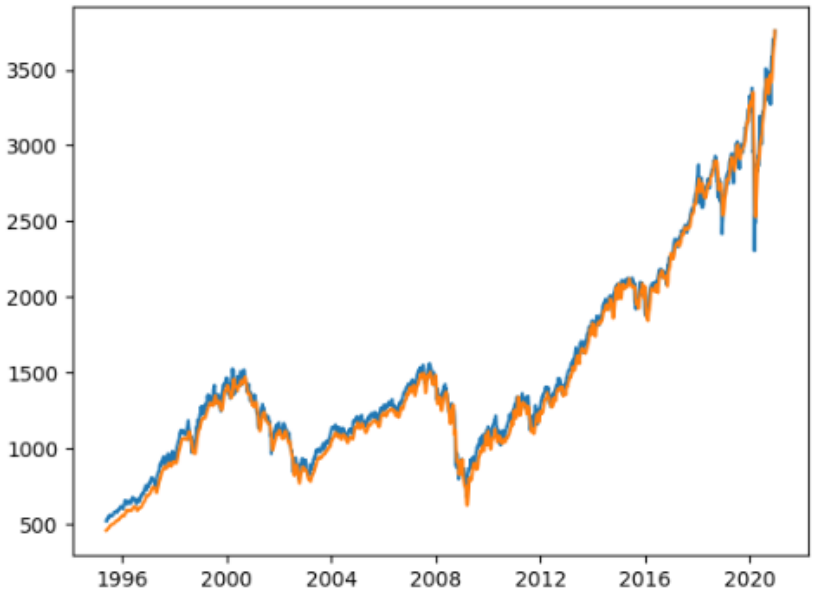
Progress Report 1

1. The project will use a GRU model in order to predict general market trends. To this end, the ^GSPC ticker will be used as a baseline.
2. The data for the ^GSPC ticker will be gotten from yahoo finance using the yfinance python package. The dataset initially has tens of thousands of datapoints. I have decreased this number to just under 4000 by only taking data in 1-week intervals instead of daily. I have also removed all the labels except for 'close' and volume. Additionally, I added my own label, which is a 30-week weighted average. All these choices will make training quicker and more effective (less data means quicker, weighted average should allow for better logic)
    a. Moreover, I heavily preprocessed the data in order to prepare it for training in a GRU/LTSM. The data had to incorporate multiple steps in each x and multiple steps in each y. This allows for the model to take into account the past/future of what it is predicting.
3. I did not decide to change my model, I will be using a GRU. However, it is always possible that I end up changing to an LTSM depending on improvements in performance.
    a. I used a Keras implementation of a GRU model. This was used in order to provide quick and efficient training when building up the framework on my model. I used a small validation set with no test split for the moment. This will surely change when I start tuning hyperparameters. For regularization I used dropout layers, this allows me to avoid some amount of overfitting, though it still definitely happens.
        i.

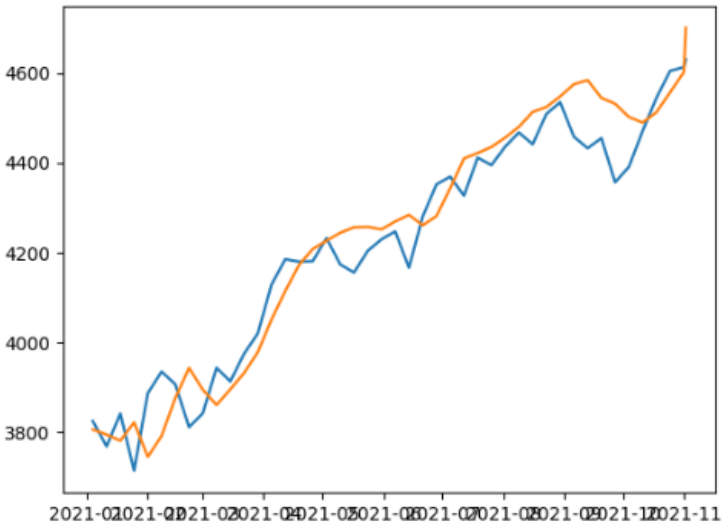
Layer (type)	Output Shape	Param #
gru (GRU)	(None, 20, 1028)	3185772
dropout (Dropout)	(None, 20, 1028)	0
gru_1 (GRU)	(None, 512)	2368512
dropout_1 (Dropout)	(None, 512)	0
dense (Dense)	(None, 2)	1026
activation (Activation)	(None, 2)	0

    b. For validation I plotted a graph in order to visualize it (Training and Validation fit seen below). As can be seen in the graphs, my model is clearly overfitting.

i. Training



ii. Validation



c. I faced a lot of challenges, most of them giving me immense headaches. Most of the challenge was to get the mode working in the first place given the complexity of the pre-processing work and the debugging of more complex shapes in Keras model fitting.

4. The performance is bad. The MSE loss is consistently over 1 for the validation set, and as you can see in the graph it is not very close (The MSE is 1 when the data is scaled to a range of 0 to 1). The project scope definitely will need to see some changes. For the most part, I will be looking into making the model predict the direction that the stock price will go in instead of the exact price.
5. As mentioned in #4, I will be greatly altering my model. Though some fine-tuning will be attempted, it will surely require some rethinking on a larger scale as well.