

Artificial Intelligence - Still a Man Behind Machine



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Shakespeare said, "What's in thy name?" But, I feel there is a lot in the name. When we talk about Artificial Intelligence (AI), we must know as to what it signifies. It aims at intelligence which says the capacity and ability to think, learn, reason and apply knowledge. Intelligence test assesses a person's mental and developmental ability whereas the word artificial gives a meaning for a particular thing which is invented or produced by people and is not natural. Basically, it is imitation of natural like we have artificial flowers.

My idea of giving the dictionary meaning of these words is to emphasize that artificial intelligence is not natural but a creation of mankind. John McCarthy is known as father of Artificial Intelligence and according to him, AI is the science and engineering of making intelligent machines especially intelligent computer programmes. AI is a way of making a computer, a computer-controlled robot or a software think intelligently in the similar manner as to how intelligent humans think. AI is accomplished by studying as to how human brain thinks, how it learns, decide

and work while solving the problem. Then, using the outcome as the basis of developing intelligent software systems.

AI's beginning was slow but steady

It is important to be aware of the historical perspective of every concept. Therefore, we need to know the timeline of AI. It goes as follows:

1943: Warren McCulloch and Walter Pitts: a model of connected artificial neurons

1956: Dartmouth workshop Alan Turing, John McCarthy, Marvin Minsky, Allen Newell

1958: LISP by McCarthy

1965: ELIZA: Weizenbaum, a program that acts as a psychotherapist, Work on machine language, unsuccessful

1966: Funding for AI stopped. Difficulties: Lack of knowledge about world. The scale problem: easy to solve toy problem, very difficult to solve real world problems.

1969-1979: Knowledge - based systems

1972: Prolog, created by Alain Colmerauer

1975: Frames: a knowledge representation scheme, developed by Marvin Minsky

SHRDLU by Terry Winograd- understanding natural language in block world

DENDRAL- inferring molecular structure from the information provided by a mass spectrometer. Developed by Edward Feigenbaum.

MYCIN- a rule-based system for knowledge representation and inference in the domain of medical diagnosis and therapy.

1980: R1- first commercial ES- McDermott, configures orders for new computer systems.

1981: Fifth generation project in Japan. Mid 80s Neural networks

1990: Major advances in machine learning, natural language processing, multi-agent systems, robotics.

2000 Robotics: Humanoid robots, Rodney Brook, Robo cup soccer, humanoid sociable robots, interactive robot pets

After 2000, there has been tremendous progress in the field of AI and today we talk about remote air traffic control, heart operations by robots, driverless

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cars and metros, and things are moving rapidly finding solutions to problem areas where human brain is unable to calculate.

Now, the question comes as to how the human intelligence is different from machine intelligence. Where humans perceive by patterns machines perceive by set of rules and instructions. Human store and recall information by patterns, machine do it by searching algorithms. For instance, the number 80808080 is easy to remember, store and recall as pattern is simple. Humans can figure out the complete object even if some part of it is missing or distorted but machines cannot do it correctly. The domain of AI is huge in breadth and width whereas human intelligence has got its limits depending upon individual capacities.

Computerization - The beginning of AI

AI is an intelligence exhibited by machines. Any device that perceives its environment and takes action which maximises its chances of success at some goal are smart devices. Artificial Intelligence is a science and technology based on disciplines such as computer science, psychology, mathematics, biology, linguistics and engineering. AI emphasizes the development of computer functions associated with human intelligence such as reasoning, learning and problem-solving. The basic philosophy of AI is based on power of the computer system and it all began with curiosity of humans which led to wonder as to whether a machine can think and behave like human. The goals of AI are: to create expert systems which exhibit intelligent behaviour, learn,

demonstrate, explain and advise its users. It also aims to implement human intelligence in machines by creating systems that can understand, think, learn and behave like humans.

Now-a-days, everybody talks about AI with certain amount of fear in the mind as to whether it will replace the human resource. It came from technology and the advancement has come in the mainstream system. Microsoft, Google, Amazon have made it more accessible. There are optimistic and pessimistic views with regard to future of AI and its impact on mankind. AI is a branch of computer science which is concerned with the automation of intelligent behaviour. It is a science of making machines to do things that would require intelligence if done by men. In simple terms, we can understand AI in the form of study of computations that make it possible to perceive, reason, and act.

AI is extension of human intelligence

The academicians and researchers have been working on AI since last many decades and today the strongest form of AI has come by creation of a robot which is autonomous, thinks for itself, makes its own decisions, can deliberate about its own thoughts, can learn and adapt to new situations and it can communicate with humans through the use of language.

Let us see how we define intelligence in the context of AI because there is no human factor involved to have the feeling. The intelligence in terms of AI is the ability of a system to calculate, reason, perceive relationships and analogies, learn from experience, store

and retrieve information from memory, solve problems, use natural language fluently, classify, generalise, adapt new situations and comprehend complex ideas.

