



Special Issue

“(Global Partnership: India's Collaboration Initiatives for Economic and Social Growth)”

Artificial intelligence in education and its effect on economic growth

Dr. Manjusha^{1*} and Prof. P. K. Varshney²

¹ Department of Physics, Damyanti Raj Anand Rajkiya Mahavidyalay, Bisauli, Badaun, Uttar Pradesh, India

² Department of Commerce, Damyanti Raj Anand Rajkiya Mahavidyalay, Bisauli, Badaun, Uttar Pradesh, India

Correspondence Author: Dr. Manjusha

Abstract

A multinational organization called the Global Partnership on Artificial Intelligence is made up of a variety of stakeholder groups, such as governments, businesses, trade associations, and specialists. The European Union, the United Kingdom, the United States, Austria, France, Canada, Germany, Italy, India, Japan, New Zealand, Mexico, South Korea, Singapore, & Slovenia are the founding members. Sweden, Belgium, Denmark, Israel, Czech Republic, & Ireland joined in 2021, following the countries of Brazil, the Netherlands, Poland, and Spain in 2020. The application of artificial intelligence (AI) & machine learning in critical industries including healthcare, banking, manufacturing, and transportation is a natural consequence of advancements in computer science & digital technology. The growing application of these technologies in various industries has raised concerns about potential effects on economic variables. Encoding various particle behaviours and tracking their minute variations over time offers physicists a wealth of AI modelling analysis and interpretability, enabling them to get deeper mathematical computation insights and more precisely encapsulate their observations.

Keywords: artificial intelligence, economic growth, innovation, human intelligence

Introduction

GPAI was launched in June 2020 as a multi-stakeholder initiative on artificial intelligence (AI). All G-7 nations, including the EU, are GPAI members. India joined as a founding member in 2020. Machines with particular human intelligence traits, such as learning, perception, reasoning, problem-solving, linguistic interaction, & even creative output, are known as artificial intelligence (AI) systems. AI has been incorporated into the field of education throughout the last ten years. Schools are using it to organize student performance data more efficiently. For instance, the Nipun Assessment Test in Uttar Pradesh uses artificial intelligence (AI) to evaluate the abilities of 1.6 crore pupils in grades 1 through 8. First, proliferation of computers and chips have given way to vast quantities of cheap and affordable computation power. Computing millions of operations at once is now slow, and graphical processing units have opened up new frontiers in parallel processing. Second, data storage has become cheaper and more affordable - terabyte computers are now standard for every household. Further, the internet has allowed data to be collected and stored in useful manners for analysis. The application of this technology has been ubiquitous. Voice recognition in your phone, autonomous vehicles on the road, and advertisement recommendation abilities are now rooted in these AI technologies, and many more companies are joining forces to commercialize these artificial intelligent systems.

AI in education

Given the significance of fostering children's AI talents, the CBSE has made AI a skill module for grades 6 through 8 and a skill topic for grades 9 through 12. Furthermore, a number of organisations are developing virtual assistants to help parents, instructors, and students learn and teach more effectively. These days, a wide range of application cases are witnessing several of these projects.

The following are some possible applications for generative AI:

- Using virtual assistants, parents can choose activities to help improve their child's reading and comprehension abilities. For instance, parents can have their children read aloud stories or have them narrated by the AI. This can be especially helpful for parents who wish to be active in their child's education but are illiterate.
- Rather than spending hours reading through various resources, teachers can follow the recommended guidelines for instruction with the aid of generative AI. By referring to a selection of carefully picked materials and expert insights, a virtual assistant built on generative AI can help a teacher organize innovative and interesting classroom activities and recommend strategies that might be effective in a classroom context.
- In addition to helping with text-to-speech, speech-to-text, and text-to-speech translations, generative artificial intelligence can also modify the tone and cultural context

of the translation. This will contribute to the inclusiveness of education for kids from diverse socio-cultural and linguistic backgrounds.

- Because this technology can adjust to each kid's individual needs, it can be very beneficial in early childhood education, where each child learns at a different pace and with different techniques, when used with the guidance of a caring adult (teacher, parent, or community member). Teaching fundamental language skills and fostering the development of literacy and numeracy foundations can benefit from it.

