RECENT ADVANCES IN THE ARTIFICIAL INTELLIGENCE

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Abstract: The following research paper presents a research of the recent advances in the field of artificial intelligence. Since the introduction of computers, human beings have continued to create better machines that could replace human beings in various aspects. The invention of industrial robots to handle complex and repetitive tasks industries has inspired to create even better machines that can help human beings in making decisions, planning and even setting goals. Many governments such as United States, South Korea, China, Japan and Western countries have funded research projects with billions of dollars in the field of artificial intelligence. Interesting inventions have since been unveiled as result of these efforts. The paper has identified some of these technologies that have hit the headlines recently from various parts of the world. The paper starts with an introduction, which gives the background information of the artificial intelligence, and the advancements made in the field. The paper has looked into details, the autonomous cars, speech recognition and language Learning, reinforced learning, diagnostic of cancer and prediction of US election as some of the innovation in AI that has hit the headlines recently. The paper concludes with a summary and an analysis of the significance of the information presented in the paper.

Introduction

Electricity and internet are the two major inventions that transformed the twentieth century, supporting thousands of other inventions and business and teaching processes. Artificial intelligence is greatest transformation tool in the twenty-first century that has brought to reality thousands of ideas that were just dreams and fictional tales. Artificial intelligence, defined the intelligence that is exhibited by an artificial entity, such as a computer or a machine to solve complex problems or operate systems, has grown to new heights nowadays. Computers have been made to think and act like a human in less time than human beings themselves. There are three areas of artificial intelligence today; cognitive science applications, applications in the natural interface and the robotic applications (Abbas, Nasser, & El Ahmad, 2015) [1].

The artificial intelligence has gone to new heights today. New advances have been recorded in this research paper, which looks into detail some of these cutting-edge technologies that are on the market today. From 2016, we have seen various improvements in Artificial intelligence, in both military and civilian applications, which have continued to revolutionize the way we live. Online advertising, aviation, driving, image and speech recognition, and medicine among other fields are currently using AI technologies. This knowledge helps to identify and appreciates the efforts that have been made by researchers and scientists in the growth of technology. The knowledge of the trends and advances also allows us to focus on the future technologies, which enable us to prepare and welcome these technologies. Entrepreneurs, industrialists, and innovators are all relying on the advances made in the field of AI to make better products, systems or procedures that are helping to improve the lives on the planet.

Many AI enthusiasts believe that in a few years, machines will supersede human beings in their intelligence. An examination of the recent trends it is possible to reach those heights. For instance, last year, 2016, a machine, Alpha-Go was the first machine to defeat professional players like the Korean grandmaster Lee Sedol and the world champion, Ke Jie from China in the board game Go. However, even with these sophistications, the technologies are mainly limited to the specified applications. They mostly lack "common sense"; they are not able to make judgments that are beyond the acquired knowledge (McFadden, 2016) [6]. The also lack emotional intelligence and can only detect the basic human emotions such as joy, anger, sadness, stress, neutrality, pain and fear. AI is expected to mimic human cognition by 2050, in the abilities to dream, feel emotions, think or have goals. Therefore, it is important to assess the progress not only in the technological viewpoint but also in other perspectives such as legal, social and ethical.

Artificial Intelligence: Recent Technological Advancements

Today, there is a consensus among the industry players in the field of technology that artificial intelligence will control the economy in the next era. Machines will work alongside human beings on most issues, and this can be demonstrated by the through the recent inventions in the field of arterial intelligence. While many see artificial intelligence as the robotics only, there are many applications of the technology in medicine, pharmacy, business, production, teaching among others (Lu & Xu, 2017) [9]. Some of the advancements are discussed below.

1. *Autonomous Vehicles*

In the field of engineering, the old science fiction of self-driving cars has been made into reality by the advancement of artificial intelligence. Engineers are determined to help human beings come up with better means of transport that will be all-time safer and easier than ordinary drivers (*Codementor*, 2017) [2]. Several companies have put attempted to developed autonomous vehicles and some of them tested on real roads and cities with considerable success.

Google and Tesla are the frontrunners in this technology. Tesla started with a semi-autonomous vehicle in 2015, with features such as lane-switching, automatic braking, and speed-adjusting. Despite having one test resulting in a fatal crash in 2016, Tesla Autopilot's tests have proved it is possible to have autonomous vehicles in normal transport in a few years (Els, 2017) [5]. A Tesla Autopilot was able to drive a man suffering a blood clot in Springfield to the hospital. Google, on the other hand, has made several tests with their driverless cars, which have also been reported to run successfully. This year, 2017, NVIDIA launched a test on its driverless taxis. The robotaxis from NVIDIA will be operated by software and have been designed with high computational requirements and artificial intelligence on an NVIDIA DRIVE PX platform (Viswanathan & Hussein, 2017) [17]. The company hopes to launch its fleet of vehicles which will operate without pedals, mirrors or steering and has the interiors designed for a living room or an office.

