

The Effect of Artificial Intelligence on Human Ingenuity

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

In December of 2022, Open AI released Chat GPT, which stands for generative pretrained transformer, to the public. Since its release, this chat bot has allowed students to write essays in the matter of seconds, artists to create songs with a simple command prompt and programmers to easily debug code in what would have normally taken days to figure out. These implications can definitely be seen as positive towards the productivity of humanity. However, this does beg the question on whether humans will become too dependent on advanced Artificial Intelligence and whether society will require this new technology for everyday simple tasks.

Artificial Intelligence has been the newest field of technology to blow up in recent years. Machine Learning practices within Artificial Intelligence have been able to imbue monotonous machines that perform simple mathematical operations on binary values with a sense of human-like intelligence. However Intelligence is not the only thing these machines are capable of. They have been able to display levels of creativity that are indistinguishable to humans, as well as curiosity that has never been seen before. Different pieces of technology that were previously thought of as impossible are now possible. Some examples include, self-driving cars, automated customer service, and efficient ranking mechanisms. These machines have definitely aided society through different products and features inside of technology.

The release of Chat GPT last year marked a significant cornerstone in the discussion of Artificial Intelligence. In fact, its release was so meteoric that ChatGPT amassed 1 million users in 5 days, a feat that took Facebook around 10 months, Twitter 2 years, and Netflix 3 and half years. Within days of its release, highschool teachers and college professors around the world

expressed their concern with the product as it allowed students to complete large assignments in seconds without actually learning anything (Blöse, 2023). Likewise, programmers have begun to use ChatGPT in their everyday workflow. The Chat Bot even has its own array of creative uses like writing poems and songs. The increased dependence of humans on Artificial Intelligence raises the question of how society will be impacted in the long term future. A large lingering question among society is how artificial intelligence will impact human ingenuity (the quality of being clever, original, or inventive) in the future. Some are even proclaiming that AI marks “the end of work” as it can perform many tasks as well as if not better than humans (Brynjolfsson, 2017). Will Artificial Intelligence turn out to aid humans in tasks like we hope so while still retaining the cleverness that humans have enjoyed for millennia, or will it render an entire population incapable of remembering information and performing complex tasks.

Ingenuity is a relatively vague term but overall it generally refers to qualities that are unique. Two qualities that make humans unique are critical thinking and decision making skills. The aim of this paper is to argue that the increased dependence on Artificial Intelligence will in fact negatively impact human society in its ability for ingenuity because of its effects on critical thinking, and decision making. This will be proven using online and current literature that exist in the form of articles and research publications. Through my analysis of these sources, I conclude that there is more evidence for Artificial Intelligence degrading human ingenuity because it worsens memory and decision making ability which are large parts of intelligence. These points will beat the argument that there should be no concern for human ingenuity as a result of Artificial Intelligence.

Currently the cross section between emerging Artificial Intelligence and Societal impact has been well looked into, however there haven't been any empirical results that can conclude whether AI will benefit or harm society. The reasons for this lack of empirical results is simply that all of this is still very new. We can't conclude how the latest GPT model will impact growing kids in school when it has only played a large role in the past few months. This paper will theorize about what is already known in the field of technology and neurology to predict what could happen.

Methods

I will primarily focus on online articles surrounding the topic of AI because of their abundance and specificity. I will use established research papers that have been published no later than 2 years in the past. The reason for this is because anything that was published more than 2 years in the past will contain inaccurate information and discrepancies since they were not created in light of modern Artificial Intelligence Technology. I will try to stray away from anecdotal pieces of information. In regards to measurable data, I will try to find reputable figures in either the online articles or research papers that contribute to the research question. Overall, I will analyze all the sources mentioned above in light of the SCOT framework to understand the different social groups impacted and come to a comprehensive conclusion on my research question. My analysis will also serve as a literature review because it provides both background on the topic of Artificial Intelligence as well as analysis into how this technology impacts human ingenuity.

I use Pinch and Bijker's Social Construction of Technology Framework(SCOT) to analyze the research question of whether artificial intelligence degrades or improves human ingenuity. The main ideas of this framework are that Human action shapes technology rather than technology shaping human action, technology can only truly be understood by the relationships that different stakeholders and participants in the network hold with it, and that the most important thing to understand is how technology is embedded in a social context.

I will use SCOT to identify key groups and participants who will benefit or be damaged by the rising use of Artificial Intelligence. My hope is by identifying all of these points/participants as well as proven studies, and considering them in a holistic view, I can come to a reasonable conclusion on whether Artificial Intelligence has a positive or negative impact on human ingenuity.

