PwC Internship Project and Tax Technology Insights

Human Agency vs. Machine Intelligence: Redefining Trust in AI and Data Control

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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

Accounting firms around the world have been leveraging technology to better streamline their tax services. By using technology to process forms and information, accounting firms are able to reduce costs, maximize output and client response, and improve the quality of their work. Additionally, accessibility to low cost technology has driven up competition between firms, making technological development a priority to stay above competition (Lim, 2013, p.99-100). Particularly at the company I interned at this summer, the size of the company coupled with the size of the clients that the company serves require large scale applications in order to keep track of tax data and produce quality deliverables. Teams of engineers at these large firms work on specific applications that have the wider goal of assisting clients and partners of the firm, or helping internal operations to allow for more efficient company workflow. With all these clients and all this data comes the question of how best does one go about automating work in the best way possible in order to reduce the load on the engineers and accountants that are already working hard, and in my work this summer I witnessed one solution that is a hot topic in the world right now, artificial intelligence.

Artificial intelligence has taken the world by storm, most notably through generative AI in the past couple of years. Though gen AI has been the central focus of the mainstream media's attention, I got to witness how AI can be used to enhance the functionality of specific tasks at a company, as well as its presence in already existing cloud and web services. With this in mind, an issue that is relevant to both firms and clients alike is how much can we trust AI? How much can we trust it with our information, and how much can we trust it to do work sufficiently. Additionally, to what extent do we already trust AI and what are the most significant factors contributing to that already existing trust? This issue is one I will attempt to explore and partially

resolve, while applying it to the context in which I saw it in action, in the corporate world. What steps need to be taken to combat this, and how can software engineers and executives keep this issue at the forefront of their work in order to ensure a safe and prosperous future where we can trust our technology?

Technical Topic

This past summer I worked as an intern on a team that was continuously developing a tax application that allowed partners and clients to view, submit and process tax documents. This application allowed users to view tax withholding, document batch and tax onboarding modules. The project my fellow intern and I were assigned to within the team involved using AI to replace the current OCR process when reading tax forms, as well as exploring potential ways to integrate a form specific AI chatbot to help clients. For context, OCR stands for optical character recognition and is essentially just the process to read and extract text from image files. Throughout the internship we found Microsoft's Azure document intelligence in tandem with the Azure form recognizer API to be an efficient AI driven solution. We were able to train neural network models using this software in order to recognize information from several types of tax forms regardless of what information was present. Neural networks are artificial intelligence models that have functionality modeled after the human brain and the biological neural network. Artificial networks model biological neurons using a series of logical computations. More complex models are created using architecture such as the perceptron, which essentially take in number inputs and use them to compute weighted sums to produce certain outputs(Géron, 2017, pp.259). By layering these networks of perceptrons, the model is able to store information through the various computations, and utilizes a technique called backpropagation to make

predictions as accurately as possible. In simple terms, backpropagation is the iterative comparison of output data in comparison to actual test data throughout all the layers of perceptrons in the model in order to find the path with the lowest value of error (Géron, 2017, pp.259). This allows for the model to be as accurate as possible, and gain the maximum amount of information from each layer. This was what was happening behind the scenes in Microsoft Azure Document Intelligence which allowed for extremely advanced machine learning to be applied to the application. Additionally, we did some surface level research into LLMs such as Ollama for their potential use as AI assistants in the application. LLM stands for large language model and can be classified as artificial intelligence models that leverage deep learning techniques to learn and understand complex patterns in language data (Hadi et al., 2023 pp.1). Because of these capabilities, I was tasked with seeing if it was possible to implement an LLM that was trained on tax data that clients uploaded to the application that we were working on. On a whole, I was also able to witness the rising excitement regarding artificial intelligence at the firm at a high level. The firm had already developed its own generative AI chat platform, and made sure to emphasize their efforts to deepen their involvement with artificial intelligence in the future with us interns. This made the prevalence of artificial intelligence at my firm and in the accounting industry as a whole abundantly clear for years to come.

STS Topic

When using artificial intelligence, especially in large scale enterprise and company wide projects, trust is a massive concern. Trust in artificial intelligence can apply to both its ability to provide quality insights and can be analyzed in relation to data security and privacy. However, I think both of these components connect to the fear of losing control and agency over our data by

feeding it into an autonomous system such as AI. The relationship between humans and AI can be classified as a Human-Machine-Network(HMN), which is described as a collective structure where humans and machines interact to produce synergistic and often unique effects (Engen et al., 2016, pp. 97). In regards to control and agency it is important to note that machines themselves don't have any self-motivated intentions, which can give weight to the theoretical claim that they have no agency, however the roles machines have in human-machine-networks can have major implications on other components of the system, as well as the output of the network itself, so it's potential agency must be considered (Engen et al., 2016, pp. 98).

