Senior Project Proposal

We propose to use a mathematical model with use of AI algorithms to predict trends in stocks, using historical trends plus the following data as evidence: Insider trades - the publicly available stock trades of Congresspersons and insiders in corporations alike, social media sentiment, interpreted by an existing LLM, and financial news, also interpreted by an LLM
A second algorithm will use the aforementioned predictions to maximize profits.

We aim to have the program downloadable or compiled from source code. It can run automatically if given API access to a trading platform to directly trade stocks. We hope users might be able to select from different stock-predicting algorithms, being able to tweak the profit-maximizing algorithm for certainty vs risk, etc. giving users more options and opening up the product to a larger audience. Our target audience are users in the finance sector as well as those that are financially literate.

In terms of programming, we plan to code in Python to utilize existing libraries for AI, algorithms, mathematics and statistics. For the processing power, Akash has a virtual private server with upgradable RAM. This server can transmit stock prediction data to local applications, which would then carry out the profit-maximizing algorithm.

The project will be a cumulation of what we have learned in several classes throughout our previous semesters such as:

- Algorithms and Analysis (CMSI 2130)
- Artificial Intelligence (CMSI 3300)
- Probability and Statistics (MATH 361)

It will further extend our collective understanding of statistical mathematics, machine learning, AI, and other algorithms,this will further help us develop our knowledge and give us a meaningful team experience. We also hope to gain more experience with statistical and mathematical programming.

We collectively possess a deep understanding of Python. Abdullah has experience in SQL which could be informative in terms of mathematical programming and managing databases. Akash also has experience running a virtual private server, helping us greatly with computation power. Rayane and Akash both have minors in math and Abdullah has a minor in statistics. All four members of the team are interested in using AI. Together, these skills can and will be used as a catalyst for success and amplify the quality of our end product.

Thanks to existing research and programs, such as:

- Chakravorty and Elsayed 2025 [https://arxiv.org/abs/2502.08728]
- Talazadeh and Perakovic 2024 [https://arxiv.org/abs/2410.07143]
- Khanna et al 2025 [https://arxiv.org/abs/2508.13327]
- Goyal et al 2025 [https://arxiv.org/abs/2508.02089]
- Zhou et al 2025 [https://arxiv.org/abs/2504.10078]

- Jing et al 2021 [https://www.sciencedirect.com/science/article/abs/pii/S0957417421004607]
- Koukaras et al 2022 [https://www.mdpi.com/2673-4001/3/2/19]

it is most certainly feasible to complete the project within one semester. Some extra features, such as modifying the algorithm, will depend on how much time is available, but they won't hinder nor do they obstruct the timeframe needed to complete this project. All four members of the team are interested in this project, both in its conceptual side and its practical function. Together, we have an eager and personal interest in building this project and making it work to the best of our abilities.