificial intelligent digital personal assistant. It uses machine-learning technology to interact with human beings. It is able to understand and respond to the queries and requests made by people.

- **Alexa:** When Amazon introduced Alexa as a personal Digital Assistant (PDA) for the first time into market, it received overwhelming response from people all over the world. It's ability to understand and follow instructions given by individuals from anywhere in the office room made it the most sought after product of the time. It helps in searching the web for desired information; assist in shopping, verifying appointments, setting reminder alarms and many other millions of tasks. Thus, it helps us power our smart homes. It is also used as a tool for those who have limited mobility.

- **Tesla:** Tesla, the world's most technologically advanced car has high predictive capabilities, self-driving features, safety and luxury features. It can respond to over-the-air updates spontaneously.

- **Cogito:** It was established by Dr. Sandy Pentland and CEO, Joshua Feast. It has advanced technology that improves the emotional intelligence of customer service representatives. The company uses combination of behavioral science and machine learning to improve the satisfaction level of customers in their interactions with phone professionals. This is being helpful to thousands of companies across the world using voice calls to interact with global customers and improve their customer service.

- **Boxever:** Boxever is the brainchild of its CEO, Dave O'Flanagan. The travel company seeks to deliver experiences that do not just satisfy but delight the customers. It is using machine learning technology to identify the expectations of customers from the company. Then it is making efforts to offer service beyond the expectations of customers to their delight. It is also engaging customers in innovative ways during their journey. Boxever is thus leveraging Artificial Intelligence to increase its market share in the travel industry.

- **John Paul :** It is a highly-esteemed luxury travel concierge company headed by its founder, David Amsellem. It is using artificial intelligence to understand its customers' needs and expectations at an accurate level. It is also using predictive technology to forecast the future travel plans of customers and expectations from the company. The company partners with the world's largest companies

like VISA, Air France and Orange to offer premium service to its customers. Accor Hotels acquired the company as a part of it expansion plans that fetched huge profits to John paul's founder.

- **Amazon Rekognition**: Rekognition is used by Amazon to analyze billions of images daily. It helps in detecting objects, scenes, and faces in images, as well as search and compare differences between images. Amazon also uses highly advanced transactional Artificial Intelligence. It refines its predictive algorithms on a continuous basis. The company has mastered the process of predicting future purchases of customers based on their online behavior. It is able to refill the items in refrigerator, kitchen storage, etc even before the customer knows that the items need replacement.

- **Netflix:** It uses advanced technology to identify the kind of films that would be liked by customers based on their reactions to films that they watched in the past. For this it, analyzes billions of records of customers, the films watched by them, the frequency of watching movies, number of times they watched each movie, etc.. The company is improving the technology further and further. However, the technology presently focuses on big-brand movies. In future, it may even highlight the low-budget movies also.

- **Pandora:** At Pandora technology is used to identify songs that have been long forgotten but loved by people if they listen to them. Expert musicians' team at Pandora, analyzes the songs based on predetermined musical criteria and select the best songs. These characteristics are used by the advanced artificial intelligence system to identify the old songs that are not available in the market but appealing to people.

- **Nest :** It is the learning company that was acquired by Google in January 2014 for $3.2 billion. It developed technology that automatically changes the temperature in home or office according to the customers' needs and preferences. It understands the oral instructions given by customers. The system observes the pattern in which customer is choosing temperature at different periods of time and then automatically adjusts temperature settings on its own. It is also developing Nest Cameras that adjust the settings of camera according to surroundings and preferences of customer.

5. Negative Impact of Artificial intelligence

Artificial intelligence can benefit as well as harm society. The following are the possible negative outcomes of artificial intelligence:

Loss of Jobs: Artificial Intelligence replaces employees performing specific tasks that can be automated. This will result in loss of many jobs and reduction in income of workforce. Generally, low-skilled workers are the first to be effected by automation.

Advanced Artificial Intelligence may lead to displacement of high skilled employees as well. These high skilled employees who lose their jobs will compete for the low-skilled jobs for their living. This will lead to decline in earnings of low-skilled workers also.

Loss of Control: If machines become smarter than human beings, they will no more remain under the control of human beings. This is detrimental to existence of human beings. When machine intelligence exceeds our ability to understand, it is called superior intelligence. We should not blindly depend on machines for execution of entire project. Instead human beings should perform control checks at intermediate stages so as to ensure that situations do not completely go out of control of people. Some self-driven cars developed by Tesla met with fatal accidents killing the passengers in car. This emphasizes the need for monitoring of artificially intelligent devices by human beings

Unforeseen Consequences: There have been many movies about robots turning into killer machines and taking lives of people including its creator. Along with the interesting applications of AI, the undesirable outcomes of artificial intelligence also need to be paid special attention by scientists and engineers. Many people criticized that Facebook used artificial intelligence to influence election outcome and impaired the process of fair elections.

