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Proposal

In light of current financial instability, this project aims to model the volatility of the target financial assets (e.g., stocks, forex, commodities) using data sourced from Google Finance or NASDAQ. Independent investors, particularly those with limited capital, are experiencing significant losses—especially in the technology sector as the stock market crashes—due to recent tariff policies imposed by the U.S. administration.

This project will focus on applying advanced Bayesian techniques to analyze financial data and extract insights for mitigating risk. While macroeconomic factors play a role in market dynamics, the primary focus here is to develop quantitative models that can inform practical trading strategies and actionable insights.

I am particularly interested in understanding how investors can mitigate risk in a free-falling market. A few questions of interest to explore are mentioned below, with my order of preference:

1) How we can use Bayesian Hierarchical GARCH modelling to forecast sector-specific volatility (the sector I am interested in is TECH; this way I can even make use of the FAANG data as well). The choice of GARCH models befits the time-varying nature of the dataset.This idea would delve deeper into individual modelling of the stocks and collective modelling of the overall sector, to see how the shifting market positions affect the overall trend.
2) How investors can devise trading strategies to survive, or even profit in a crashing market, given their positions (long/short). This project would be heavily based on developing trading strategies (particularly algorithmic) and then backtesting them on historical data, to gain further confidence.
3) How investors can optimize their portfolios and allocate their funds appropriately using expected assets as a metric developed using Bayesian Decision Theory. This would utilize Bayesian regression (linear/non-linear depending on the data) and MCMC with Stan, which would be a great choice given the uncertainty of the market.