**The Template and Guideline for the Final Report**

* This document serves as a guide for developing project proposal which will eventually become the proposal and final report.
* You start with the end in mind and adopt an agile approach:
  + Making progress continuously towards your goal.
  + Updating this document continuously along the way.

**1. Title and Author**

* Project Title : STOCK PRICE PREDICTION
* Prepared for UMBC Data Science Master Degree Capstone by Dr Chaojie (Jay) Wang
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* Link to your PowerPoint presentation file
* Link to your YouTube video

**2. Background**

Provide the background information about the chosen topic.

* What is it about?

Using machine learning, we analyze historical stock data to predict future prices. Algorithms identify patterns, trends, and correlations, informing investors and traders for better decisions. Employing techniques like regression and deep learning, predictive models aim to capture the dynamic nature of financial markets by analyzing factors such as historical prices and trading volumes.

* Why does it matter?

Machine learning in stock market prediction is crucial for:

1. \*\*Risk Management:\*\* Investors assess and manage portfolio risks, making informed decisions to minimize financial losses.

2. \*\*Portfolio Optimization:\*\* Predictive models optimize portfolios, identifying profitable opportunities and allocating resources efficiently.

3. \*\*Trading Strategies:\*\* Traders refine strategies using machine learning predictions, including automated buy/sell orders through algorithmic trading.

4. \*\*Market Efficiency:\*\* Accurate stock predictions enhance overall financial market efficiency, providing investors and participants with improved information transparency.

* What are your research questions?

Key research questions in stock market prediction with machine learning include:

1. \*\*Accuracy and Robustness:\*\* How well do machine learning models predict short-term and long-term stock movements?

2. \*\*Feature Importance:\*\* Which features contribute most to predictive power, enhancing model interpretability?

3. \*\*Model Comparison:\*\* How do various machine learning algorithms compare in predicting stock market trends?

4. \*\*Generalization:\*\* How effectively do trained models adapt to new data and diverse market conditions, ensuring real-world applicability without overfitting to historical data?

**3. Data**

Describe the datasets you are using to answer your research questions.

* Data sources

YFinance and github

* Data size (MB, GB, etc.)
* 200mb
* Data shape (# of rows and # columns)
* Time period (for example, 2010 to 2020) if your data are time-bound
* **What does each row represent?(a patient, a school, a crime, etc.)**
* Data dictionary
  + Columns name
  + Data type
  + Defition
  + Potential values (for categorical valuables, what are the categories?)
* Which variable/column will be your target/label in your ML model?
* Which variables/columns may be selected as features/predictors for your ML models?