The Ethical and Social Dimensions of AI

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Course: ENCS 393

September 25, 2023

**Abstract**

This paper explores the ethical and societal implications of AI, focusing on the perspectives of software engineers and computer science students. The study employs a survey distributed to students and an interview with a software engineer to investigate public perceptions, attitudes, and experiences related to AI. The literature review delves into scholarly articles discussing the economic impact, social challenges, and uncertainties surrounding AI. Noteworthy concerns include labor disruptions, data abuse, biases, and the need for ethical considerations in AI development.

Findings from the interview with a software engineer reveal optimism about AI's contributions to efficiency and productivity in software development. However, the engineer emphasizes the ethical responsibility of developers to address bias and ensure fair AI decision-making. Survey results indicate that students in engineering and computer science acknowledge the benefits of AI but express concerns about legal and ethical issues. Additional figures from external surveys highlight public sentiments regarding the excitement and concerns surrounding AI.

The discussion section synthesizes the findings, revealing a nuanced perspective on AI. While most surveyed students believe in the positive impacts of AI, concerns about legal inadequacy and ethical implications persist. The study concludes that, despite the evident benefits of AI, there is a need for comprehensive regulations and ethical guidelines to mitigate potential harms.

**Introduction**

In an era marked by unprecedented technological advancement, the rise of Artificial Intelligence (AI) stands to become one of the most impactful to society. With its capacity to decipher complex patterns, process vast datasets, and perform tasks that normally only humans can do, AI has the potential to reshape industries, revolutionize economies, and bring boundless innovation. However, many ethical and social questions must be considered.

Artificial Intelligence, like any powerful tool, has the potential for tremendous good and significant harm. The ethical dilemma of AI has gained increasing prominence as its applications permeate our lives. It is present in almost all the software we use, from the cameras in our phones that use AI to improve image quality to the algorithms that recommend personalized content on social media. Furthermore, in the past year or so, the rise of AI chatbots like ChatGPT, the use of AI to produce art, and the use of deepfakes have caused concern for many people.

The population studied in this paper will be software engineers and Computer Science or Software Engineering students. I will attempt to get an interview with a software engineer and will distribute a survey to engineering students.

So, is AI good or bad for society?

The advancement of AI brings a net positive to society. The numerous benefits of AI are undeniable and have the potential to improve many aspects of society, such as productivity and efficiency, innovation and research, and healthcare just to name a few.

However, the advancements in AI technology also pose great challenges to existing legal and regulatory frameworks. As AI capabilities grow, there will be a need for continuous adaptation of laws and regulations to ensure that AI systems are used in a manner consistent with societal values and norms. Failure to do so may result in ethical dilemmas, privacy violations, and potential harm to individuals and communities.

**Literature Review**

The scientific paper “AI and the Economy” by Furman and Seamans discusses the effects of AI on the economy. It concludes that artificial intelligence has the potential to significantly impact the economy. It can boost productivity growth, which is particularly important given the recent slowdown in productivity in advanced economies. However, the paper brings up concerns about AI-induced labor disruptions, which could worsen existing labor force issues, such as declining male labor force participation rates. While early research suggests that AI and robotics enhance productivity but have mixed effects on labor, more empirical research is needed to confirm these findings. (Furman and Seamans, 2019)

The article “How AI can be detrimental to our social fabric” by Bhowmik explores the potentially detrimental effects of artificial intelligence on our society and highlights the concerns surrounding its impact. It begins by acknowledging the longstanding fear of AI replacing human jobs, particularly in repetitive industries, leading to economic loss and unwanted consequences. There are apprehensions about data abuse, loss of human control over data, socio-economic imbalances, and emerging forms of AI-related crimes. Despite these concerns, experts emphasize that AI can address global challenges but call for global leaders to establish checks and balances to prevent malicious disruptions.

