AUTOMATION & ARTIFICIAL INTELLIGENCE – BOON OR BANE: A HUMANISTIC PERSPECTIVE

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Abstract: The role of Artificial Intelligence and Automation has evolved dramatically and exponentially in recent times and there is a great deal of debate on the impact of this on society in general. This paper essentially presents perspectives to examine the role of Artificial Intelligence and it's economic and social impact to assess the effects of the growth of this technology on the human race and also examine the various opportunities and challenges that Artificial Intelligence could bring about. The paper attempts to study the impact of Artificial Intelligence and Automation on the jobs landscape and summarizes the challenges which policy makers would have to deal with to harmonize the growth of technology and its societal impact.

Keywords: Artificial Intelligence, Automation, Interface between Human and Artificial Intelligence, Benefits and Challenges of Artificial Intelligence and Automation.

Introduction

Artificial Intelligence (AI) is basically intelligence demonstrated outside the human mind, essentially by machines. (Parakh, 2018) Machine Learning (ML) is a way of achieving AI and can be defined as the ability of computers to learn using statistical techniques without being specially programmed. Both the terms are symbiotic but also mutually exclusive in their own right with different definitions.

AI is software that is meant to perform functions that human intelligence can undertake like learning and problem solving among other things like reasoning, planning, perception as well as Natural Language Understanding (NLU) and Natural Language Processing (NLP). This technology, in the Information Technology (IT) sector, is being applied to several objects. Digital Assistants are one of the foremost products built keeping AI in mind. Amazon's Alexa, Apple's Siri, and Tesla's Autopilot are some popular Virtual Assistants. However, today, IT industries are experimenting with a plethora of AI-enabled services and solutions and tagging them "smart," like Smart TVs, Smart Toys, Smart Speakers, Smart Autonomous Cars, and others.

1. Evolution of Artificial Intelligence and Impact on Jobs – Review of Literature

Keynes was the first to postulate in 1937 that rapid technological progress can impact jobs. He further indicated that this can impact in two ways:

- By directly displacing workers from tasks that they were previously performing (displacement effect).
- By increasing the demand for labour in industries or jobs that arise or develop due to technological progress (productivity effect).

Autor, Levy & Murnane (2003) stress that technology can replace human labour in routine tasks whether manual or cognitive but as yet cannot replace human labour in non-routine tasks. Goos & Manning argue that the impact of technology leads to rising relative demand in well paid skilled jobs, which typically require routine non cognitive skills and rising relative demand in least skilled jobs which typically require non routine manual skills.

At the same time demand for middling jobs which typically required routine manual & cognitive skills will fall. The authors call this process job polarisation. Acemoglu & Autor (2011) found similar results for the U.S., while Darvas & Wolff (2016) report such developments for a selection of EU countries too: France, Germany, Italy, Spain, Sweden & the UK. Their finding is that the number of high-education jobs such as Manager's, Engineers and health professionals is growing while the number of middle-education jobs (clerks, machine operators, assemblers is declining). However low education service occupations like shop workers, plumbers etc. which are non-standard and difficult to automate are also growing due to the growth of the economy. A key conclusion is that technology was incorporated into the subset of core job tasks previously performed by middle skill workers, causing substantial change.

In general past industrial revolutions suggest that in the short run the displacement effect may dominate. But in the longer run when markets and society are fully adapted to major automation shocks, the productivity effect can dominate and have a positive impact on employment. However the reliability of this approach is questionable as researchers from Mckinsey Global Institute estimate that the disruption of society caused by AI is happening 10 times faster and at 300 times the scale of the Industrial revolution in the 18th & early 19th centuries and is therefore having roughly 3000 times the impact (Dobbs, Manyika and Woetzel).

This rapid progress of AI has led to assessing the risk of occupations and tasks that could be automated in the next few decades because of advances in technology. Frey & Osborne (2013, 2017) famously claimed that 47% of US occupations were at risk of being automated in the next decade or two. Bowles (2014) repeated this analysis for the European job market and found that on an average 54% of EU jobs are at risk of being automated.

