Project UID - 21
Trading Strategy Prediction
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Introduction to Problem Statement

A real time dataset is taken from bitmex platform using Bitmex API. We have to identify the bullish or bearish sentiment of market and build trading strategies using these signals using XGBOOST algorithm and predict the closing prices of securities for a given time interval using RNN and LSTM.

Existing Resources

- API Documentation
  - Bitmex API Intro :-
    https://algotrading101.com/learn/bitmex-api-introduction-guide/
  - Documentation :- https://www.bitmex.com/app/apiOverview
- XGBoost Python Documentation:-
  https://xgboost.readthedocs.io/en/latest/python/index.html
- RNN :-
  https://towardsdatascience.com/an-introduction-to-recurrent-neural-networks-for-beginners-664d717adbd
- Usage of LSTM to predict a time series data :-
  https://www.datacamp.com/tutorial/lstm-python-stock-market

Proposed Solution

(a.) To Download tick-level trade data from a cryptocurrency exchange.

(b.) To identify the bullish or bearish sentiment of market and build trading strategies using these signals. However, these signals don't work with a high probability of success. Our aim in this project is to increase our probability of success by filtering the earlier identified signals using the XGBOOST algorithm. Our XGBOOST algorithm will take in various features like stock market indicators and other market indicators for each signal and predict whether we should act on that signal. It is a classification problem.

(c.) To build an RNN on the Bitmex data to predict the closing prices of securities for a given time interval. For this, we plan on using the LSTM library. The basic idea behind using RNN is that a perceptron doesn't keep the history of price data. However, to correctly predict the prices, we need to analyze the historical data and update the weight matrix accordingly. We also plan on plotting the graphs between the predicted and the actual price.

Methodology & Progress (Mention the work done week-wise)

Week 1. Extracted the bucketed trade dataset of Cryptocurrency for the past 8 years (from 2015 to present) using Bitmex API and visualize the data and extract interesting insights on the dependent variables.

Week 2. Studied the data from Bitmex and classified it using the XGBOOST algorithm to determine the market's bullish and bearish sentiments, considering various Technical Indicators.

Week 3. Analyzed the data by using RNN and LSTM library to predict the closing price of Bitcoin

Week 4. Cleared doubt regarding the algorithm and its application and Started Making report of your work while doing all the application

Results

Please add the link to github page consisting of code files and reports

Name of the file on Github - **Trading-Strategy-Prediction-WiDS**

Link - https://github.com/Komalika2/Trading-Strategy-Prediction-WiDS

Learning Value

Learned many new Machine learning algorithm that can be applied in real world data to improve accuracy of models to give precise decision to solutions related to business.

Developed intuition of which algorithm to apply along with techniques to handle data that are not very nice (dirty data).

Was exposed much to python and its libraries which helped me in building logical thinking in python

This project acted as initiator for me in the field of Data science to gain some hands-on experience with real world dataset

Tech-stack Used

- Python
- Bitmex
- Sklearn
- Pandas
- NumPy
- Seaborn
- Matplotlib
- Json, request, Xgboost
- Google Collab as notebook for writing and implementing codes

Suggestions for others

Throughout the entire project, I had the impression that communication with the mentor was crucial. Additionally, we had excellent mentor communication, and if the project had been given more time—say, two months—we could have made improvements. By improvement, I mean gaining new knowledge to boost our performance. I had very little opportunity to get to know my teammates well because the group was also quite inactive due to the new year and other fest at IIT Bombay

References and Citations

- https://betterprogramming.pub/easiest-way-to-use-the-bitmex-api-with-python-fbf66dc38633
- https://colah.github.io/posts/2015-08-Understanding-LSTMs/
- https://www.youtube.com/watch?v=zwqwIR48ztQ&list=PLZoTAELRMXVNUcr7osiU7CCm8hcagSzGw&index=4
- https://www.kaggle.com/code/ozkanozturk/stock-price-prediction-by-simple-rnn-and-lstm#Model-predictions-for-train-data
- https://medium.com/@hsahu/stock-prediction-with-xgboost-a-technical-indicators-approach-5f7e5940e9e3