Analysis

There is a studied neurological effect that occurs when humans invent tools that restructure day to day life. The earliest occurrence of this was the advent of writing methods. When writing was first created, humans would use it to track inventory of their possessions. For example, farmers would use it to record how much crop they had as well as livestock. As writing started to expand into other areas of use such as event planning or even government regulation, there was a very subtle and gradual effect that happened within the subconscious minds of humans. Over hundreds of years, humans began to have worse memory for small details (Richardson, H., 2022). The results seem very intuitive. With writing, there is less of a need to remember certain key ideas because people can just write it down and refer to it later. The notion

that writing can worsen human recall is reinforced through modern research and actually interferes with working memory processes (Tindle, & Longstaff, 2015). Extrapolating this concept to current times, this observed effect has even had an impact with the rise of Google. Google served humans very similarly to how writing did. People didn't feel the need to memorize small details like recipes or the directions to a particular location when they know they can just search it up on Google later. In fact this phenomenon was coined as The Google Effect (Sharfstein, 2011). It isn't a large assumption to make that with increased Artificial Intelligence technologies which deliver much more intelligent information than Google, this effect will only happen on a grander scale. With the release of Chat GPT, a language learning machine (LLM), students are already using it to quickly complete essays and other school work with high quality without actually learning the material (Mitchell, 2022). Over a span of decades, incoming generations will have really poor memory capabilities as they have grown up in an environment where remembering small details are not necessary. It may not seem clear now what the link between memory capability and human ingenuity is but evidence later in this paper will show that there is a connection between the two. Overall this will show that advanced AI will harm human ingenuity.

Some might say on the other side of the argument that the increased use in Artificial Intelligence has only changed the type of knowledge that humans are required to know but has not necessarily diminished it. AI has provided unprecedented feedback and analysis to chess players which is one of the biggest reasons why chess has evolved over the last fifty years. This provided evidence in how AI didn't take any ability away from humans but actually changed the type of knowledge that humans needed (instead of having to traditionally learn from many

different games with other humans, they can learn from the computer) (Alezan, 2021).

Generative Artificial Intelligence technologies, most typically generative neural networks, are capable of producing creative and unique art. However, instead of striking fear into human artists, they have actually allowed them to create new forms of expression and expand the limits of human art in the same way it does with chess (Aela, 2023). Future artists will utilize AI to create new art in the same way that past artists adjusted to digital drawing mediums, and ancient artists developed brushstrokes. With the emergence of Chat GPT, Prompt Engineering has become a highly sought after skill by many companies. Prompt Engineering focuses on the different ways to manipulate an input to AI to get the most optimal output. This shows that with Chat GPT, employees don't need to know exactly how to do a certain skill, but instead need to know exactly what to provide the AI: not a decrease in knowledge but simply a different type of knowledge (Saboo, 2021).

This line of thinking that AI has only changed the knowledge that humans need to know has inherent flaws. We can make these theories about previous tools that have revolutionized humanity in the past like writing and Google. However these previous tools were fundamentally different. They were merely supplements to human knowledge that allowed us to access information quicker and more reliably. Recent AI developments like Chat GPT cannot just be categorized as a supplement. It is truly intelligent and has the ability to replace human intelligence. It not only has the ability to provide information fast, but it can make its own inferences and display creative ability. There are two qualities of a particular technology that can be used to gauge how much it will grow. These are barriers to entry and degree of centralization. Technologies with a high barrier to entry and a large degree of centralization, like Operating

Systems, are very limited in how much they progress. This is why there is not a new Operating System being released every three months. Artificial Intelligence has a low barrier to entry since even some of the most complex AI's are Python code that can be written by anyone, and a large degree of decentralization many projects are open sourced and almost anybody can release AI technology if they wanted to (Allen, 2017). This combination of low barriers and high decentralization is something that has never been seen before in previous technology waves. This is why AI should be more closely scrutinized than other technologies in the past and should not be held in comparison to Google. In recent news, it was found that Chat GPT related technology was able to trick a real human into solving a Captcha (Hurler, 2023). This is truly scary. Captchas are commonly used across the internet to prevent bot programs from flooding servers with requests. They are known as something that only a human can solve. The advent of Google never created concerns of this nature. This shows that AI cannot be compared to other tools of the past. A large point that has been made in this paper is that human ingenuity will suffer since it will lead to a decrease in memory capacity. Many might argue that true intelligence is not correlated with the ability to remember details. After all, humans only became smarter with the invention of writing. As intuitive as this may seem, there are actually many studies that prove the opposite. Human Recall and Critical Thinking Skills are actually strongly linked. Long term memory has been proven to be tied with critical thinking skills. Someone who wishes to use critical thinking skills will access information from their long term memory (Ejim, 2023). This could prove that the degradation of memory could have a noticeable impact on the critical thinking of a society. Numerous studies prove that the amount of information one can hold is tightly correlated with IQ and problem solving ability. Our long term memory, short term memory, and thought engine all work in tandem (Klemm,2013). As mentioned previously in the paper, critical thinking ability is

