Programming for AI - final project journal

Multi-Crypto Price Analysis: Comparative Study and Unified Insights

Group M: Haiyan Hu (22247327)

GitHub link: https://github.com/iAnisdev/final_ms_ai_pai.git

Task Stage	Task	Task Description	Time	Issues Encountered	Solution to Issues
project communication and setup	initial meeting	Discuss the goals of the project. Identify the project topic.	02/12/2024 2 hours and 09/12/2024 1 hours	It's important to define project goals.	Through the active communication of the group members. Project goals were defined, assign responsibilities, and choose the need tools and techniques.
data collection	get data from Binance API	Use the Binance API to get historical data on cryptocurrencies for the last 5 years (get historical OHLCV data).	14/12/2024 2.5 hours	1. Avoid hard-coding API keys in code. 2. some API rate limiting errors were encountered during data acquisition.	1. Use .env files to store API keys. 2. Get historical data at intervals of days ('1d').
data pre-processing	cleaning the data and preparing the dataset	Converted timestamps to date format, normalized the data using MinMaxScaler, and divided the data into training and test sets.	16/12/2024 2 hours	Timestamp formatting errors.	Convert timestamps to the correct datetime format. Normalize the data.
data analysis	exploratory data analysis	Performed data visualization and basic statistical analysis to understand cryptocurrency trends, volatility, etc.	17/12/2024 3 hours	No issues.	
model selection	selection of LSTM model	Decide to use the LSTM model for cryptocurrency price prediction based on its ability to effectively handle time series data.	18/12/2024 3 hours	Consideration needs to be given to the need to use other traditional models such as ARIMA for comparison.	The LSTM model was chosen because of its ability to better handle complex time series data and long-term dependencies.

model training	LSTM model construction and training	Train LSTM models using historical data of cryptocurrencies.	19/12/2024 2.5 hours	Challenges encountered during hyperparameter tuning, such as choosing epochs and batch size.	Tried different batch sizes and epochs and evaluated the model performance after each change.
model evaluation and optimization	model evaluation and optimization	The predictive effectiveness of the LSTM model is evaluated using the MSE and a comparison between actual and predicted data is performed.	20/12/2024 1.5 hours	The model had an overfitting problem.	Adjusted the number of LSTM layers and units to reduce overfitting. Increased the proportion of validation data during training.
future price prediction	Predict the price for the next 3 days	Predict the price of a cryptocurrency for the next 3 days using a trained LSTM model. And results visualization	21/12/2024 2 hours	No issues. Prediction completed successfully.	
Communication before write the report	Define the structure and content of the report	Report format : 1. Introduction 2. Literature Review 3. Data Collection 4. Historical Data Analysis and Comparison 5. LSTM Model Training and Prediction 6. Model Evaluation and Results Analysis 7. Conclusion and Future Work References	27/12/2024 1.5 hour	No issues. Great communication.	
write report	write report	Contains: search and read related reports. Edit the content of Data Collection and Historical Data Analysis and Comparison	27/12/2024 to 02/01/2025 total time 11 hours	No issues.	
change web style	change web style	Make changes to the style of the project web display. (Date selection module is covered)	29/12/2024 1hour	Using shiny app display styles, some UI styles are displayed in error.	Change the wrong styles.

work record	record journal	Record work done on this project	02/12/2024 to 04/01/2025 total time 1.5 hours	No issues.	
video record	record a project introduction video	Recorded a short video introduction showing the project process and modeling results.	05/01/2025	No issues.	Successfully recorded a project introduction video showing all the tasks and results of the project.