The above intelligence can be linguistic, logical, mathematical, spatial, bodily kinesthetic, interpersonal. Finally, we can say that a machine or system is artificially intelligent when it is equipped with at least one and at the most all above intelligence. It is dependent on human intelligence who created it. We must agree that a super intelligent artificial intelligence cannot exhibit human emotions like love or hate and there is no reason to expect feelings from AI. A robot can think, innovate and act with certain limitations. It will choose the best alternative but its search will be limited to the alternatives available in the memory. AI might become a risk if it is programmed to do something devastating. Autonomous weapons with AI systems can be programmed for killing and if it is in the hands of wrong doers, these AI weapons can cause mass casualties. The AI arms race could inadvertently lead to AI war resulting in mass casualties. We need to design weapons with a button turn off. The AI is programmed to do beneficial things but it may adopt a destructive method to achieve a goal and this can happen if we fail to fully align our goal with AI. You may have an obedient AI car to your destination as fast as possible. It may get you but you may face vomiting. It's not what you really wanted.

Tech Radar Report – a milestone

Let us know about technologies and tools for artificial intelligence

to be used by application development professionals. Noted researcher Forrester has published a tech radar report with a detailed analysis of technologies which may be considered to support human decision-making.

First and foremost the Natural language generation, in order to produce text from a computer data which is being used in customer service, report generation and digital reasoning purposes. The Speech recognition, transcribed and transformed human speech into format useful for computer application. We are using it in interactive voice response system and mobile application. The virtual agents named as the current darling of the media by Forrester. It was a relationship from simple chat-bots to advanced systems that can network with humans. It is used in customer service and support as smart home manager by Amazon, Apple, Google, Microsoft, and IBM, etc. The Machine learning platforms provide algorithms, training toolkits, computing power to design. IT is used in wide range of applications like predictions and classifications by Skytree, Microsoft, Amazon, Google.

Forrester also talked about AI optimized hardware as graphics processing units and appliances specifically designed to efficiently run AI oriented computational jobs. Google, Amazon, Intel use them in making a difference for deep learning applications. The decision management is another field in the form of engines, that insert roots and logic into AI systems to be used for initial setup, training and on-going maintenance, tuning. It is a matured technology which is used in wide variety of enterprise application.

It assists in performing automated decision-making.

The deep learning platforms is special type of machine learning which consists artificial neural networks with multiple abstraction layers. It is being used in pattern recognition and classification, applications with a support of very large data sets by Saffron Technology, Sentinent Technologies, fluid AI and math works. Biometrics is another important AI tool which enables natural interaction between humans and machines such as image and touch recognition, speech and body language. It is being used for the purposes of market research by face first, sensory, affective and tahzoo.

Forrester also talked about Robotic Process Automation which uses scripts and other methods to automate human action for supporting business processes. It is being used when it is too expensive and inefficient for humans to execute a task or a process. Blue prism, automation anywhere, UI path and work fusion are sample vendors. Text analytics and natural language processing uses and supports text analytics by facilitating the understanding of sentence structure and meaning, sentiment, intent through statistical and machine learning methods. This AI tool is important in fraud detection and security. The basis technology, expert system, Indico, Knime, Mind Breeze are some of the sample vendors. Handwriting recognition software is important tool of AI which reads the text written on paper via pen or on screen by a stylus. It can recognise the shapes of the letters and convert it into editable text.

A Narrative Science survey found last year that 38% of enterprises are already using AI, growing at 62% by 2018. Forrester Research predicted a greater than 300% increase in investment in artificial intelligence in 2017 compared with 2016. It is estimated that AI market will grow from 8 billion dollars in 2016 to more than 47 billion dollars in 2020.

AI leads to accuracy and perfection

We must appreciate that when programming is done without AI, it can answer specific questions it is meant to solve and modification in the programme, may lead to change in its structure. Moreover, modification is not quick and easy and it may also affect the programme adversely whereas if the programming is done with AI, it can answer the generic question it is meant to solve and programme can absorb new modification by putting highly independent pieces of information together and the programme can be modified without affecting its structure which is quite quick and easy.

We analyse as to why AI? It is not a replacement of human resource. In real world, knowledge has come with some unwelcomed properties because its volume is huge next to unimaginable. It is not well-organised or well-formatted. Knowledge is scattered. Moreover, it keeps on changing constantly. AI is a creation of human in order to organise and use the knowledge efficiently so that it should be perceivable by the people who provide it and the process of modification for correcting errors should be easy.

