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‘Which problems will economists need to solve within the next 20 years and will artificial intelligence help them?’

In the following essay, I will consider five of the largest problems that economists will be tasked with dealing in the next two decades, and consider whether Artificial Intelligence (AI) can play an integral role in solving these problems.

As a way to consider these problems, I will categorise them into 2 strands: Environmental and Socio-Political. In the first category, I will consider Energy Usage and Protecting Wildlife as case study examples. In the second category, I will consider Agricultural Issues and the use of Automobiles and Healthcare.

In an attempt to consider the ways in which AI can help solve some of these problems, we must first look at the powers AI possesses, and more specifically in comparison to “Human Intelligence. AI is, as stated by the Encyclopedia Britannica, “the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.”[1] The concept of an intelligent being is vague and very open-ended, but in general intelligent beings have the ability to think, understand and learn quickly and effectively[2]. Of the 3, AI is generally not seen as being able to truly ‘understand’ something[3] while their ability to “think” is very similar, if not inferior to that of humans[4]. It is in the field of “learning” that AI holds a huge advantage to humans as its ability to store, parse, interpret and remember is simply limited by a computer's processing power. AI is therefore likely to best support economists in solving issues where learning and application needs to occur rapidly and efficiently, especially when this process involves a colossal amount of data.

Energy Usage

One of the largest problems we will face in the next 20 years is undoubtedly climate change[5] . It is obvious that our current methods of energy production and usage are unsustainable. One use of AI is in helping us be smarter about our energy consumption. This usage has in fact already been explored.

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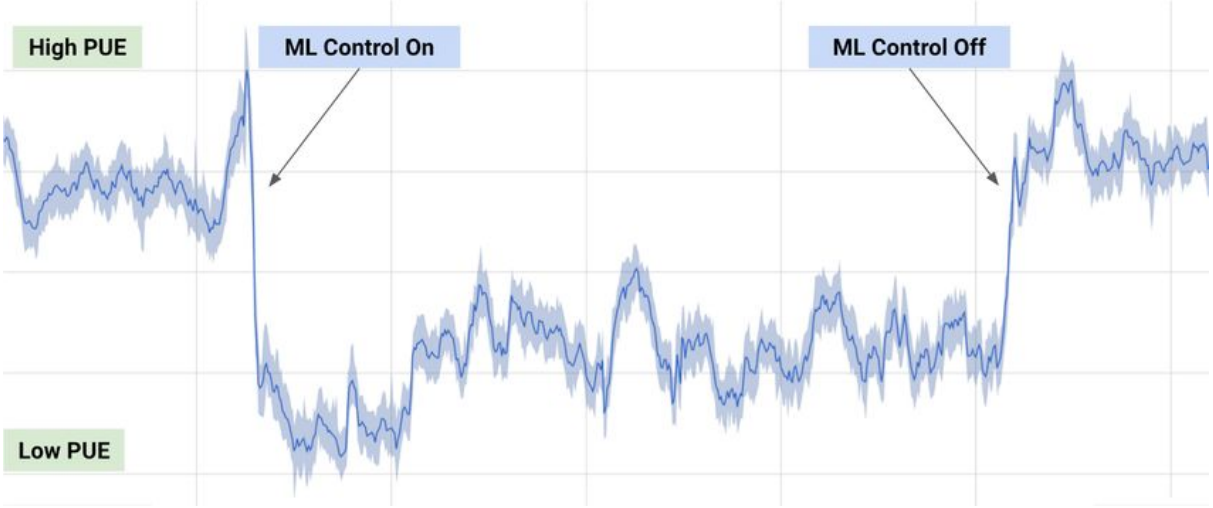
[1] "artificial intelligence | Definition, Examples ...." https://www.britannica.com/technology/artificial-intelligence. Accessed 30 Jan. 2020.
[2] "Intelligence defined and undefined: A relativistic appraisal.." https://psycnet.apa.org/record/1975-27677-001. Accessed 30 Jan. 2020.
[3] "Can A.I. Understand Humans? | reatch." https://www.reatch.ch/de/content/can-ai-understand-humans. Accessed 30 Jan. 2020.
[4] "Can Artificial Intelligence “Think”? - Forbes." 23 Oct. 2019, https://www.forbes.com/sites/danielshapiro1/2019/10/23/can-artificial-intelligence-think/. Accessed 30 Jan. 2020.
[5] "Global Warming's Terrifying New Math | Politics News ... - tfl.net." 19 Jul. 2012, http://www.tfl.net/PresentationHandouts/Global%20Warming's%20Terrifying%20New%20Math.pdf. Accessed 30 Jan. 2020.