a strong indicator of ingenuity. If memory has been proven to be a detriment to critical thinking, then it stands to say that a loss in memory correlates to a loss in ingenuity, furthering the point that Artificial Intelligence is a detriment to this ingenuity.

As mentioned above, AI has the potential to degrade human recall and memory. However, some might still say that the ability to remember information does not correlate with complex human tasks like decision making. This is true in the sense that decision making is not impacted by short term memory recall but instead by higher quality memories that relate to the bigger picture (Lastiri, 2022). Despite this, recent artificial intelligence technologies have been able to show better decision making capabilities than humans. One example of this is the Gotham platform created by Palantir. Gotham is an AI software used by the US military and armed forces to help make decisions for high US military personnel. This could include Generals and Lieutenants (Palantir, 2021). While Gotham itself is not making the final decision, it does present a list of potential decisions to make and likelihood of success. This shows how an AI is able to take a complex situation such as world affairs and present possible actions to humans. With the use of Gotham, Generals do not really need to have the ability to come up with possible actions themselves while evaluating their probabilities of success. Artificial Intelligence is also much more objective when it comes to decision making. It does not allow bias to affect its course of action that a human might be susceptible to (Simplilearn, 2022). Therefore, it can be said that AI also has better decision making ability than humans which is an essential part of ingenuity.

Conclusion

By now it should be understood that there is a strong correlation between memory/recall and intelligence. Since Artificial Intelligence will have a much stronger impact than the Google Effect, it can be supposed that it will make humans have even worse recall which will affect intelligence. Overall this point reinforces the fact that Artificial Intelligence stands to degrade human ingenuity. People who are generally interested in the social impact of large and rapidly emerging technology like Artificial Intelligence will find this paper interesting. Even though advanced Artificial Intelligence is essentially an inevitability at this point, there is still something that can be done to mitigate its negative impact. One potential response to the harms that could accompany Artificial Intelligence is to utilize something that is known as an AI summer. The idea is that when a new and groundbreaking artificial intelligence is released to the public, there should be a temporary but long term cease in AI development. The reason for this is that it will give society and governments enough time to adapt in response and hopefully develop infrastructure to control the way it is used. With the recent releases of the Generative Pretrained Transformer models, there has actually been an open letter signed by many Tech leaders including Elon Musk and Steven Wozniak for an AI summer of 6 months to commence (Millman, 2023).

One way that a researcher could build off this project is to take measurements now that summarize human ingenuity and then take measurements in 1 or 2 decades. More specifically, researchers could measure 10,000 humans' capacity for memory using standard tests, and then do the same a few decades later. These tests should be reputable like digits span, cube imitation tests, and block tasks (Richardson, J., 2007). Decision making is something that is harder to measure. The idea is that this process could help spot trends and either confirm or deny this

paper. Future research should mainly look at different methods to influence the way that Artificial Intelligence can impact society. As unlikely as it seems, it may be possible to mitigate the impact of AI.

Reflecting back on the framework of SCOT(Social Construction of Technology), to truly understand the impact of a new or existing technology, we must examine the different key participants in a conceptual network surrounding the technology. Within the network of Artificial Intelligence, there are a few key players. There are the developers of Artificial Intelligence, society at large, and the governments that must regulate these technologies. It cannot be easily determined whether each of these players will be positively or negatively impacted. Using AI, society can perform things that could never be done before, but with all this added benefit, there will be new ways for it to degrade through complacency, crime, and terrorism. Governments can also become more efficient with certain bureaucratic processes, but will now have to be even more proactive with creating limiting regulation. Overall the network has many caveats and delicacies which make it difficult to predict what will happen. The only thing that can determine its impact is time.

There are many different ways that Artificial Intelligence will help humans. Just because a technology degrades a certain skill doesn't mean that it is a net negative. It is simply important for future generations to recognize this so that their ingenuity stays intact. In the same way that memory was worsened by Google, society is still clearly functional, and Google is an extremely useful tool. The same can be made of Artificial Intelligence as long as people continue to stay cognizant.

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