The AI looks for using the

information in many situations even though it may be incomplete. The AI techniques elevate speed of execution of the complex programme. We should not miss the role of intelligent robots who are able to perform the tasks given by humans. Their sensors to detect physical data from the real world such as light, heat, temperatures, movement, sound, bump, and pressure. They have efficient processors, multiple sensors and huge memory, to exhibit intelligence. In addition, they are capable of learning from their mistakes and they can adapt to the new environment.

There is always a man behind the machine

We need to critically analyse human intelligence and artificial intelligence which will reveal that AI is extension to human intelligence. Human learn ordinary tasks since their birth by way of perception, speaking, language. The formal tasks are learnt first and then expert tasks. The ordinary tasks are easy to learn. The machine requires more knowledge, complex knowledge representation and algorithm for all purposes whether it is for ordinary tasks or expert tasks. It does not require common sense. The system is based on agent and its environment. The agent is anything that can perceive its environment through sensors and acts upon that environment through effectors.

Now, let us see how different agents work. A human agent has sensory organs such as eyes, ears, nose, tongue and skin and parallel to these sensors, other organs such as head, leg, mouth for effector. The robotic agent replaces cameras and infrared range

finders for sensors and various motors for effectors. A software agent has encoded bit strings as its programmes and actions. The performance measure of the agent is the criteria which determines its success. The behaviour of the agent is an action it performs after any given sequence of inputs at a given instance. The percept sequence is the history of all agents have perceived and finally, the function of the agent is a map from the percept sequence to an action.

Today, we have AI devices as our personal assistants on our phones. It is driving cars, winning chess matches, chat-bots, interacting with customers online, robots assisting doctors in diagnosing diseases and managing our homes. There is so much new coming out on daily basis. There is no limit to the possibilities of an AI driven features. Even in surgeries, intelligent automation tools are helpful. The areas which

machines cannot replicate would still be of utmost importance such as creativity, empathy and emotional intelligence. AI should not be treated as a threat to human intelligence but it should be taken as enabler for enhanced performance with absolute perfection.

Multi-dimensional uses of AI

It will be relevant to pen picture certain interesting episodes relating to AI like a robot performing human stunts at Disneyland. A video of the stunt robot shows the machine launching into the air from a swing and performing several flicks before landing in a net. This was the first step of stickman robot towards creating a human scale robot capable of performing stunts. But the guests at Disneyland are not impressed about it as it looks like animation devoid of human touch. The risk factor of the stunts performed by human gives excitement.

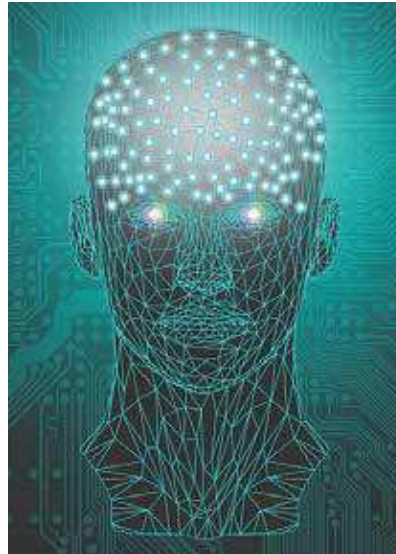
It is an unfounded myth that Artificial Intelligence is an impediment in the way of human resource development. Rather, it is a great tool in the hands of human resource to enhance the overall efficiency and productivity of the organisation. Human Resources need to feel proud that they are the creator of Artificial Intelligence. The computer programme and for that matter, even a robot can think and innovate only to the extent of memory he/she has got. It can generate alternatives to a problem by the way of choosing the best available in its memory. Errors, mistakes, omissions, inaccuracies and lapses only relates to human intelligence. These words are non-existent in Artificial Intelligence.

Google emerges as leading user of AI

The internet search giant Google announced artificial intelligence and security as top priority among host of services it offers. Google is going deep on AI and security areas as security is the number one worry and AI is number one opportunity. The cloud infrastructure of Google is a collection of many football stadium size data centres of Google which are running carbon neutral with specialised processes like Titan. Google extolled deep dive into AI and its benefits in healthcare services with predictive inputs on risk of diseases. We have seen incredible spaces with AI especially with healthcare. AI is helping doctors to predict diseases like heart-attack and strokes to the patients. Google is taking the lead by using AI in various fields since it holds enormous promises for the world.

We are using Google to re-think and re-imagine the products with an AI first approach. It's a cloud journey where safety and security are built into every layer of cloud operation with high level of data encryption. Google is going deep on AI for security areas as in today's scenario security is number one worry and AI is top opportunity. Sundar Pichai, CEO of Google has said that, "Our mission is to organise world's information and make it universally accessible and useful. I am always talking of being fortunate as a company, as a timeless machine, one that feels as it did 20 years ago."