Google and Microsoft have very large data centres that have a large number of servers(circa 60,000[6]). These in turn need to be kept cool, which requires a huge amount of energy. Google has used its AI platform DeepMind to predict when its data centres will get too hot. This way, cooling systems are only activated when required improving Power Usage Effectiveness(PUE). As such, AI has saved Google approximately 40% in energy costs at its data centres[7].



In the long term, economists can use AI to improve energy use to a near perfect level and inturn reduce both energy costs and the wastage of non-renewable resources on a global scale. Further to this, AI can help iron out many of the reliability issues with renewable energy production methods such as wind turbines by using them optimally in the best conditions. This can help pave the way for a renewable energy system.[8]

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Protecting Wildlife

Biodiversity is a huge issue in the modern world. The collapse of a few species can devastate whole ecosystems and cause irreversible damage. It is clear that monitoring wildlife is critical but this brings with it a major problem. Animals are difficult to keep track off, let alone manage and control.Being able to analyse massive amounts of data therefore gives AI the ability to transform wildlife conservation.

A use of AI in 2018 is WildBrook, a software program which identifies and tracks individual giraffes in Kenya by their unique coat patterns and ear outlines.[9] It has lead to a drop in poaching and allowed for more effective protection measures, as each giraffe can now easily

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[6] "Google Data Center FAQ & Locations | Data Center Knowledge." 17 Mar. 2017, https://www.datacenterknowledge.com/archives/2017/03/16/google-data-center-faq. Accessed 30 Jan. 2020.

[7] "DeepMind AI Reduces Google Data Centre Cooling Bill by 40 ...." https://deepmind.com/blog/article/deepmind-ai-reduces-google-data-centre-cooling-bill-40. Accessed 30 Jan. 2020.

[8] "Optimization of the Wind Turbine Layout and ... - IEEE Xplore." 24 Sep. 2013, https://ieeexplore.ieee.org/document/6607158. Accessed 30 Jan. 2020.

[9] "Artificial intelligence is counting animals to help save them." 13 Nov. 2018, https://www.nationalgeographic.com/animals/2018/11/artificial-intelligence-counts-wild-animals/. Accessed 30 Jan. 2020.

be accounted for, despite the hugely large number(100,000). While this many giraffes would be impossible to monitor if done solely by humans. A computer's speed and ease of tracking means the Giraffes are more effectively protected, with the giraffe population falling by 40% pre-AI and only 2% after its implementation.[10]

A similar strategy can be used around the world to maintain biodiversity, as AI is capable of tracking a very large number of animals. In doing so, we can stop the ecological apocalypse that has been plaguing us for years, and help maintain the environment for future generations.

Agricultural Issues

The world population is growing but as a direct result of this, arable land is now being reallocated for housing. This means that there are more mouths to feed, but less agricultural space to produce this food.[11] The biggest problem with farming is that the process is unreliable and inefficient, and AI can provide effective measures to improve both. AI-augmented agriculture involves automated data collection and effective decision-making to allow early detection of crop diseases and other issues. It can also be used “to provide timed nutrition to livestock, and generally to optimise agricultural inputs and returns based on supply and demand”. All of these occur because AI can collect data and implement decisions quickly and efficiently, lowering the use of key resources such as water, sunlight, fertilisers and pesticides.[12]

On top of this, AI will play a critical role in implementing hydroponic and vertical farming, both futuristic farming solutions being put forward by many, including economists. Both of these methods will require more controlled monitoring and fine tuning to make up for lack of soil, which gives AI a key role.

Automobiles

In the future automobiles will play a greater part in our day to day lives than even today. Firstly travel by car needs to be environmentally friendly, and AI will prove critical here. AI-guided autonomous vehicles will allow for greenhouse gas reductions through route and traffic optimisation, eco-driving algorithm and programmed “platooning” of cars to traffic[13].

