

In the Future, Could Artificial Intelligence (AI) Replace Human Scientists and Why?

Introduction

Artificial Intelligence (AI) is the theory and development of computer systems able to perform tasks which would normally require human intelligence. It was predicted that machines could be programmed to form abstractions, solve problems and predict outcomes on a larger scale and more efficiently than humans (Shanahan, 2018). Terms such as machine-learning and statistics are often used synonymously in the field of AI and have real-time applications to numerous fields including medicine, engineering, healthcare and economics. Historically, the dynamic field of AI has relied on human input, as the driving force behind the implementation of complex algorithms to manipulate pre-existing neural networks.

A Brief History of AI

The term AI was first coined by John McCarthy at the Dartmouth Conference of 1956 (Bai, 2019). AI is a dynamic multidisciplinary field encompassing the expertise of a variety of scientists, including cognitive neuroscientists, engineers, medical physicists, doctors and programmers to name a few. The existential questions and largest anticipated challenges in AI, which plague scientists today are the same as those first proposed in the mid-1950s (Shanahan, 2018). Two competing major research paradigms were put forward; namely, 'Symbolic AI' focusing on language and logic-like inferences and 'Machine Learning' which involves neural networks and forms the research basis for Deep Learning.

Deep Learning

Google Deep Mind are the world leaders in AI research and are on a scientific mission to push boundaries of AI, enhancing machines to perform tasks without needing to be taught how (Shanahan, 2018). It has been hypothesised that through deep learning, machines will not only learn models, but will potentially learn patterns, intensities and image automatically (Bai, 2019). Machines may be simulated to perform certain tasks and perhaps perform them with greater accuracy and precision than would ever be humanly possible. For example, using graph theory and the general linear model (GLM) to work out relative errors, machines may learn to repeatedly adjust weights to optimise their performance. Whereas, humans are still reliant on physiological presumptions and canonical models. Additionally, machines are not subject to human qualities such as emotions, fatigue and frustration. Nonetheless, the relationship between humans and AI is not yet bi-directional; AI remains more reliant on humans for inputs, and humans use AI for assistance.

Robotics and Neurorehabilitation

In fields such as Cognitive Neuroscience and Robotics, devices such as 'Gripable' have been engineered to improve clinical outcomes for stroke patients on neurorehabilitation wards (Bentley, 2018). Arguably, engineers, researchers and clinicians are the forerunners of AI, and are greatly valued and needed to make advances in this field. Furthermore,

Computational and Cognitive Neurosciences are still relatively new fields, with untapped potentials. These fields are reliant on the upcoming contributions of research scientists, experimental methods and peer-reviewed critique, all of which is distinctly human and cannot be computed and analysed through AI alone.

Role of Media

In part, the media and film industries are partially to blame for public perceptions of AI and the belief that robots may evolve and outcompete humans (Lorenz, 2018). Fearmongering and inaccurate science fiction portrayals of machine-learning and AI are exemplified by films such as 'Ex Machina' and 'I, Robot'. With respect to media interest, there has been an exponential increase over the past decade and it is likely that the trend of these 'Hype Cycles' will continue (Shanahan, 2018). Above all else, these measures for predicting the future of AI are arbitrary. As scientists, we ought to refer to our paradigms and evaluate the evidence-bases surrounding AI as it stands today. It is highly unlikely, that machines can evolve so quickly as to be able to replace scientists or make these fields redundant.

Conclusion

A fundamental role of human scientists is to observe, design and conduct experiments and analyses. This role can be applied to all scientific fields of research and AI is no different. Humans are the driver behind these disciplines, whether in the form of engineers designing machines and devices, mathematicians applying models, statisticians forming design matrices or doctors and research scientists conducting experiments. Human scientists possess the inherent ability to interpret and understand derived results, AI currently does not and perhaps never will. The relationship between humans and AI can be described as symbiotic, whereby AI systems function at the discretion of human scientists. Overall, with respect to the dynamic field of AI, it is unlikely that a revolution replacing human scientists will come about any time soon.

References

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