LONDON METROPOLITAN UNIVERSITY

Module Code & Module Title

CU6051NP Artificial Intelligence

Submission Type

Understanding of AI Concept Report in

Stock Prediction

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Declaration

I confirm that we understand our coursework needs to be submitted online via My Second Teacher under the relevant module page before the deadline to be accepted and marked. We are fully aware that late submission will be treated as non-submission and a mark of zero will be awarded.

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1. Introduction to Stock Prediction

What:

Stock price prediction involves forecasting the future price of a company's stock using historical data and machine learning techniques.

Why:

Accurate stock prediction can help investors make informed decisions, optimize portfolio management, and reduce financial risks.

How:

Machine learning models analyze past stock prices, volume, and technical indicators (e.g., moving averages, RSI) to predict future prices.

2. Machine Learning

What:

Machine learning involves training a model on labeled historical stock data to predict future prices.

Why:

It helps identify patterns in stock movements and provides data-driven insights for financial forecasting.

How:

Algorithms like Random Forest, XGBoost, and LSTM are trained using historical stock prices, technical indicators, and volume data to generate predictions.

3. Machine Learning Algorithms Used

Random Forest

- An ensemble-based decision tree algorithm.
- Captures non-linear relationships in stock data.
- Reduces overfitting by averaging multiple trees.

XGBoost

- Gradient boosting algorithm optimized for speed and performance.
- Handles missing data efficiently and improves prediction accuracy.

LSTM (Long Short-Term Memory Networks)

- A type of recurrent neural network (RNN) designed for sequential data.
- Captures long-term dependencies in stock price movements.
- Suitable for time-series forecasting.

4. Data Preprocessing

What?

Data preprocessing involves cleaning and transforming raw stock data to improve model performance.

Why?

Stock data often contains missing values, noise, and different scales that can affect model accuracy.

How?

Feature Engineering: Adding indicators like SMA (Simple Moving Average) and RSI (Relative Strength Index).

Scaling: StandardScaler for Random Forest and XGBoost, MinMaxScaler for LSTM.

Train-Test Split: Splitting data into training (80%) and testing (20%) while maintaining chronological order.

5. Model Evaluation

What?

Assessing how well the models predict stock prices.

Why?

Evaluation ensures model reliability and accuracy for real-world applications.

How?

Key evaluation metrics used:

Mean Absolute Error (MAE): Measures the average absolute difference between actual and predicted prices.

Root Mean Squared Error (RMSE): Captures overall prediction error magnitude.