The most recent advancement as a result of AI is Android's journey. Helping mobile makers and users from a coffee shop on the corner to complex enterprises with



thousands of offices around the world. The android was launched with one phone and one carrier in 2008. Today, we have eco-system of phone makers, mobile operators and application developers leading to 24,000 different devices from 1300 different brands.

AI in HR - optimizing productivity and efficiency

There has been a sea change in the working of HR professionals during last three decades with introduction of computerization and without the use of AI, it was impossible to complete end to end recruitment process for lakhs of candidates within three months right from the stage of notification of vacancies to offer of appointment that too for a right candidate at the right time at the right place. But, the AI has come as a boon and the traditional time-consuming, prone to human error, human skill-based system has been replaced saving time and energy, leading to error-free, transparent selection process. After Google, IBM also revealed its dependency on AI especially in the field of talent

acquisition. It has got more than 3,50,000 employees globally and AI became a dominant theme in HR technology being used by IBM because it helps in taking analytics and predictive insights directly to the right person at the right moment as stated by Ms. Joanna Daly, Vice-President of IBM Talent.

She has given an example in talent acquisition. "Let us say the potential candidate is interested in learning more about roles in IBM. They can interact with Watson and have a conversation using Natural language to ask about jobs and locations. They can upload resume and receive recommendations on roles they match to with insight on how strongly they match to the role and why, based on their skills."

As far as recruiters are concerned, IBM use AI to help the recruiter prioritize which openings to focus on first to have the biggest business impact and which candidate are the best fit. What is so powerful about applying AI to an area like talent acquisition is that AI can change mindsets. Candidates might apply for a role they never would have thought about if they were doing a traditional search. AI can help recruiters and managers to remove bias from selection decisions. AI can help to build a more inclusive technology workforce.

Today, AI has the biggest impact on recruitment making it a more efficient technology which also enhances candidate assessment. AI can turn a 15-minute video interview into a set of 20,000 data points on facial movements, intonation and word choice to assess a candidate. Machine learning can automate candidate's

outreach and streamline employee onboarding. HR software claimed 71% reduction in cost of hiring and a three-fold increase in recruiter's efficiency. These figures are based on statistical findings.

AI also helps in performance management system since technology continuously tracks the productivity of various teams on real time basis. It helps managers in identifying individuals with the highest probability of success in order to place them on the right job. Innovation and virtual learning are an important aspect where AI augments learning and development with multiple platforms. The AI based learning technology claims to have 32% increase in employee productivity and 43% increase in retention of employees. Increased use of smart phones. Tablets and laptops have made mobile workforce management. It brings team mates closer boosting a collaborative spirit.

Another important aspect is Employee Self Service (ESS) in a smart manner so as to have constant free flow of information and engagement. Smart ESS aids quick replies to questions and find policy related information and also have transaction without lengthy administrative processes or multiple level human interactions. The employee data is collected and compiled quickly and without human error. In nutshell, we can say that whether there is 26 years old HR manager or a CHRO with 26 years of experience, the use of AI in HR creates more time for them to tackle bigger and more important challenges and allows to focus on what they can do best by nurturing, cultivating and working with talent.



Career in AI is no cakewalk but lucrative

It has been observed that from the world's largest tech companies to start-ups, everyone is looking for AI. A lot of mathematics, constant learning and understanding human behaviour are some of the ways to get a foothold in AI's growing industry. There are a few AI professionals who have excelled in making a career and according to them, the career in AI is about many different things from data analysis, text and image recognition to linguistics but the successful AI professionals do not talk about robots. They came from engineering background, gained experience in IT sector and joined MNCs like Amazon, Google, Facebook, etc. Their package ranged from 40 lakhs per annum to 60 lakhs per annum. Many cities in our country have AI communities, both online and offline. One has to keep eyes and ears open, follow the latest research and attend conferences to be abreast with latest happenings.

AI is not some kind of magic tool that can solve all problems. Basically, it is only an advanced statistical tool. For an AI solution to be effective, it requires certain conditions like having plenty

of data to work on. In order to become a successful AI professional, one needs to have good understanding of linear algebra, probability, statistics and other core mathematical concepts because machine learning involves complex functions with different variables. AI professional tweak different parameters and run experiments with them.

Finally, I would like to summarize that it is an unfounded myth that Artificial Intelligence is an impediment in the way of human resource development. Rather, it is a great tool in the hands of human resource to enhance the overall efficiency and productivity of the organisation. Human Resources need to feel proud that they are creator of Artificial Intelligence. The computer programme and for that matter, even a robot can think and innovate only to the extent of memory he/she has got. It can generate alternatives to a problem by the way of choosing the best available in its memory. Errors, mistakes, omissions, inaccuracies and lapses only relates to human intelligence. These words are non-existent in Artificial Intelligence. ■