ARTIFICIAL INTELLIGENCE: APPLICATIONS AND FUTURE

Ellur Anand* & S. G. Varun Kumar**

* Acharya Bangalore B School, Bangalore, Karnataka
** Srinivas Institute of Management Studies, Mangalore, Karnataka

Abstract:
Artificial Intelligence (AI) or Augmented Intelligence happens to be the most talked about technology that would have a major impact on the way the current day world functions. The next step in evolution of digital world is AI. The safety of the world with more and more use of AI also becomes necessity. Safety rules and regulations of the digital world need to be drafted and redrafted as AI evolves and becomes a new normal in every one's life just as mobile phone has become in the current scenario. Every day, several articles are being published about the new areas of applications of AI. This paper makes an attempt to track the evolution of AI as subset of evolution of digital world, various applications of AI that have been published and commercially made viable and the future of AI as predicted by the experts in this area. The methodology adopted by the authors is to collect secondary data regarding AI and its applications. Mapping of the various AI events on the timeline to study the evolution of AI and then to attempt to map its future.

Introduction:
Alan Turing (Turing, 1950) discussed methods to call a machine intelligent. This is now famously known as Turing Test. It is, in simple words, for machine to pass the test to be called as 'Intelligent'. Since 'Intelligence' is an attribute and difficult to decide who is more intelligent, Alan Turing proposed that a machine can be called intelligent if it imitates human and for a knowledgeable observer passes as a human. If the observer cannot tell the difference between human and machine, then machine has passed the Turing Test and can be called Intelligent.

Artificial Intelligence (McCarthy, 2007) is the science and engineering of making intelligent machines. The established standard is that the machine would need to fool minimum of 30% of observers into not being able to recognize which side is human and which side is the machine (Warwick, 2009). Till date, not even a single machine has passed the test. Artificial Intelligence of machines has come a long way since it was spoken about by Alan Turing in 1950. Recently a machine has come closer to predicting right for about 25% of average observers. It was 'Elbot' from Reading University, Great Britain.

The 10 important milestones (Rahul, 2016) in the evolution of Artificial Intelligence are:
- ✓ 1950 – Alan Turing suggested Turing test to test the intelligent machines.
- ✓ 1956 – Artificial Intelligence emerged as a field of computer science. It happened in Dartmouth conference
- ✓ 1974-80 – There was widespread criticism of Artificial Intelligence that it took backseat on the priority list of Governments.
- ✓ 1980-87 – The field started regaining the lustre it had lost. Governments, like Great Britain, started funding the research related to Artificial Intelligence. During this time, first Artificial Intelligence based movie 'Terminator' was made and released.
- ✓ 1987-93 – There was lull in the field of Artificial Intelligence. Nothing much happened during this period in this area.
- ✓ 1997 – The IBM's Deep Blue supercomputer beat Gary Kasparov, World Chess Champion, in the game of Chess.
- ✓ 2011 – IBM's Watson won the American TV Quiz Show. Apple introduced Siri to the world.
- ✓ 2012 – Google introduced Google Now to counter Apple's Siri.
- ✓ 2014 – Amazon Echo was introduced.

We have to see how this is going to shape our future. Stephen Hawking predicts Artificial Intelligence is beginning of end of mankind. Machines might become more powerful than human in future. At least now, they are more powerful when it comes to calculating complex numbers but fail only when it comes to intuition.

Literature Review:
There are several researchers generating research of high quality in this field. There are several aspects and applications of Artificial Intelligence to be looked upon. Few of the works have been studied and reviewed here. Marr has (Marr, 2003) tried to look at Artificial Intelligence from two perspectives labelled Type 1 and 2. He further says that Artificial Intelligence tries to identify and solve certain information processing problems.

Campbell, Hoane and Hsu (Murray Campbell, 2002) have discussed the various factors that led to Deep Blue intelligent machine, supercomputer winning Chess match with the World Chess Champion Gary Kasparov. Few of the factors identified are: a) a single-chip chess search engine; b) a massively parallel system with multiple levels of parallelism; c) a strong emphasis on search extensions; d) a complex evaluation function and e) effective use of Grandmaster game database.

