Thesis Project Portfolio

Financial Literacy Virtual Voice Assistant

(Technical Report)

The Power of AI and its Resulting Ethical and Societal Implications

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

Financial literacy is an extremely important skill to have, yet is not being emphasized enough in today's society or in our classrooms. As it stands today, only 57% of American adults are considered financially literate, with only half of K-12 teachers teaching financial literacy in their classes in some form. This nonchalant disposition toward financial literacy needs to change because financial literacy can be the key difference between financial freedom and living paycheck-to-paycheck. The technical thesis explores the application of artificial intelligence (AI) in teaching financial literacy to K-12 students, while the STS thesis more broadly discusses the uses of AI presently, and some of the societal dangers that come along with it.

The technical thesis discusses the idea of putting artificial intelligence to use in the form of a verbal voice assistant in order to teach K-12 students basic financial literacy. This includes developing lesson plans from national standard benchmarks set for financial literacy, divided by age group. One developed, these lesson plans would then be placed into an AI voice assistant system. The goal of the technical thesis is to test the effectiveness of employing AI in a voice application to teach financial literacy. This goal can then be assessed by collecting metrics from the AI system and analyzing them to see the robustness of the AI, as well as its ability to deliver the lesson plan effectively.

The STS thesis explores the societal implications of artificial intelligence within the context of how powerful it is, as well as its connection to the framework of sociotechnical systems. The STS research first lays out current and future landscapes of AI, and highlights how powerful and far reaching these AI systems are. The thesis then explores the ethical and societal concerns of such a powerful tool, using biases as an example of the ways in which this tool can

be poorly handled at the detriment to our society. Possible solutions to remedy the present issues of AI are then considered and explored, so as to avoid further problems as AI expands into the future.

Both the technical and STS theses explore possible use cases and applications of AI with the goal of employing AI to make our society a better and more equitable place for all to live. I would like to thank the MITRE corporation for supporting my technical topic, specifically Jyo Gadewadikar and Jennier Kuczynski, my advisors, Sean Ferguson and Tariq Iqbal, and especially my Capstone team, Matt, Jesilyn, Candace, and Vinny.