The article recalls physicist Stephen Hawking's warning about the uncertainty of AI's consequences, emphasizing the need to be prepared for all possibilities. Job automation is identified as a major concern, particularly in lower-wage jobs and fields like medicine, law, and accounting. AI bias and socio-economic inequality are also highlighted, with fears that human biases may infiltrate AI systems due to the limited perspectives of their creators.

Furthermore, the article discusses the potential for data abuse and loss of control, stressing the importance of incorporating values and ethics into digital systems. Privacy, security, and the rise of deepfake technology are identified as threats, including the manipulation of audio and video to deceive and influence. Additional concerns include financial instability due to algorithmic trading and the potential erosion of cognitive and social skills.

To mitigate these risks, the article suggests well-thought-out regulations to prevent harmful AI implementations while promoting the responsible use of AI without compromising human relevance. Ultimately, it underscores the need for proactive measures to harness the benefits of AI while safeguarding against its detrimental impacts on society. (Bhowmik, 2023)

The article “The AI ‘Age of Uncertainty’” by Edelmandiscusses the profound impact of AI on society, highlighting the uncertainty and challenges associated with its rapid advancement. It draws parallels to historical periods of rapid change and uncertainty, such as those discussed by economist John Kenneth Galbraith in "The Age of Uncertainty."

AI's increasing influence in daily life is noted, including AI-generated content, self-driving vehicles, and its use in professional work. The article emphasizes the potential for AI to disrupt industries positively but also mentions concerns regarding large language models (LLMs), such as bias and confabulation.

The focus then shifts to the next wave of AI models, which are expected to be more sophisticated and generalized. Specific attention is given to Google's Gemini model, capable of processing various data inputs and described as the "Swiss Army Knife of AI models." It is suggested that these models could represent a significant step toward Artificial General Intelligence (AGI).

While the potential benefits of these advanced AI models are immense, the article also discusses the associated risks, including human extinction scenarios and the challenge of regulating rapidly evolving AI technologies. The need for oversight and regulation is acknowledged, even though it presents a significant challenge due to the open-source nature of much AI technology. (Edelman, 2023)

The article “The Future of Artificial Intelligence” by van der Madediscusses the current state and prospects of AI. It emphasizes the need for companies to adapt to the AI revolution by assessing their current skill sets and identifying the additional skills employees need to acquire. Developing an AI strategy is crucial for businesses to effectively integrate AI into their products or services and stay competitive in the market.

Machine learning, a subset of AI, continues to advance as more data becomes available, leading to sophisticated algorithms. AI applications span various fields, including healthcare, finance, manufacturing, and transportation.

The future of AI looks promising, with increasing investments in the technology. Neuromorphic processing, which mimics brain-like functions, is highlighted as a promising development. Neuromorphic cortical models are smaller, faster, and more energy-efficient than traditional computers, potentially leading to significant advancements in AI capabilities.

The article suggests that modeling various brain regions responsible for different cognitive functions, such as the thalamus, hippocampus, and cerebellum, could further enhance AI systems' performance in processing sensory information, learning, and multitasking.

Cortical neuromorphic neural networks are expected to replace current neural networks, offering advantages such as learning from few examples, cost-effectiveness, and continuous learning. These networks are anticipated to be used in various applications, including speech recognition, image processing, space exploration, healthcare, and robotics.

The development of cortical neural networks may eventually lead to the emergence of Artificial General Intelligence (AGI), a significant milestone in AI development. AGI is expected to profoundly impact the global economy and human society, like previous technological revolutions like the internet and computers. (van der Made, 2023)

**Methods**  
A survey will be designed to gather data on public perceptions and attitudes towards AI. The survey will be distributed to Engineering and Computer Science students, fields that will greatly be affected by AI, and will consist of 5 questions. The questions will be structured to capture opinions on the benefits and challenges of AI, as well as the need for legal adaptation. The data will be represented in charts.

An interview will be conducted with a Software Engineer. It will include discussions on the benefits of AI and its legal implications. It will provide insights on the topic that complement the survey data.

Further, anecdotal events will be included in the Discussion section to support or counter the hypotheses.