However, with an increasing need for public transport, vehicles will also have to become more interconnected. In many cases today, public transport is very large to make it economically viable and this means it covers many more stops and stations, rapidly increasing journey times as opposed to the more bespoke journeys provided by personal

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[10] "Artificial intelligence is counting animals to help save them." 13 Nov. 2018, https://www.nationalgeographic.com/animals/2018/11/artificial-intelligence-counts-wild-animals/. Accessed 30 Jan. 2020.
[11] "Population growth and loss of arable land - ScienceDirect." https://www.sciencedirect.com/science/article/abs/pii/S0959378002000432. Accessed 30 Jan. 2020.
[12] "Precision Farming: Sensor Analytics - IEEE Xplore." 14 Jul. 2015, https://ieeexplore.ieee.org/document/7156034. Accessed 30 Jan. 2020.
[13] "Energy use, cost and CO2 emissions of electric cars ...." 15 Feb. 2011, https://www.sciencedirect.com/science/article/abs/pii/S037877531001726X. Accessed 30 Jan. 2020.

cars. To find a happy median, Carpooling is seen as an optimum strategy[14]and while this may currently occur with friends and colleagues, it requires significant planning and is largely limited to acquaintances.If economists want to implement carpooling on a large scale, AI will be key[15].

For large scale carpooling to work, we require a 'sentient' transport network. This means we would need to know the location of every car and every desired journey to quickly collate information and see which cars would be able to pick up passengers. This would firstly require us to move away from the days of car ownership[16], and a likely solution would be a fleet of cars, just as in the modern day we have fleets of delivery vans. The second major change would be the implementation of AI, to monitor cars and journeys, and allocate people to their respective journey based on a series of algorithms. This idea was trialled on a small scale in Hyundai[17] and is likely to become a key transport system which will begin to be implemented in the next 20 years.

Healthcare

Just as we have noticed when looking at the ways in which AI can solve major economic problems; one of the biggest benefits of AI is its capabilities in trawling through large sets of data quickly. This helps researchers pinpoint areas of focus for their own research.[18]

For example, a recent revelation in the search for a cure for Amyotrophic Lateral Sclerosis (ALS), was made through research conducted by Barrow Neurological Institute using the artificial intelligence IBM Watson Health.[19] The artificial intelligence computer, reviewed thousands of pieces of research and was able to identify new genes linked to ALS.

This kind of research could prove key to permanently eradicating diseases in the future[20], especially as antibiotic resistant becomes a more and more significant problem in years to come. Although AI cannot find cures, it can definitely speed up their discovery by finding correlations in huge data sets, and this may prove critical in saving countless lives.

Final Assessment

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[14] "Intelligent systems in the automotive industry - Springer Link." https://link.springer.com/article/10.1007/s10115-006-0063-1. Accessed 30 Jan. 2020.
[15] "Materials Comparison and Potential Applications of ...." https://link.springer.com/chapter/10.1007/978-3-319-48099-2_4. Accessed 30 Jan. 2020.
[16] "Patents and Artificial Intelligence: Thinking Computers." https://books.google.co.uk/books?id=XTWEDwAAQBAJ&pg=PA50&lpg=PA50&dq=https://patents.google.com/patent/US6668219B2/en&source=bl&ots=fNyJIfW3st&sig=ACfU3U37bZH0dwzrPWTcH_DP5-cF_5q1pg&hl=en. Accessed 30 Jan. 2020.
[17] "Hyundai self-driving cars: initial testing is successful ... - Auto123." https://www.auto123.com/en/news/hyundai-autonomous-vehicles-successful-first-tests/64371/. Accessed 30 Jan. 2020.
[18] "The potential for artificial intelligence in healthcare - NCBI." https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6616181/. Accessed 30 Jan. 2020.
[19] "Paging Dr. Watson: IBM's Watson Supercomputer Now Being ...." https://library.ahima.org/doc?oid=300441. Accessed 30 Jan. 2020.
[20] "Artificial intelligence-enabled healthcare delivery - Sandeep ...." https://journals.sagepub.com/doi/abs/10.1177/0141076818815510. Accessed 30 Jan. 2020.

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Overall when considering the main problems that economists will face in the next 20 years, it is important to take a holistic approach. To achieve this I have chosen to look at protecting animals and wildlife corridors, along with improving healthcare, agriculture, energy usage and our transport system. However we can see that wherever it is applied AI brings to the table the unrivalled ability to parse through huge volumes of data in record time, and in turn save money and increase efficiency. We see both from the examples above and through basic intuition that all three of these are likely to prove critical when solving problems and it is for this reason that AI's benefit seems so apparent. While it may not be able to solve problems like humans, AI brings unmatched advantages to any task and as such will prove hugely beneficial in trying to solve economic problems.