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| Project Title: | Development of a Comprehensive Financial Investment Analysis |
|  | System |
| Supervisor: | Dr. Zhang, J.R |
| Student 1 (Leader) | Du Jianzhang |
| Student 2 | Wu Zhouyin |
| Student 3 | Xie Tianyou |
| Student 4 | Yang Anjinyu |
| Student 5 |  |

**Aim**

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| The aim of this project is to design and develop a state-of-the-art financial investment analysis system that integrates advanced machine learning algorithms, graphical representations of investment price trends, and real-time data analysis capabilities. The system will cater to both individual and professional investors, providing a user-friendly interface and powerful analytical tools to help make informed investment decisions in an ever-changing market. |

**Brief Literature Review**

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| Over the past few decades, the financial market has undergone significant changes due to advancements in technology, specifically the emergence of computational finance and artificial intelligence (AI). Researchers have explored various AI techniques, such as machine learning, deep learning, and natural language processing (NLP), to facilitate the investment decision-making process (Abraham et al., 2019; Zhang et al., 2020).  Machine learning algorithms, in particular, have shown promising results in predicting stock prices and analyzing financial data (Huang et al., 2020; Patel et al., 2015). Additionally, deep learning techniques, such as Long Short-Term Memory (LSTM) and Convolutional Neural Networks (CNN), have been employed to improve prediction accuracy (Chong et al., 2017; Gers et al., 2000). Furthermore, graphical representations and data visualization play a crucial role in providing investors with intuitive and clear insights into market trends and patterns (Munzner, 2014; Yau, 2013).  Despite these advancements, there remains a need for a comprehensive investment analysis system that combines powerful machine learning algorithms with an intuitive interface and real-time data analysis capabilities. |

**Proposed Methodology**

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| The development of the financial investment analysis system will involve the following steps:   1. Data Collection: Obtain historical financial data from reputable sources, such as stock exchanges, financial news, and market indicators. 2. Data Preprocessing: Clean, normalize, and preprocess the data to ensure it is suitable for input into the machine learning models. 3. Feature Selection: Identify and select relevant features that can be used for prediction and analysis, such as historical prices, trading volumes, and technical indicators. 4. Machine Learning Model Development: Develop and train various machine learning models, such as linear regression, SVM, LSTM, and CNN, to predict future prices and perform other forms of analysis. 5. Model Evaluation: Evaluate the performance of the models using metrics such as Mean Absolute Error (MAE), Mean Squared Error (MSE), and R-squared. 6. Graphical Representation: Design and implement visualization tools to display investment price trends, model predictions, and other relevant data in an intuitive and user-friendly manner. 7. User Interface Development: Develop a user-friendly interface that allows users to easily access and interact with the investment analysis system. 8. Real-time Data Integration: Integrate real-time data feeds from stock exchanges and other financial sources to ensure that the system remains up-to-date with the latest market information. 9. System Testing: Test the system for functionality, usability, and performance to ensure it meets the requirements of both individual and professional investors. 10. Deployment and Maintenance: Deploy the system on a suitable platform and provide continuous updates, maintenance, and support to ensure its long-term effectiveness. |

**Milestones**

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| ***Tasks*** | | ***Estimated completion time*** | ***Estimated number of***  ***learning hours*** |
| 1 | Data Collection | 1 week | 15 |
| 2 | Data Preprocessing | 1 week | 20 |
| 3 | Feature Selection | 1 week | 20 |
| 4 | Model Development | 2 weeks | 80 |
| 5 | Model Evaluation | 1 week | 20 |
| 6 | Graphical Representation | 1 weeks | 35 |
| 7 | User Interface Development | 2 weeks | 35 |
| 8 | Real-time Data Integration | 1 week | 40 |
| 9 | System Testing | 1 week | 15 |
| 10 | Deployment & Maintenance | 1 week | 20 |
|  |  |  | ***Total: 300*** |

**Deliverables**

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| ***Items*** | |
| 1 | Collected historical financial data |
| 2 | Cleaned and normalized data |
| 3 | Feature selection report |
| 4 | Implemented machine learning models |
| 5 | Model performance metrics and the best-performance model(s) |
| 6 | Implementation of visualization tools in the system |
| 7 | Implementation of the user interface in the system |
| 8 | Real-time data sources and implementation of data integration procedures |
| 9 | Test cases for system functionality, usability, and performance |
| 10 | Deployment procedures on the chosen platform and maintenance plan, including update schedules, support, and troubleshooting guidelines |