**Findings**

The following is an excerpt from an interview with a software engineer currently working at CAE.

1. How has AI improved efficiency or productivity in software development or within the organizations you've worked for?

AI has undoubtedly improved efficiency and productivity. We can automate routine, time-consuming tasks, such as data entry or quality assurance, allowing developers to focus on more complex and creative aspects of their work.

1. Can you describe any projects or applications you've been involved in that were made possible or significantly enhanced by AI?

One project I worked on involved using AI to predict equipment failures in a manufacturing plant, helping the previous company I worked for save money on maintenance costs.

1. What are the ethical considerations that software engineers should be aware of when developing AI systems or applications?

Ethical considerations in AI are critical. Software engineers should be aware of bias in data and models, as well as the potential consequences of AI decisions on individuals. It's our responsibility to design systems that are as fair and unbiased as possible.

1. How can software engineers contribute to shaping the ethical development of AI technologies? Are there industry standards or guidelines that you think should be followed?

The software engineering community can contribute by actively participating in ethical AI discussions, adhering to industry standards like those proposed by organizations such as the IEEE, and continuously improving transparency and explainability of AI systems.

The following 5 figures are charts that show the responses of the students to the questions of the survey.

A graph with blue bars

Description automatically generated  
Figure 1

A graph with blue bars

Description automatically generated  
Figure 2

A blue circle with orange triangle and white text

Description automatically generated  
Figure 3

A blue and orange pie chart

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Figure 4

A graph with blue bars

Description automatically generated  
Figure 5

This study conducted by Pew Research shows the concern vs excitement about AI in US adults (Tyson, 2023).  
A graph of a number of people

Description automatically generated with medium confidence  
Figure 6

This survey done by Mckinsey & Company shows the average cost decrease and revenue increase of a large selection of companies that have adopted AI (Cam, 2019).

A blue and white graph with numbers and text

Description automatically generated with medium confidence  
Figure 7

**Discussion**

From the interview, we can see the perspective of a software engineer, who is very optimistic about the future of AI. By experience, he also benefits himself from AI, but is also aware of several ethical and social issues that may arise from it. This shows that the ethical dilemma of AI must be addressed, even if there is a lot of benefits that arise from it.

From figure 1, we can see that most students have a modestly high belief that AI plays an important role in our society. Further, from figure 2 and 3, many students believe that AI has numerous benefits and has led to innovation in research and technology. These data suggest that students in engineering and computer science believe in the positive impacts of AI to our society. However, from figures 4 and 5, we can see that they believe that AI raises legal and ethical concerns that must be addressed, and that current laws are insufficient.

In figure 6, we can see that people are increasingly getting more concerned about AI than they are excited for it. This can be explained by the emergence of various AI technologies that got out to the public, such as AI chatbots and AI generated art. The effectiveness of AI is shown in figure 7, where we can see that various functions of a business can both decrease cost and increase revenue.

**Conclusion**

In conclusion, although the evidence collected from this research does suggest a few things about the hypotheses, no definite conclusion can be made about them. Simply, the sample retrieved for the survey is way too small, and not representative of the entire population. Furthermore, public opinion about AI is merely subjective, and cannot factually tell us if AI is a benefit to society. From the data collected, it does seem however that AI brings positives to society. It can also be concluded that the current legislations around AI are insufficient, as many people are concerned about AI. Many obstacles were encountered during the collection of data. Finding an AI researcher for the project was quite difficult, but I have been able to find a software engineer that has experience with AI. A more thorough investigation of the matter should have been done to more precisely know if AI has a net positive on society, where peer-reviewed studies on the matter should have been studied or surveys should have been distributed to multiple companies to know if they benefited from AI for example. That, however, would have needed a lot more resources to conduct and may not have been realistic for a student to do. AI is a net positive to society, as it improves efficiency, and brings about innovation to many fields related to science and technology. Like all powerful things, however, it can bring harm to us if used incorrectly. That is why proper regulation of AI is mandatory.

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