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Artificial Intelligence and Its Adverse Impact on Cognitive Abilities

Yash Dua

Abstract

AI has the potential to significantly impact the future more than any other invention from this century, but the reliance on artificial intelligence, while enhances efficiency, carries the risk of eroding critical human decision-making skills, leading to potential lapses in judgment during high-stress situations. However, researchers worldwide are focusing on the positive impacts of AI, whereas its negative impacts are being neglected. Although studies have explored the adverse consequences of artificial intelligence, they have primarily concentrated on job displacement rather than delving into the ethical implications of the technology. Therefore, this study aims to investigate the effects of artificial intelligence on cognitive abilities, particularly for those who face high costs for poor decisions and may experience substantial losses when making independent decisions. This research is based on an investigation conducted by the Bureau of Enquiry and Analysis for Civil Aviation Safety (BEA) on the unfortunate incident of Air France 447, where strong dependence on automated systems, insufficient manual flying skills, and a lack of situational awareness and decision-making abilities led to a tragic incident. This study focuses on the negative impacts of AI that rather than empowering humans reduces autonomy and control over our own lives.

Introduction

What Is AI?

In the past few decades, technology has impacted almost every sector whether it is communication or education. It plays a significant role in assisting the human race in one way or another. One such technology that came into being not too early is Artificial intelligence (AI). Artificial intelligence is a crucial technology that has the potential to shape our future more significantly than any other invention from this century.

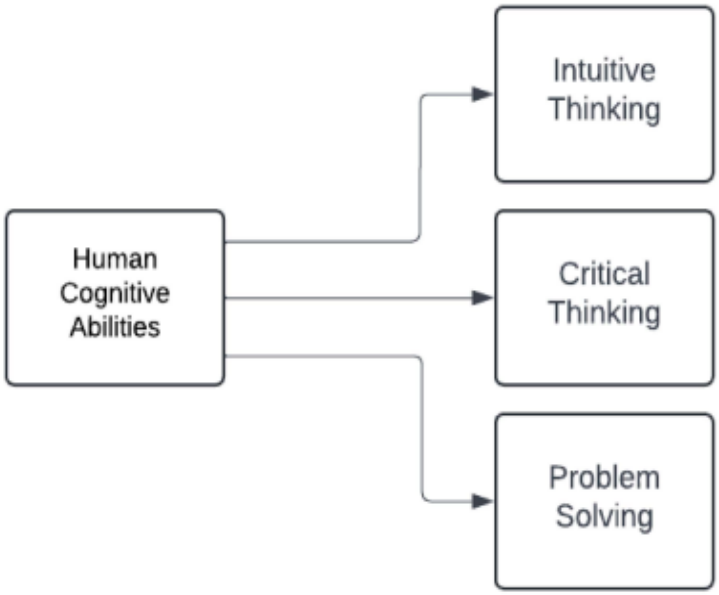
While John McCarthy in 1955 defined AI as "the science and engineering of making intelligent machines", Fedorko et al. acknowledged in 2022 that it is challenging to identify a consistent and accurate definition for AI. This definition offers a concise taxonomy that outlines the core domains of the AI research field and transversal topics, as well as a list of keywords that represent these components. The definition also recognizes the dynamic nature of the AI field and suggests an iterative approach that allows for updates over time to reflect its ongoing evolution. (Rosenstrauch et al., 2023)

We experience the effects of AI unintentionally in almost our daily lives by allowing Netflix to suggest us movies according to our preference or talking to an AI-enabled chatbot while seeking customer support. Anyone who doesn't keep up with it will soon be left behind, finding themselves in a world that feels like magic. (Ahmad, et al., 2023)

Loss of Human Autonomy, Decision Making and Cognitive Abilities

Artificial intelligence has made significant changes in our lives from the way we work to the way we make decisions everything has changed. Though Artificial intelligence has brought numerous benefits we must also consider its negative impact on human autonomy and decision-making. Technology has a crucial part in the decision-making process. It assists individuals in using information and knowledge effectively to make suitable decisions for their organization and innovations (Ahmad, 2019). As a result, decisions are made differently, with AI systems potentially making more precise and efficient choices than humans.

