Application for NBER Digital Economics and AI Tutorial

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I am a 4th-year PhD student at Indiana University, specializing in behavioral economics and artificial intelligence. My research lies at the intersection of behavioral macroeconomics, experimental economics, and large language models (LLMs). I use AI tools to investigate how economic behaviors and expectations are formed. Currently, I am working on several projects that leverage LLMs to simulate economic survey data and analyze inflation expectations, replicate the Survey of Professional Forecasters to study prediction mechanisms, and apply transformer-based models to Federal Reserve communications to extract insights into monetary policy.

More broadly, in my work, I employ LLMs in a novel capacity—having them participate directly in survey experiments and information provision treatments. These experiments allow us to examine the cognitive processes of AI agents as they navigate economic scenarios, and help us understand how they "think" about economic decisions. This research has drawn interest from both academics and policymakers, and I've had the opportunity to present it at the International Monetary Fund (IMF) and collaborate with researchers from the Federal Reserve.

In my most recent working paper I focus on the application of LLMs to understand how AI agents, when embedded with synthetic personas from the Survey of Consumer Expectations, form and adjust inflation expectations. In another project, I use a set of LLMs and OpenAI's Assistant (a functionality that allows to fine-tune model's output and behavior) to human forecasting behavior within the framework of the Survey of Professional Forecasters. I begin by constructing forecaster personas, each modeled to reflect human forecasters by integrating personal characteristics (e.g., educational background, job title, and professional experience). These synthetic personas are then fed real-time macroeconomic data, ensuring that the simulated forecasts are grounded in the most current economic conditions. The OpenAI Assistant is then prompted to generate forecasts across a wide range of macroeconomic variables and time horizons, mirroring the forecasting process of human professionals in the SPF.

By utilizing these detailed personas and integrating real-time data, I was able to extend the survey to a higher frequency. My co-authors and I are currently in the final stages of writing up the results of this project. Ultimately, the goal is to offer more adaptable and cost-effective data collection compared to traditional methods. This approach allows for a more nuanced understanding of how personal characteristics influence forecasting behavior, and addresses the inherent limitations of conventional forecasting surveys.

I am also interested in other applications of AI to economic problems. For example, in a recent working paper, I use a number of language models to analyze the language in Federal Reserve meeting minutes in order to forecast potential future policy decisions. Additionally, I'm exploring how to use AI to improve economic surveys, which has the potential to revolutionize data collection and analysis in the field.

The findings from my projects demonstrate that AI tools can offer deeper insights into how individuals and institutions form economic expectations and how personal characteristics affect forecasting behavior, and enhance the way we understand economic decision-making. This is why I am extremely interested in attending the NBER Tutorial, as it will enable me to sharpen my skills, amplify its impact, and engage with leading experts who are driving innovation in this field.

Working Papers

1. Zarifhonarvar, A. (2024). Evidence on Inflation Expectations Formation Using Large Language Models. Working Paper Available at http://dx.doi.org/10.2139/ssrn.4825076

2. Hansen, A. L., Horton, J. J., Kazinnik, S., Puzzello, D., & Zarifhonarvar, A. (2024). Simulating the Survey of Professional Forecasters via AI Agents. Working paper.

Work in Progress

- Comparing the Persuasiveness of LLMs and Humans: An Experimental Study (https://sites.google.com/view/ai-persuasion/team)
- An Application of Transformers for Text Data in Economics

Selected Coursework

- Advanced Microeconomics 1, 2 and Advanced Macroeconomics 1, 2
- Econometrics 1, 2, 3
- Modern Causal Inference
- Experimental Economics 1, 2
- Advanced Game Theory
- Microeconometrics
- Empirical Industrial Organization
- Machine Learning and Big Data in Economics
- Programming for Data Science

Dissertation Committee

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Committee Members:

- Professor Ala Avoyan (aavoyan@iu.edu)
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