CS 4641 Project Proposal

Stock Price Trend Prediction

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Introduction - Background

- Stock
  - A significant form of investments
  - hard to predict
  - triggering intense study and research topics related to new methods to predict stock tendency.
- Precisely Quantifiable Parameters
  - prices
  - volume of trade
  - open interest
  - etc.

Introduction - Challenge

- Unpredictable parameters - Unstable nature
  - investment strategies
  - intrinsic value
  - a piece of news
  - etc.
- Predicting the exact price of a stock is a challenging task.

Introduction - Our Tasks

- Predicting the short-term trend of a stock using historical data.[1]
- Dataset
  - Open, Close, Low, High, Volume, and Open Interest of a unique stock over a period of time.[2]
- Preprocessing
  - obtain several technical indicators
    - relative return
    - momentum
    - price rate of change
    - Etc.
- Taking these indicators as inputs and predicting a short-term future trend[4].

Methods

- Proved to be effective:
  - LSTM, random forest, and multi layer perceptron, etc.[3].
- Our choices (for now):
  - Random Forest
    - fit the training data
    - extract the most important features with PCA
  - Feed-forward Neural Network
    - reconstruct the input base on the new features
    - feed reconstructed input into FNN
  - Or Conduct RF and FNN respectively

Outcome

- Input
  - data from the past 30 days
- Output
  - predicted trend of the price on the 31st day[4].
- Binary Classification Problem
  - Accuracy is calculated by classification metrics
    - accuracy scores (F-measure)
    - Hamming loss
    - ROCAUC
  - Predicted market price trend **VS** Ground truth market price trend

References

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[2]Marjanovic, B. (2017, November 16). *Huge stock market dataset*. Kaggle. Retrieved October 7, 2022, from https://www.kaggle.com/datasets/borismarjanovic/price-volume-data-for-all-us-stocks-etfs

[3]Huang, Y., Capretz, L. F., & Ho, D. (2022, January 26). *Machine learning for stock prediction based on fundamental analysis*. arXiv.org. Retrieved October 7, 2022, from https://arxiv.org/abs/2202.05702

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