

**Project Proposal:** Analyze current trends in the stock market and past data to determine whether the market is presently in a bull or bear regime. Our primary focus will be based on the performance of the S&P 500 index. We will use Hidden Markov Models as our primary model for predicting regime switches. Additionally, we plan to execute sentiment analysis, using news headlines and public discourse on social media sites as a benchmark to compare the aforementioned regime-switch model performance.

**Goal:** Detect the current market regime (focusing on S&P 500)

**Extended Goal:** Compare regimes in different markets (e.g. technology/travel/natural resources) over the same time period.

**Data Sources:**

- Stock market data from Yahoo Finance.
- S&P 500 prices from Kaggle (by the minute).
- Web-scraping for news headlines from financial news agencies.
- Social media discourse from twitter/reddit.

**Stakeholders:**

- Financial institutions trying to optimize their market position.
- Retail investors choosing investment strategies.
- Regulatory bodies trying to safeguard against market volatility.

**Key Performance Indicators:**

- Accuracy of predicting the S&P 500 stock price based on our model.
- Determining the correlation between public sentiment and the long-term state of the market.
- Profit made by a simulated investment strategy using our predictions.
- Understanding which markets are relatively secure in times of increased volatility.