As the dependence on AI technologies increases among humans, the role of humans in decision-making processes will become more limited. Furthermore, an excessive reliance on AI technologies may result in a reduction in human cognitive abilities, such as intuitive thinking,critical thinking, and creative problem-solving.



As AI becomes more prevalent in our lives, concerns have arisen about the potential for human laziness and the erosion of critical thinking skills. (Hutter & Hutter, 2021) When individuals become Addicted to relying on AI to make decisions, they may become less inclined to Participate in independent problem-solving. This removes Autonomy capabilities from humans and makes them function more like algorithms. (Nasir, 2018)

AI is taking the place of hundreds years of experience. For example companies like Walmart and amazon are incorporating artificial intelligence into their recruitment process (Ahmad, et al., 2023). Furthermore Artificial intelligence has begun to influence the decisions made by CEOs, board members, and even physicians. Although the integration of AI has resulted in improvements in their work, there is little attention being paid to the negative consequences of AI on their decision-making abilities. The over-reliance on AI technologies by individuals who bear high costs for poor decisions can result in significant losses when they are required to make decisions independently.

Case Study - Detailed Analysis of the Air France Flight 447 Case

02:10 UTC:

The Aircraft Airbus A330 Departed from Rio De janerio at 19:29 local time on a pleasant note with 216 passengers and 12 crew members expecting to reach Paris

At approximately 02:13 UTC:

The aircraft started facing icing condition which lead to blockage of pilot tubes which measured the airspeed the Aircraft's auto thrust system and autopilot disengaged

02:14 UTC:

The aircraft had to be now controlled by the pilots manually. Upon this change pilot pulled back on the side stick causing the aircraft to ascend rapidly, the aircraft began to ascend rapidly, positioning it at a nose-up altitude and entering thinner air at higher altitudes. This created a critical situation, as it placed the aircraft at risk of an aerodynamic stall. Aircraft climbed from its cruising altitude of 35000 feet to a whopping 38000 feet that to in less than a minute. The continued nose altitude resulted in the aircraft to enter a stall. Due to which the wings were not able to produce sufficient lift to support the aircraft leading to loss of altitude

02:18 UTC:

The aircraft, under high angle of attack, crashed into the Atlantic Ocean approximately four minutes after the autopilot disengaged, resulting in the tragic loss of all 228 passengers and crew members.

Implications

When due to inconsistent air speed readings the autopilot of the aircraft disengaged, the pilots were unprepared to handle the plane manually in high stress conditions.Furthermore an abrupt shift from an automated to a manual flight system led to a loss of situational awareness and a stressful situation for the pilots.The PF's approach of continuously nose up inputs was actually contrary to standard stall recovery procedures and ultimately caused the stall .

The loss of 228 lives is a tragic reminder of the importance of understanding how automation impacts human cognitive skills. Here, the autopilot’s sudden disengagement created a cognitive overload, as the pilots, accustomed to relying on automation, struggled with decision-making under extreme stress.

But was the event primarily caused by overconfidence in the autopilot system or a lack of manual flying ability under highly stressful conditions, due to greater emphasis on learning how to operate automatic systems? That leaves us with future research areas, specifically the impact of AI on neurological impacts.

Furthermore, to comprehend the future of AI, it is also vital to understand the impact of AI on early cognitive development, as well as how AI and humans can collaborate without becoming overly dependent.

Conclusion

While AI has immense potential for enhancing our lives we must approach its implementation with a critical eye and a strong commitment to preserving our human autonomy (Huang, 2023). We must maintain a balance between AI technologies and human autonomy ensuring that advancements in AI do not come at the cost of Human cognitive abilities and the fundamental right to self-determination. (Cheng, Varshney, & Liu, 2021) (Mello, et al., 2023)

The BEA's investigation into the crash reveals that over-reliance on automated systems, inadequate manual flying proficiency, and lack of situational awareness and decision-making under stress were key contributors to the disaster. The Air France 447 emphasizes the need for a critical balance between automation and manual pilot skills. To prevent similar incidents in the future, it is recommended to implement comprehensive training programs that balance automated system management with manual flying skills, enabling pilots to become proficient in both manual and automated systems for the safety of aviation.

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