Several applications of artificial intelligence are required to make autonomous cars a reality. One of the technological pillars is sensing. Just like human beings who can see, hear and touch and take all these signals to the brain for actions, the autonomous cars also have to have such features. There are designed with sensors that cover 360 degrees using high-resolution cameras and redundancy sensors like scanners and radars (Hofmann, Neukart, & Bäck, 2017) [7]. The intelligence software can the process all the data sent and be able to tell where all the entities around the vehicle are, their statuses and choose the right action. Secondly, the mapping is the next necessary technology for autonomous cars. A very detailed map is used with an accuracy of the range of ten centimeters to give all details about the roadways, delimiter and drivable paths. The maps used should be updated at a very fast rate to indicate the changes such that occur on the roads now and then. The third technological pillar of artificial intelligence in the autonomous cars is the driving policy (Viswanathan & Hussein, 2017). The car should not only sense where other cars or pedestrians are but should also know what they are doing and likely to do next. This will help in knowing when to change lanes, speed or come to a halt. They need to know the driving policy from city to city as it changes which involves complex systems. However, despite all these complex challenges it is projected by 2021, the intelligent cars will be in the market for sale, courtesy of artificial intelligence.

2. *Speech Recognition and Language Learning*

Machines can now understand human beings better than fellow human beings. Through AI, speech recognition robots were developed in 2016 and led to the popularity of virtual assistants. According to research by Microsoft, the speech recognition system achieved an error of 5.1%, which matches with the professional human transcribers (Xiong, 2017) [16]. The research used CallHome and Switchboard which contains more than two thousand telephone conversations on a wide range of topics (Xiong, 2017) [16]. The development shows that machines will easily understand the human language better than human beings in the next few years (Press, 2017). However, despite the advancements, the machines are yet to understand various accents from various parts of the world.

With speech recognition technology now in place in most places, researchers have gone ahead to use artificial intelligence to make machines generate language for human conversations (Clark, 2016)[3]. Google Home and Amazon Alexa are some of the machines that can be spoken to and speak back. More research is being done to have machines learn languages whereby they can communicate with human beings freely through speech. However, "chatbots" have become popular especially on e-commerce firms whereby they can understand text language and make intelligent replies (Corea, 2017) [4]. These chatbots can make sales to online customers or solve customer complaints intelligently. In Georgia Tech, chatbots have been used to replace teachers and have provided a naturalistic learning (Reisinger, 2016) [12].

3. *Reinforced Learning*

Reinforced learning involves teaching a computer to do a task or procedure, which it learns, and can do the task effectively. The learning uses trial and error, for instance, how to navigate a maze and exit successfully without the use of instructions (Knight, 2017) [8]. After several attempts, the computer can then figures out the process and learn how to exit the maze. This idea has been attempted for decades, but when combined with deep neural networks it has been figured to become successful. In 2016, AlfaGo learned to play the complex game of Go (Millington & Funge, 2016) [10]. Through numerous learning and analysis of the previous games played, AlphaGo was able to figure itself how to play the game like an expert and eventually defeated the world champion, Sedol in four out of five games.

The success of AlphaGo on learning the Go game has started to be applied in real life situation where industrial robots in China are trained to learn process where they can do complex lobs without instructions (Strong, 2016) [15]. Though on an experiential basis, reinforced learning is going to take artificial intelligence innovation to higher levels.

4. *Cancer Diagnosis Using AI*

Artificial intelligence major advances in health according to University of Louisville Cybersecurity Lab, Yampolskiy, robots have been used to spot illnesses that the human doctors have failed to identify in patients. A cognitive machine has been used to detect Leukemia to a lady patient in Japan, a case where doctors had failed (Sharma, 2015) [13]. The artificial intelligence, in Houston Methodist Research Institute, have developed the AI programs for healthcare by developing software that reviews millions of mammograms in very high speed which gives 99 percent accuracy in interpreting the information that is found in a patient. These advanced technologies have been possible by artificial intelligence, which is making machines better than human beings.

5. *Prediction of US Election*

While the US presidential election was too hard for people to predict who will win between Trump and Clinton, an Indian company MogIA was able to predict Trump win successfully. The company used software to analyze social media sentiments and identify the true voter preferences where many traditional systems are not able to do (Singh, 2017)[14]. So far, artificial intelligence software has been used to predict four US presidential elections successfully. MogIA has received great attention by predicting one of the most complex elections in US history that many humans could predict right.

Conclusion

In summary, artificial intelligence has led to many advances in the field of technology today. Just as many AI researchers are predicting, artificial intelligence will be one of the major factors of the economy in by 2021. The importance of artificial intelligence can understand by observing how major companies in the world like Google, Toyota, Facebook, Amazon, Tesla and major research instructions have invested a lot of resources in the field of artificial intelligence. The major advancements of the artificial intelligence presented in this research paper offer individuals to see the standard of the world regarding artificial intelligence. Researchers in this field can easily identify the 'next big thing' in AI using the information presented.

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