Artificial intelligence: opportunities and challenges

The effects of artificial intelligence (AI) are being seen both locally and globally. The way people live, work, and communicate with one another is probably going to change as a result of artificial intelligence platforms like Chat GPT and Open AI, among others. It will have an effect on various industries in the US, the Asia-Pacific area, and other countries, ranging from corporate finance, retailing, entertainment, pharmaceuticals, and medical to commerce. Artificial intelligence (AI) has the potential to transform patient treatment and diagnostics in the pharmaceutical and medical industries. AI may make it easier and faster for medical professionals to recognize medical indicators. Hospital administrators, physicians, and nurses can enhance the medical care delivery system. Additionally, through the arrangement of medical records, AI could enhance hospital revenue-generating systems. It might speed up the processing of medical test findings, provide physicians and other healthcare professionals more autonomy and improve workflow, enhance patient-doctor relationships, and free up more time for doctors and nurses to spend with patients. Furthermore, multidimensional imaging can be used by doctors to direct and enhance surgical treatments. It might result in lower expenses, better results, and a more effective and productive healthcare delivery system. Faster data analysis and diagnosis can be provided by an AI tool like IBM Watson. AI machine learning algorithms can reduce medical costs along the medical value-added chain by processing massive amounts of data more quickly and enabling more precise and targeted therapy.

What is the relevance of physics to AI as a discipline?

Since AI can benefit from so many physics applications, it doesn't take long to recognize the importance of this scientific field. The Higgs Boson Particle, sometimes known as the God Particle, was one of the most important discoveries in physics and was found utilizing an artificial intelligence neural network to help detect intricate patterns in particle collisions.

While AI specialists simply state image processing, physics scientists also use terminology like gravitational lensing for analysis of images utilizing neural networks to dig out classifications to finer degrees of precision. Geek speak is a constant problem in interdisciplinary fields since it frequently perplexes business executives who are unable to understand the meaning of the phrase.

Furthermore, a lot of well-known physicists claim to have been instrumental in the advancement of artificial intelligence, therefore there is rivalry friction in these fields as well excuse the pun.

www.dzarc.com/social

How AI will affect physics?

I should note that there is no doubt that machine learning and artificial intelligence will become essential components of physics education and research before I delve into the consequences of those topics. Nevertheless, much like artificial intelligence plays a role in human culture, we have no idea how this new and quickly developing technology will ultimately impact physics, any more than our forebears knew when transistors and computers were being built in the early 1950s. What is certain is that, as technology advances, artificial intelligence will have a significant and constantly changing effect on physics.

AI and economic growth

"The capability of a machine to imitate intelligent human behavior" or "an agent's ability to achieve goals in a wide range of environments" are two definitions of artificial intelligence (A.I.). These definitions instantly make me think about basic economic problems. What would happen, for instance, if artificial intelligence permitted an ever-growing number of jobs that were previously completed by human labor to be automated? The application of artificial intelligence (A.I.) in routine manufacturing processes could have an effect on income distribution and economic growth.

AI and Production Automation can be seen as the driving force behind economic advancement during the past 150 years. During the industrial revolution, many production processes were automated using steam and then electricity. Semiconductors, transistors, and relays carried on this pattern. Rather than a clear rupture, artificial intelligence might be the next stage of this process. From MRI equipment, computer-controlled car engines, and autopilots, self-driving automobiles and artificial intelligence radiological reports would be a logical development. Automation has mostly impacted routine or low-skilled jobs until recently, but it looks like A.I. may automate more non-routine, cognitive jobs carried out by highly qualified humans.

Factors which cause economic growth

A rise in the amount or quality of one of the production elements, or in the effectiveness of their use, is what drives economic growth. As an illustration: increasing the labor force and raising its quality as a result of greater education. This could be the result of increased participation rates, migration, or birth rates. enhanced technology, which produces more. This indicates a more effective use of resources. Increased investment to support economic expansion. Purchases of additional machinery will raise output. finding new resources, like oil. Business incentives like tax rebates or subsidies.

Employment physics

Workplace In 2015, almost two million individuals were employed by companies with a physics foundation. Eighty-six percent of these work for companies in the industrial, transportation, information and communications, or professional, scientific, and technical services sectors. Manufacturing & retail both have higher employment rates than other industries: in 2015, they employed about 2.5 million and 3 million people, respectively. Because physics-based firms are knowledge- and technology-intensive, their

productivity is higher than that of many other industries.