Al Strong (Strong, 2016) has discussed the various advantages and disadvantages of Artificial Intelligence and also its applications. It also discusses the various applications in different areas like heavy industries, gaming, aviation, weather forecasting and expert systems. It also tries to list out the potential applications of Artificial Intelligence in the future.

Carlos, Augusto and Shapiro (Carlos Ramos, 2008) coined a new term Ambient Intelligence which deals with an interconnected digital world where several computing devices are interacting intelligently with the people. Ambient Intelligent environments could be diverse, in homes, offices, meeting rooms, schools, hospitals, control centers, vehicles, stores, multiplexes, malls etc.

Meryem et al (Meryem Duygun Fethi, 2010) have discussed the use of Artificial Intelligence techniques to measure the efficiency and performance of bank. The paper further studies other techniques such as neural networks, support vector machines and multi-criteria decision tools to predict bank failure and in assessment of bank credit-worthiness and underperformance.

Wang et al (Wen-Chuan Wang, 2009) have studied and developed a hydrological forecasting model based on past data using Artificial Intelligence instead of traditional time-series techniques. The researchers have used several tools like autoregressive moving-average (ARMA) models, Artificial Neural Networks (ANN), Adaptive neural-based fuzzy inference system (ANFIS) techniques, Genetic Programming (GP) and Support Vector Machines (SVM) to study the river flow discharges. Researchers have studied two river sites as cases and have concluded that the best performance can be obtained by ANFIS, GP and SVM techniques.

Millet and Kalogirou (Adel Mellit, 2008) have outlined how Artificial Intelligence systems can be applied to number of problems related to photovoltaic systems. They have tried to address three types of problems areas – forecasting and modelling of meteorological data, sizing of photovoltaic systems and simulation & control of photovoltaic systems.

Hamet and Tremblay (Pavel Hamet, 2017) have discussed the modern technology usage for performing complex medical surgeries and have further explored and explained in depth, Artificial Intelligence in medicine. As they have mentioned, there are two main branches here: Virtual and Physical. Virtual branch includes storage of all medical history records and data of patients that will be used by physicians to treat the patients accordingly. Physical branch includes the use of *nanorobots* a unique drug delivery system.

Applications of Artificial Intelligence:

Artificial Intelligence (AI), is at certain level globally but India has long way to go when it really starts adopting AI technology for daily use. It could be only in the year 2025 that India would start experiencing AI in some high end technology items and not in daily use products or services. As per estimates, AI technology market would be around $5 billion globally. And India seems to be not interested in getting on to this bus. The applications of AI are in every field. This paper tries to list few of them.

Medical:

Using predictive data analysis, diagnosis accuracy can be increased in case of lung diseases. Machine learning algorithm uses routine lung parameters and clinical variables like smoking history, BMI, age etc. The conventional method of diagnosis by clinician uses population-based parameters while by using AI, the machine can observe combination of patterns helping increase in accuracy of diagnosis. Using AI reduces the redundant extra tests which clinician has to conduct to improve accuracy of diagnosis. This research was presented by European Respiratory Society's International Congress.

Microsoft Intelligent Network for Eyecare uses predictive modelling to help eliminate avoidable blindness. Several institutes are working together on diverse datasets across geographies to develop machine learning predictive models to diagnose visual impairment and other eye related problems.

A study conducted Alzheimer Center of VU University medical center, could predict 100 patients out of 260 tested would probably be with Alzheimer disease. Few were with mild cognitive impairment (MCI) and few others with subjective cognitive decline (SCD). This was conducted using machine learning training to classify the data into these levels of Alzheimers.

The IBM's Watson identifies the patient's status to recommend course of action. It offers a special program for Oncologists. Babylon app maintains the history of patient in its app to fix an appointment as per your health condition on that day. Artificial Intelligence in healthcare is growing exponentially as every other company in this field would not like to miss this opportunity.