In a recent paper published in the National Bureau of Economic Research (May 2018); Ajay Agrawal; Jushua Gans & Avi Goldfarb have explored the impact of Artificial Intelligence: Prediction Versus Judgement and have concluded that based on recent developments in the field of artificial intelligence (AI), they examined what type of human labor will be a substitute versus a complement to emerging technologies. They argue that these recent developments reduce the costs of providing a particular set of tasks – prediction tasks. Prediction about uncertain states of the world is an input into decision-making. They show that prediction allows riskier decisions to be taken and this is its impact on observed productivity although it could also increase the variance of outcomes as well. They consider the role of human judgment in decision-making as prediction technology improves. Judgment is exercised when the objective function for a particular set of decisions cannot be described (i.e., coded). However, they also demonstrate that better prediction impacts the returns to different types of judgment in opposite ways. Hence, not all human judgment will be a complement to AI. Finally, they show that humans will delegate some decisions to machines even when the decision would be superior with human input.

2. Artificial intelligence & Automation impact on businesses – a perspective

Allen Frank (2018) states that we are rapidly moving towards a workplace where people will interact with Machines on a routine basis. Technology is now interwoven into many of our everyday job tasks. He believes that AI is set to impact work in 3 major ways: Human to Machine Interaction, Smart Process Automation and Advanced Analytics which are discussed below

a) **Human to Machine Interaction**
The best example of this is the rising use of Chatbots which are now able to demonstrate how technology is increasingly able to capture the human essence by evoking and responding to human speech and actions. This is already being felt across a range of sectors like customer service, personal service assistant which is able to autonomously provide answers and assist in completing tasks etc.

b) **Smart Process Automation**
Today machines are already responsible for much of the basic work being done across many industries. From robotic process automation to natural language translation to fielding customer service requests they are becoming smarter and more capable. With the advances in technology machines like 3D Printers are able to leverage technology to provide customized mass production giving a competitive edge to several industries. Machines are also able to perform several complex and hazardous tasks and this has

revolutionized industries like automobiles production etc. and altered the balance of labor versus machines.

c) **Advanced Analytics**

Due to rapid rise in computing technologies and storage of data; advanced analytics and AI based machine learning are discovering patterns in data and using those identified patterns to generate value. It helps companies plan business operations and better understand customers. This technology enables business leaders to gain insight into their organizations as they function allowing them to increase revenue, reduce costs and improve overall customer satisfaction. Advanced analytics is becoming essential for organizations that want to be truly insight driven.

Interface between Human & Artificial Intelligence

However while there would be a lot of disruption over the next 5 to 10 years; Erik Brynjolfsson of MIT Sloan School of Management believes that if we could better understand those effects and if we could work to reinvent our business processes; we would be able to take advantage of these technologies to create benefits and wealth for society and organizations. Further Brynjolfsson's team analyzed data from the Department of Labor which gave descriptions of 964 occupations in the US economy and evaluated each skillset to determine which tasks could be done better by AI. The results were mixed and while there were plenty of tasks which could be done by AI there were equally tasks where humans were better than AI and Machine learning. In fact the major finding was that there would need to be coordination to help AI and humans work together which would also require the workforce to be upskilled.

3. Benefits & Challenges of Artificial Intelligence and Automation

There is no doubt that AI & Machine Learning is here to stay as IDC has predicted that $46 billion would be spent by industry by 2020 on AI and almost every industry is working on a digital strategy for the business. Forbes Technology Council has in a study come up with 14 points in which AI could benefit or harm society and organizations.

- **Efficiency & Throughput**

  While there is no doubt that AI & Automation are disruptive technologies they have also been very successful in enhancing productivity through cost savings and revenue generation as demonstrated in a variety of industries from automotive to customer services.

- **Harnesses Human Creativity**

  Humans are not best served by doing tedious tasks and AI provides the platform to enhance the creative content in jobs.

- **Adds Jobs, Strengthens the Economy**

  While this is debatable there is no doubt that AI will encourage a gradual evolution in the job market which with the right policy framework and business preparation will yield positive results. The unparalleled combination of human and machine could become the new normal in the workforce of the future.