Implications of AI innovation on economic growth

Increases in productivity should result from the process of learning via experience and repetition, opening up possibilities for economic progress. According to Arrow (1962), technical progress results from knowledge and experience being translated into new physical capital that enters the production process and raises "productive efficiency." Review of the literature A large portion of the literature now available on technology & economic growth relies on endogenous growth models. Technology is a "by-product of ordinary production," according to Arrow (1962), who refers to this process of knowledge acquisition as "learning-by-doing." This line of reasoning is followed in the literature on technology & growth, which assumes that technological advancement raises capital productivity. Adoption of technology reduces labor costs and raises capital intensity in the production process. If technology boosts output, it is then accepted; yet, not all nations can keep on top of the technological frontier because technology demands more capital. Differences in overall output and productivity are a consequence of the variations in technological levels throughout nations.

Large effects of AI on economic growth

The advent of generative artificial intelligence (AI) in recent times prompts one to wonder if task automation is about to pick up speed, leading to labor cost reductions and increased productivity. Although there is a great deal of ambiguity around the potential of generative AI, its capacity to produce content that is indistinguishable from output made by humans and to lower barriers to communication between humans and computers represents a huge breakthrough with potentially enormous macroeconomic implications.

The job market may experience major disruption if generative AI lives up to its hype. We discover that around two-thirds of present employment are subject to some level of AI automation using data on occupational tasks in both the US and Europe. Additionally, we find that generative AI has the potential to replace up to one-fourth of existing work. Based on a global extrapolation of our projections, generative AI may result in the automation of 300 million full-time employment.

The impact of AI on employment

As artificial intelligence (AI) develops, the cost of automation will gradually drop, replacing human labor with machine labor. Actually, the problem of robots replacing human work due to technological advancements is not new. Numerous economists have been studying this subject in-depth ever since industrialization began in the late 18th century, trying to determine if technical innovation increases or decreases employment. The evidence that is now available suggests that technological innovation may affect employment in two ways: negatively by inhibiting it, and positively by providing new jobs. Technological innovation reduces work opportunities by increasing labor productivity and replacing a portion of labor. Schumpeter, for instance, suggested that process innovation will have a saving effect that will lead to a decrease in demand for labor and an increase in unemployment, while technological creativity and efficiency improvements will temporarily increase demand for the primary factors utilized to produce

new products. On the other hand, through capitalization effects, technical growth also creates jobs. As a result, the cost of lost job opportunities resulting from capitalization has already been paid; additionally, the present value of profits increases and the efficient discount rate of future earnings decreases with quicker technological improvement. Businesses will increase the size of their industrial operations and create more jobs in order to optimize profits.

Conclusion

In conclusion, there are certain parallels between machine learning and physics. Accurate observation is the main goal of both fields, and both develop models to forecast observations in the future. One phrase that physicists frequently use is co-variance, which basically emphasizes independent thinking by saying that physics should be independent of the type of rule applied or the type of observers involved.

Einstein stated this best in 1916 when he said: "The general laws of nature are to be expressed by equations which hold good for all systems of coordinates."

Acknowledgement

This paper is successfully completed with the mental and moral guidance of Principal, family and colleague. I also acknowledge all those who helped me directly or indirectly in the completion of this Paper.

References

1. "Artificial Intelligence and Economic Growth". Philippe Aghion Benjamin F. Jones Charles I. Jones Working Paper 23928. <http://www.nber.org/papers/w23928>. National Bureau of Economic Research 1050 Massachusetts Avenue Cambridge, MA 02138, 2017 October.
2. Peter Howitt, Susanne Prantl. "Patent rights, product market reforms, and innovation," *Journal of Economic Growth*. 2015;20(3):223-262.
3. Acemoglu D, Restrepo P. The race between man and machine: implications of technology for growth, factor shares, and employment. *Am Econ Rev*. 2018;108(6):1488-1542. <https://doi.org/10.1257/aer.20160696>.
4. Aghion P, Jones BF, Jones CI. Artificial intelligence and economic growth. In: *The economics of artificial intelligence: An agenda*. University of Chicago Press, 2018, p237-282. <https://doi.org/10.3386/w2392>.
5. Sankar Das Sarma is the Richard E. Prange Chair. <https://physics.aps.org/articles/v16/166>.
6. Edexcel Economics (A) A-level Theme 2: The UK Economy-Performance and Policies 2.5 Economic Growth Summary Notes.
7. Wein K Solos, Joel Leonard. On the Impact of Artificial Intelligence on Economy.
8. Full article: Artificial Intelligence: Opportunities and Challenges (tandfonline.com)
9. The Potentially Large Effects of Artificial Intelligence on Economic Growth (Briggs/Kodnani) (gspublishing.com).