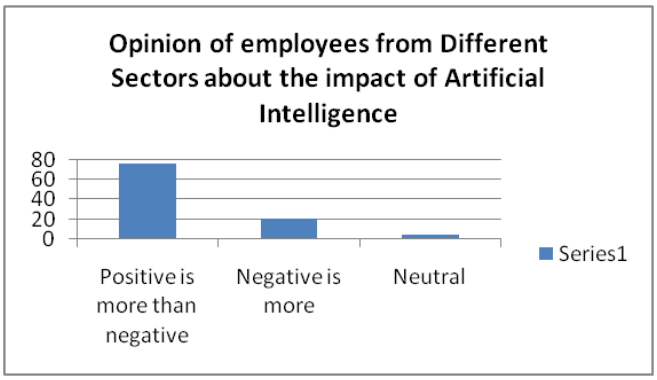
Experts across the world should be geared up to anticipate and address possible outcomes in future. Future of Artificial intelligence According to IDC, global spending on artificial intelligence and other advanced systems will be more than $55 billion in 2021. Adobe reported that 15% of the global companies are using artificial intelligence and 31% of companies are planning to use artificial intelligence in future.

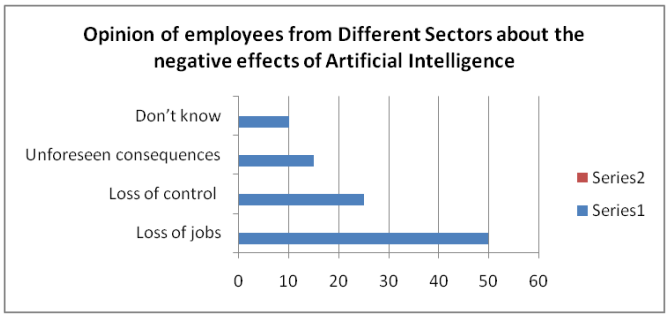
About 75% of senior executives of various businesses opine that artificial intelligence will contribute to competitive advantage of their businesses. According to Narrative Science, 61% of successful companies that are top spenders on research and innovation are giving top priority to AI technology. Also they are using the technology to predict and act on new opportunities in their sectors. According to Pega, 77% of customers are using Artificial intelligence based products and services.

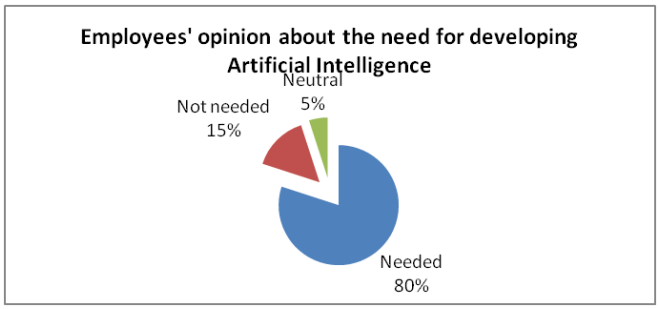
44% of these customers do not realize that they are using artificial intelligence. According to MeMSQL, 61% of senior marketing managers believe that investing in artificial intelligence is an important strategy of their company. According to Accenture, artificial intelligence will lead to increase in labor productivity and efficient utilization of organization's resources.

6. Data Analysis and Interpretation

A sample of 100 employees from different sectors were administered survey for collecting their opinion about the impact of artificial intelligence and the need for it in future.







Out of 100 employees, 50% of people opined that artificial intelligence will result in loss of jobs, 25% opined that it will result in loss of control over machines by human beings, 15% opined that there may be many unforeseen consequences and 10% were not sure about the impact of AI. 75% of employees felt that Artificial intelligence will have more positive outcomes than negative for, 20% opined that negative outcomes will be more than positive and 5% were neutral. 80% of employees opined that artificial intelligence is needed in future, 15% perceived that there was no need for artificial intelligence while 5% were neutral. Thus majority of employees are having positive opinion about artificial intelligence and its benefits in future.

7. Conclusion

In the light of above findings of surveys, it can be inferred that artificial intelligence when used rationally and intelligently can enable people to be happier, comfortable and empowered in the future. However, the technical experts need to be prepared to face the practical problems associated with implementation of artificial intelligence.

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