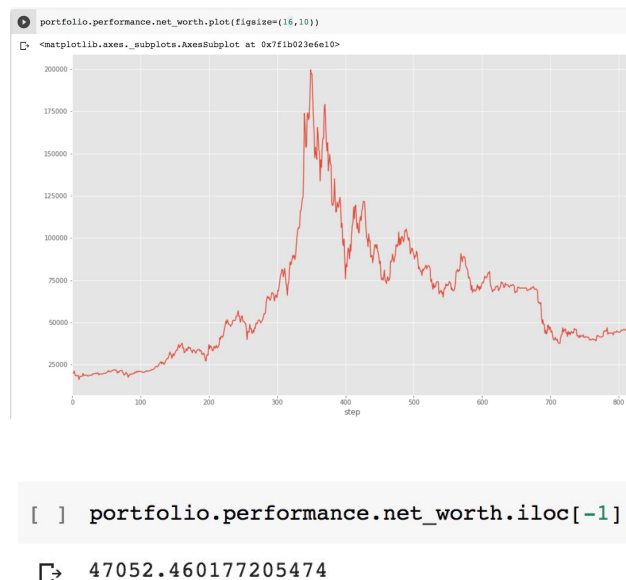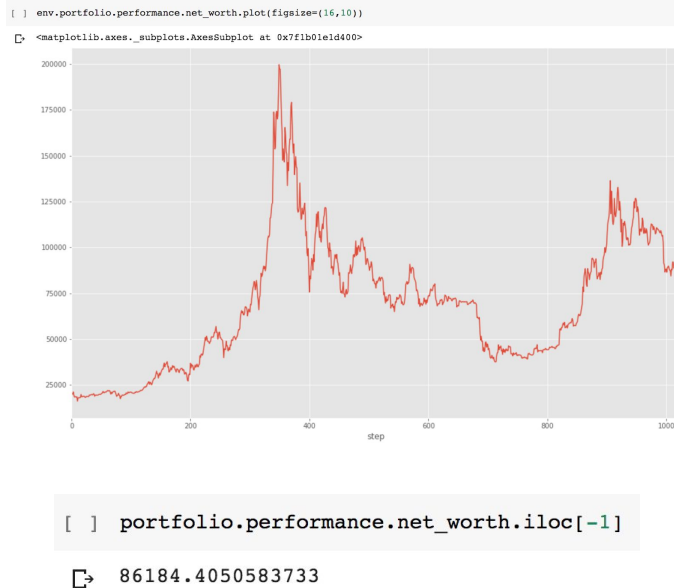# Report

Introduction

For this project, we use reinforcement learning to develop a model that formulates a trading strategy using the outputs from our previous prediction model. In the prior model, the first input variable is the daily closing price of Bitcoin and the second is Google's daily trend data for queries relating to "Bitcoin". Finally,we evaluate the strategy using backtesting to assess its performance.

Model: Methods and Results

We create the data feeds using the TensorTrade packages to stream from coinbase and instantiate the portfolio. We also use these feeds/streams and iterator objects to initiate the environment. The agent is trained in this environment using the first 80% of the dataset, and the resulting net worth is depicted below, with a final portfolio value of approximately $47,052.


```
portfolio.performance.net_worth.plot(figsize=(16,10))
```
`<matplotlib.axes._subplots.AxesSubplot at 0x7f1b023e6e10>`

```
[ ] portfolio.performance.net_worth.iloc[-1]
```
`47052.460177205474`

The latter 20% of the dataset is used to evaluate the model through backtesting. The model runs through the steps taking the best action defined by its training. We can see there is an increase in the net worth to approximately $86,184.

```
[ ] env.portfolio.performance.net_worth.plot(figsize=(16,10))
```



```
[ ] portfolio.performance.net_worth.iloc[-1]

    86184.4050583733
```

Limitations

Due to the nature of the data, the agents are trained and tested on the same environment, potentially resulting in overfitting. Further, training is inhibited by the limited size of the training data. Due to the unpredictable nature of Bitcoin prices, policies that may be optimal under normal conditions may not perform as intended.

Future Directions

We have identified two main approaches to bolster the model's performance: improving prediction accuracy and diversifying the portfolio's assets. To enhance the prediction model's precision, one can revise the set of input price variables and trend data (i.e. additional query trends). In maintaining diverse holdings, the model can hedge risks and gain the option to trade trending assets.