- **Leads to Loss of Control**

  While this is a contentious topic if machines do get smarter than humans there could be a potential loss of control which could become a detriment.

- **Enhances Lifestyle**

  There is strong evidence of this and the rise of AI has resulted in increased convenience at home by the use of intelligent assistants, better healthcare, and smart homes with energy efficiency; use of IOT etc. to enhance the quality of life.

- **Application in Healthcare**

  There is again a huge potential for improved diagnostics, remote diagnostics and telemedicine etc. which has a huge significance for underserved economies like India and countries in Africa etc.

- **Creates Unintended & Unforeseen Consequences**

  Again the controversies surrounding the ill effects of data and technology are well documented with the possibilities of killer robots; influencing election outcomes by voter profiling and influencing human behavior though mass dissemination of fake news etc.

- **Increases Automation**

  While this will be a major benefit for business due to reduction in operational costs etc. the impact on society needs to be evaluated before concluding that this is a net positive.

- **Elevates Mankind**

  The ability of technology to solve problems, answer more questions and innovate more could be used for good or ill. However if history is a guide the improvement in technology does to tend to benefit mankind and allows us to focus on higher order functions and improved quality of life.

- **Solves Complex Social Problems**

  Although AI has the promise for solving complex social problems, there are ethical issues and biases which we must still explore as this is an area which is still its infancy.

- **Improves Demand Side Management**

  There is evidence that machines have become smarter over time and have improved efficiency and throughput. Advances have also resulted in the ability to perform customized mass production and will become a competitive edge for several industries.

- **Benefits Multiple Industries**

  The impact of AI and automation has been widespread with applications in diverse areas like academic research, health sciences and technology applications. It has the potential to completely change the way we look at industries of the future.

- **Absolves Humans of all Responsibility**

  The growth and application of AI can have the potential to make people unnecessary and remove all human elements of production. There would always be the need for judgement to be applied and elements of human emotion which can impact productivity.

- **Extends & Expands Creativity**

  While there is no doubt in the impact on creativity the concerns are mainly around AI leading to large scale jobs losses and going rogue and taking control of the human race. However both of these concerns could be addressed.

4. Conclusions and Suggested Approaches for Future Research

Based on the detailed examination of the literature on Artificial Intelligence and Automation there is definite merit that technology is here to stay and will have significant impact on the way we will live and conduct business in future. It is also clear that organizations and business models would have to evolve where the technology strategy would be critical to the organizations productivity, profits and perhaps it's survival.

However despite the disruptive and potentially destructive capabilities and potential of Artificial Intelligence and Automation we definitely cannot conclusively eliminate all human intervention. There is a strong case to prove that technology would always be subservient to the human race and the very purpose of technology is to serve humanity and improve the quality of life of people.

A few authors like Ruchir Sharma have in fact opined that far from being a threat Artificial Intelligence and Robotics good be a good thing for the global economy. Countries in which robot density is the highest- Japan; South Korea; China & Germany are all nations where working age population is declining. Robots are coming but the robots are coming in where in areas where human beings are naturally vacating. Some predictions show that Japan's population of 120 million may come down to half in the next 50 years. This is where Artificial Intelligence can make the maximum impact and can benefit the society. Technology has the potential to bring about tectonic changes and forcing organizations to come up with a model whereby Artificial Intelligence and human creativity could co-exist and as technology would have the potential to significantly change the nature of jobs in the future; this would throw up some critical challenges as enumerated below:

- How to create a balance between technological advancement and the value addition of human beings and how would new business models evolve to harmonize these twin objectives?

- Based on the jobs of the future how would education and training for future generations evolve to help them be contemporary and relevant to the workplace of the future?

- How to manage risks and challenges of the digital age and ensure that the harmful effects of technology are managed through the right mix of laws and societal values?

- How would the transition impact future generations and what kind of social and economic security systems do we need to build to ensure a seamless transition?

These questions need careful deliberation and future research and knowledge should work to address these areas where we need to evolve a completely new code and generate ideas to manage technological change and ensure that this does not lead to widespread value destruction and social unrest.

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