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Final

We are living in a time of monumental change. I grew up “Googling” everything and will forever hear the echo of my parents grumbling, “We had to go to the public library and research information using a card catalog!” I am not sure if I have ever used a card catalog. Will my kids roll their eyes when I tell them I used something called Google through college? Fast forward to the new era of Artificial Intelligence. I will never forget my first time using an AI chatbot. In January 2023, I tried to edit my resume but was stuck on what to do next. I told my friends the concerns I was having and they were appalled I had not plugged my resume into ChatGPT. Before my eyes, I saw the AI chatbot fixing my resume faster than I could input my experiences. I then started to think about the artificial intelligence revolution and wondered how it would change the world.

It helped to look at where it all started, and to begin this investigation, I input the original prompt, “Describe the development of artificial intelligence from Turing to large language model Chatbots in paragraph form, citing the sources.” It responded:

The development of artificial intelligence (AI) has evolved significantly since the pioneering work of Alan Turing. Turing's seminal paper "Computing Machinery and Intelligence" laid the groundwork for the concept of machine intelligence and proposed the famous Turing Test as a measure of AI capabilities. Over the following decades, researchers explored various approaches to AI, from rule-based systems to early machine learning techniques. Significant progress came in the 20th century with the development of expert systems, neural networks, and probabilistic reasoning methods. However, it wasn't until the 21st century that the field witnessed a profound transformation with the rise of deep learning and large-scale data-driven models. **With something as monumental, uneven progress should be expected in artificial intelligence.** Breakthroughs in natural language processing (NLP) led to the creation of large language models (LLMs) such as OpenAI's GPT series, which demonstrated remarkable abilities in understanding and generating human-like text. **Yes, the breakthroughs are profound; however, they still lack aspects of a human component. I can imagine every student uses AI for some support when writing complicated pieces. But, any skilled teacher or professor would most likely immediately pick up on the mechanical response. These LLMs**

leverage vast amounts of data and powerful computational resources to learn intricate patterns in language, enabling them to perform a wide range of language-related tasks with unprecedented accuracy and fluency. AI's ability is still evolving with language and emotions, particularly in how it supports non-verbal people. This development marks a significant milestone in the journey of AI, showcasing the potential of data-driven approaches to achieve human-like language understanding and generation.

The original prompt states how Turing's paper "laid the groundwork for the concept of machine intelligence." As I continued to read, the text also brought up the Turing Test and how it had contributed to AI but did not specify the details. This made me want to dive deeper into the Turing Test which is why I asked ChatGPT the following: "How did the "Turing Test" affect AI as we know it today?"

The Turing Test fundamentally altered the trajectory of AI research, serving as a guiding principle and inspiration for the field. This makes me think about the early electric cars and how they provided the groundwork for many other car companies to follow. I hear AI is used for self-driving cars. Alan Turing's proposition challenged researchers to pursue the development of machines capable of exhibiting human-like intelligence,

particularly in the realm of natural language understanding and communication. This challenge was explored further in Oleg Antipov's blog, where he recognized that "To build an AI that can successfully handle the same duties that a person does, they must take into account all the test requirements." (Antipov, 2023) While the Turing Test itself has limitations and criticisms, its influence remains pervasive in contemporary AI endeavors. These constraints were also noted in Antipov's blog, "Given that machines are growing more complicated and are able to trick human perception as a result of current technological advancement, this approach to evaluating AI is far from optimal." (Antipov,2023) Researchers have continually strived to create systems that pass variations of the test, leading to advancements in natural language processing, machine learning, and cognitive modeling. This pursuit has propelled the field forward, fostering innovation and pushing the boundaries of what AI systems can achieve.

Moreover, the Turing Test spurred interdisciplinary collaboration and dialogue, bringing together experts from various fields, such as computer science, linguistics, psychology, and philosophy. This interdisciplinary approach has enriched AI research by providing diverse perspectives and

insights into the nature of intelligence and language. By fostering collaboration and cross-pollination of ideas, the Turing Test has contributed to the development of more robust and comprehensive AI systems. From personal experience, I have always found it better when collaborating with professionals from across their fields of expertise. The more experts that can attack a question or a problem from their set of knowledge, the better chance of finding a dynamic solution. In essence, the enduring legacy of the Turing Test lies in its role as a catalyst for advancing AI research and inspiring the quest for machines capable of human-like interaction and understanding. According to Professor Isaacson during his ninth lecture, “Turing said if you want to have a brilliant machine, you don’t do it by trying to program every answer, you want a machine that doesn’t only do what it is instructed to do, but it can teach itself.” This implies that the goal of AI is to be self-directed.

Since Allan Turing is the father of AI, I would like to know what he would have thought about its downside. Another thing I noticed that could contribute to how Turing felt about the downsides is that ChatGPT could not provide any of its sources for the following question, “ If Alan Turing had been here now, what would he have said about the potential

negatives?" I believe it is a question that calls for an opinion rather than a fact. It is also important to note that The New York Times is currently suing ChatGPT for copyright infringement which adds to the complexity of accurately citing sources.

Alan Turing, with his profound understanding of computation and its potential implications, would likely have expressed concerns about the downsides of AI. He might have warned about the dangers of unchecked AI development, particularly in terms of its impact on privacy, autonomy, and social equality. I imagine Turing could never have predicted how AI could be used to interfere in banking systems. Somehow, my grandmother's Visa card has been used, and an AI chatbot on the Bank of America app did not pick up on it.