In regards to sensitive and personal information especially, the risks of training models and exposing sensitive information to artificial intelligence without quality decision making and ethical utilization of data are scary. Sarah Bankins addresses the use of AI for human resources related functions, which are highly data driven and emphasize the need for both effectiveness and security. She mentions the tradeoff between the access AI has to personal information and the capacity for unethical applications of AI, stating that more access greatly opens the door to unfavorable outcomes from AI (Bankins, 2021). Additionally, she mentions that as models become more complex, their predictive powers improve, but the human insight diminishes (Bankins, 2021). The conflict between accuracy, security, humanity and agency is complex and interconnected in regards to AI and its use in the corporate world.

Data access and privacy by itself is already a concern for many. Global entities such as the EU have even tried to pass regulations to de-identify citizens from their data, but this has still not done enough to combat concerns related to mass data collection (Andrew & Baker, 2019, p. 570-571). Moreover, there are no European tech startups valued at over one billion dollars, partially due to the restriction provided by the existing data regulations, showing that there may

be little incentive for countries with booming tech industries to implement stricter data privacy policies (Cataleta, 2024, p. 8). Additionally these concerns affect day to day people using social media, and TikTok has received the most attention and backlash regarding this in recent years. Concerns over TikTok sending data to China was so high that they even refactored their source code to remove Chinese domains and IP addresses (Ryan, Fergus, et al, p.40). With these security concerns existing without AI in regards to data and security, the amount of added implications that come with artificial intelligence only add to the already existing problems that exist related to data security.

With all of these concerns and vulnerabilities regarding technology, it is important to explore how technology is trusted in day to day life despite these shortcomings and worries. In many cases, trust is a background routine of expectancy. Technology is something that many of us have been conditioned to blindly trust if it has been trusted by those around us and is socially acceptable (Andras et al., 2018). In many cases we will see technological breakdowns in the news that are on a larger scale, but we'll still locally engage with the same technology with no issue. However, once we have one errant experience with an object or piece of technology personally, we may start to err on the side of caution and lose trust in the technology briefly. This pattern may indicate the importance of personal technological experiences in regards to the general trust that we have with technology(Clarke, 2006, pp.xiv). Additionally, the trust that we have in technology, particularly AI, correlates with our perceived evaluation of the usefulness of said technology(Choung et al., 2022, pp.20). In studies run at Michigan State University by Cheong, David and Ross on the subject of human trust in AI, the importance of trust in the acceptance of technology and intention for future use are heavily affirmed. In surveys issued to undergraduate students related to their past use of AI powered voice technologies and other AI

applications, they found that things such as ease of use greatly increased the perceived usefulness and trust that users had in this technology (Choung et al., 2022, pp.21). Because of this, shaping AI to be more digestible and usable will allow for even more widespread use and trust in the technology (Choung et al., 2022, pp.21). This adds another element to the implications of trust and artificial intelligence. If companies find innovative ways to make their models user friendly, they can be trusted much more easily, and thus may have a lower threshold of public scrutiny to endure. This increases the importance of the verification and testing of AI tools before their implementation and mass distribution. In relation to the field of accounting, the sentiments above relation to trust being affected by ease of use are further corroborated. In a study conducted on accounting professionals in Southwest Florida, most partners (most senior employees of accounting firms, likely holding a stake of ownership in the firm) who showed hesitation to the practical use of AI did so due to lack of technical knowledge, fear of security risks, and large overhead expenses (Johnson et al., 2021, pp. 52). Many of these issues can be countered in the larger Big 4 firms due to their great access to talent with diverse academic backgrounds and monetary resources, but it still indicates that a big barrier that exists for professionals in this industry involves trust.

As the capacity for trust increases with the improvement of the accessibility and ease of use of AI, the potential for individuals to lose control of the effects that the technology has on their work also increases. This is because the trust that can be built with a user through the simplification of what is displayed to them can mask the real work happening behind the scenes. Because of this, integrity from producers of AI is more important than ever, and the ease of their ability to earn the trust of users and consumers should be closely monitored and observed.

Conclusion

In regards to the use of artificial intelligence in corporate entities and tech companies, I believe as of right now that a lot of AI companies have a huge responsibility to the safety and security of data. Currently the rate at which companies are using AI is growing rapidly, and with this growth comes a large amount of access to information for these models that companies are using. The rise of social media and personalized algorithms have already raised concerns with American politicians and citizens alike and the importance of addressing this issue is paramount now more than ever. Additionally, the trust we have in these technologies relies on several factors that can be efficiently addressed by tech companies, such as ease of use. It is important to think about how we can address AI in the future in a way that allows us to trust it. With so much uncertainty about AI, especially in regards to our agency over our data and information, it is paramount that we continue to address problems relating to artificial intelligence before they spiral out of control.

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