

Forecasts and Present Comparison of ETF Prices

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Proposal

I will be following Project 2.1 as suggested in the project ideas, which will be stock forecasting. Namely, I intend to track five different ETFs from a five-year period: VT, ARKG, SCHF, QQQ, and XLF. I will be doing not only forecasting for a couple years period, with yearly forecasts up to two years after 2021, but I will also check forecasted values for 2021 and see how they compare to current data on ETF prices.

I plan to use ARIMA modeling as a basic forecasting model for this project. From there, I will use Kalman filters as another predictive model for comparison. If time permits, I would like to also explore LSTMs as they are my favorite deep learning model, and I'd be curious to see how they apply in time series contexts.

Dataset and Software

The dataset will be the aggregated historical data for these ETFs from the Python stock API.¹ For the ARIMA modeling I will use R as that's the most straightforward modeling tool I observed for ARIMA modeling. For Kalman filtering, I believe I will use R packages as well, which could be any one of dlm, FKF, and KFAS, though I may switch to Python if I believe that to be more simple. For LSTMs, I plan to use primarily Keras for the modeling. Any other dataset alterations may also use pandas for preprocessing.

Teammate and Milestone

As far as I currently know, I will not have a teammate for this project. For the milestone, I plan to have at least the ARIMA model complete and forecasts/present comparisons to reference. I hope to have at least started Kalman filtering at this point, and also have begun explorations for building an LSTM model for this project.

¹Info on this API can be found here: <https://blog.quantinsti.com/historical-market-data-python-api/>

Papers to Use and Read

The following are some papers or websites I plan to use (these are hyperlinks):

1. [Stock Price Prediction Using the ARIMA Model](#)
2. [Stock Price Prediction with Machine Learning from Project Ideas Page](#)
3. [State Space Model and Kalman Filter for Time-Series Prediction](#)
4. [LSTM Modeling for Stock Prices](#)