On the topic of social equality, access to AI is reflected in the economic classes in society. Without internet or computer access, people's education would vary greatly and its availability needs to be better democratized. Turing was known for his ethical considerations, as evidenced by his work on cryptography during World War II and his exploration of machine intelligence. I also read about his beliefs, and he was a man of reason and logic; I think that the inherent bias in IA would trouble Turing. For example, when asking ChatGPT my current question on

this topic, ChatGPT responded that no citation was available. I think Alan Turing would worry that there would be no logic or concrete evidence of how the IA system formulates its responses. He might have emphasized the importance of building AI systems that prioritize transparency, fairness, and accountability to mitigate the risks of algorithmic bias and unintended consequences. Turing's insights into the ethical dimensions of technology would have likely led him to advocate for responsible AI development guided by principles of human rights and social justice.

Turing's concerns about the potential downsides of AI echo contemporary discussions surrounding the ethical and societal implications of artificial intelligence. His writings and contributions to computer science provide a foundational framework for understanding the complexities of AI ethics. While Turing would have recognized the immense potential for AI to improve lives and drive innovation, he would have also urged caution and thoughtful consideration of the risks involved. For example, if AI can program robots to build parts of cars more economically than humans, segments of laborers might lose their jobs. Can AI retrain humans to pursue other careers? By emphasizing the importance of ethical AI development, Turing's legacy continues to inform discussions about how to harness the benefits of AI while mitigating its potential drawbacks.

Along with the economic consequences of machine intelligence, it is crucial to consider how AI integrates the complicated dynamics of human interaction. This led me to propose the following question: How does AI incorporate the social-emotional context or nuance of language? AI incorporates the social-emotional context and nuances of language through sophisticated natural language processing (NLP) techniques. One prominent method involves leveraging sentiment analysis algorithms to discern the emotional tone of text. Tone is everything in much of human interaction. Other than realizing if a person texts in all capital letters is extremely happy or angry, how does AI account for jargon or the lexicon of different people? These algorithms, as discussed in "Deep Learning for Sentiment Analysis: A Survey" by Zhang et al. (2018), utilize deep learning architectures like recurrent neural networks (RNNs) and convolutional neural networks (CNNs) to classify text into categories such as positive, negative, or neutral sentiment. By analyzing the sentiment expressed in text data, AI systems can better understand the emotional context of communication, allowing for more nuanced interactions with users. I immediately thought about communicating with airlines. Has AI learned to manage all the moods that might come across when a person needs

information quickly? People often feel frustrated when communicating with airline representatives. How does it manage the overly aggressive or angry customer? Can artificial intelligence accommodate the customer who approaches the contact reasonably? Another key approach involves training AI models on large datasets annotated with emotional labels, enabling them to learn the intricate patterns and associations between language and emotions. In all my work with young children, I think about the non-verbal students who struggle to express language and emotion. AI can be a dramatic game changer for people who struggle to participate socially. Research studies like "Emotion Recognition in Conversations with Multimodal Data Fusion" by Peng et al. (2018) demonstrate the effectiveness of combining information from multiple modalities, such as text, audio, and visual cues, to recognize emotions in text-based conversations. By integrating multimodal data, AI systems gain a deeper understanding of the social and emotional nuances embedded within language, facilitating more empathetic and contextually appropriate responses. I wonder if AI could imitate a "Dear Abby" advice conversation. It could be a compelling support system for people who do not have regular access to professionals. In Brookings' research, it recognized its goal of

creating “seemingly human-like exchanges.” I would argue that AI has yet to realize the complexity of human emotion. (Brookings, 2023)

Since language is the basis of communication, AI has a monumental issue of how to use it in a balanced and appropriate manner. This led me to pose the question, How does ChatGPT approach controversial topics?

ChatGPT approaches controversial topics with a combination of sensitivity, neutrality, and factual accuracy. ChatGPT will get the facts right, but can it account for the human’s pre-existing viewpoints? When discussing such

topics, it strives to provide balanced perspectives without promoting misinformation or harmful narratives. This involves presenting information in an impartial manner, relying on accurate and up-to-date sources, and acknowledging the diverse viewpoints that may exist. Additionally,

ChatGPT aims to maintain a respectful tone, avoid language that may be offensive or hurtful, and encourage constructive dialogue among users. In

further explanation, Zvi Mowshowitz acknowledged, “The fact that A.I. systems express political leanings matters because people often adopt the

views they most regularly encounter.” (Mowshowitz, 2024) I know this firsthand, because when I was in middle school every student blindly

adopted the political views of their parents because that was their only exposure.

I decided on my own; I wanted to try the experiment that ran in the article asking ChatGPT to write a poem on the current and former president of the United States. I found implications of biases in the chat's word choices when discussing each president. In the Trump poem, ChatGPT describes him as a “polarizing figure, in dissent.” While the Biden poem uses language such as, “With empathy as his guiding star, he reaches out, near and far.” In further research, I learned it is not only ChatGPT that has built-in biases but also Google’s Gemini. When asked for historical images of German soldiers, images of people of color were put in Nazi uniforms. Not only is that racist but it is biased and historically incorrect just like the poems. (Grant, 2024) It adheres to community guidelines to ensure a safe and respectful environment for all users, while still promoting critical thinking and informed decision-making. Overall, ChatGPT handles controversial topics with care, aiming to facilitate understanding and respectful discussion. I would argue that ChatGPT has yet to learn how to manage controversial topics.

ChatGPT and AI chatbots across the globe have started to dominate and this is not ending anytime soon. I wonder how future generations will reflect on the enormous transformative powers of artificial intelligence. How much regulation will it demand? How will further issues be dealt with like

the biases we saw above? How safe will it be? How will privacy laws change and adapt to keep the world protected? Will we even know when the information we receive is authentic? While the change is overwhelming, I have tremendous hope that it will be used for good purposes and that consumers will gain the skills to better decipher the information given. There is so much potential in the world of AI chatbots and how they can help benefit society. I am excited to be a part of the AI revolution.