Legal:

Artificial Intelligence can predict the legal outcomes in major International courts for cases relating to violation of human rights. European Court of Human Rights has used AI method for judicial decisions and have observed accuracy levels of around 79%. Machine Learning algorithms are capable of observing patterns easily

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in the cases helping the lawyers to easily fight the cases. Ross Intelligence has law firms as clients and it provides them legal consultation using Artificial Intelligence. It supercharges lawyers by providing them the right information to fight their cases.

Retailing:

Jeff Bezos, Bansals, Jack Ma and other major retailers all have understood the importance of AI and Machine Learning and even have started using such technologies. Amazon has started using its Alexa Assistant which is voice-activated to help quick deliveries. Bezos believes that those who adapt to AI would be at advantage over those who do not. He believes that AI helps in 'high velocity decision-making'. Amazon has started using AI in its drone delivery and also in its popular voice-activated Echo and also cash-less Amazon Go departmental stores. Amazon uses AI for other activities also like natural language understanding, product recommendations, product search, forecasting demand, use of neural networks to convert speech to text.

Bansals have started using AI tools to solve many of their problems related to online shopping like 'How easy is it for buyers to search what they want?', 'Can the customers to other customers while they are shopping?', 'How can Flipkart replicate brick-and-mortar retailing experience of customers while they are shopping online?', 'How well backend operations can be streamlined?'. Project Mira was started to answer all these questions by experimenting various experiences on their app and other platforms as well. Flipkart is using AI extensively to solve many other problems. Flipkart uses AI for personalization, to answer complex queries, for predicting returns, to understand ratings and for fraud and duplicate detection.

KFC launches AI-based café in China. This outlet provides unique dining experiences to diners. Customers are able to click photos in augmented reality format which would even help the outlet or the machine to decide the menu when the customer visits the outlet next time, every time.

Banking & Finance:

AI based solutions for financial services industry. Synechron is one such global financial consulting firm which has come out with 14 reusable applications called Accelerators that can reduce the time-to-market while reducing operating costs.

Most of the banking activities are automated reducing the time taken to handle them like sanctioning a loan and negating the assumption that as the number of branches grow so must be the number of employees hired. Yes bank has gone a step ahead to provide AI-based digital wallet facility to its customers for them to use it to recharge mobile and DTH services, send-request money and pay monthly utility bills. Pay-bot also carries out conversation with customers to clarify their doubts over a friendly chat.

Potential Problems of Adapting Artificial Intelligence:

Attributes like sexism, racism and other forms of discrimination are not going to be easy to handle by AI-based technology. Google's photo app which applies automatic labels to images was labelling black people as gorillas. This is the data related problem where white people might have fed training data too much of white people related images making the app not to identify non-white people. Similar case was registered with Amazon recently that ZIP codes of black neighbourhood were less served with same day deliveries. Though both cases are unintentional but are potential threats in the future.

Banking activities are mostly automated thus reducing the manpower drastically. The less skilled manpower would not have any banking job as years pass by. Teller counters can be completely replaced by machines. No passbooks, no deposits, no cheque book requests as most of these functions are automated. This in-turn reduces the need of manpower to perform those activities.

Since the self-driving cars still in infancy, total dependency on car's autopilot mode can turn out to be dangerous. Tesla saw first death of a user of autopilot mode where car failed to identify the monster vehicle in front of it. It was tragic incident and shows that there is still a long way for AI to go before it can be totally believed upon.

Conclusion:

World is going to witness humongous change with more and more use of AI-based technologies in every field. There are potential threats on several fronts in every industry in using AI-based services. The companies adopting AI-based technologies first priority should be in addressing these issues to avoid any possible confrontation with the community. There are several advantages of using AI-based technologies to help the mankind to adopt and adapt. Like many stalwarts of businesses believe AI is going to be like 'Godlike' in future. There is every possibility that this is going to be beginning of end of mankind and this should not be taken lightly but needs to be addressed seriously.

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