Leveraging ChatGPT (Large Language Models) for Portfolio Evaluation Based on Investor Risk Profile

BY

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Lastly, I want to express my heartfelt thanks to my parents and family for their unwavering love, patience, and encouragement, which has given me the confidence and determination to complete this project. Their belief in me has been the driving force behind my journey.

ABSTRACT

This project builds upon the foundation laid in the first phase by enhancing the personalization of investment advice using ChatGPT, focusing specifically on aligning risk profiles according to an investor's existing stock portfolio. Traditional approaches to investment advice often overlook the unique composition and characteristics of an investor's portfolio, which can significantly impact their risk tolerance and investment strategy. This project aims to address this gap by providing tailored investment recommendations that are not only based on the investor's risk profile but also on their current portfolio holdings. By analysing both the risk appetite and the composition of the investor's stock portfolio, the system utilizes ChatGPT to deliver personalized and dynamic investment suggestions. This approach enables the model to better understand the investor's preferences, such as balancing risk levels, optimizing for growth or stability, and identifying potential diversification opportunities. By incorporating portfolio analysis, the system can offer more targeted recommendations that align with the investor's financial goals and risk tolerance, thereby improving decision-making processes and investment outcomes. This phase represents a significant step forward in the use of large language models for investment advice, enhancing their ability to provide more accurate and relevant suggestions tailored to individual circumstances. The project's goal is to empower investors of all experience levels to make more informed and strategic investment decisions based on their unique risk profile and portfolio composition. Hence, this is the proposal for a project called "Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile".

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LIST OF ABBREVIATIONS

ChatGPT	Chat Generative Pre-Trained Transformer
AI	Artificial intelligence
ANN	Artificial neural network
BERT	Bidirectional Encoder Representations from Transformers
API	Application Programming Interface
ChatGPT	Chat Generative Pre-Trained Transformer
AI	Artificial intelligence
CRISP-DM	Cross-Industry Standard Process for Data Mining

Chapter 1

Introduction

1.1 Problem Statement and Motivation

In the complex landscape of stock investments, a significant challenge remains in providing personalized investment advice that aligns not only with an investor's risk profile but also with their existing stock portfolio. Traditional investment advice tools often fail to consider both the investor's unique risk tolerance and the specific composition of their portfolio. This disconnect can lead to mismatched recommendations, resulting in suboptimal investment decisions, higher-than-anticipated risks, or missed opportunities for portfolio optimization. While many current approaches to investment advice consider general market trends, historical data, or a broad classification of investor types, they often overlook how an investor's current holdings impact their risk tolerance and investment strategy.

The motivation for this project is driven by the need to bridge this gap by using artificial intelligence (AI) and advanced natural language processing (NLP) techniques, specifically ChatGPT, to provide more targeted and effective investment recommendations. By analyzing both an investor's risk profile and their current stock portfolio, this project aims to create a more holistic and personalized investment advisory tool.

Leveraging ChatGPT’s capabilities to understand and process complex data, the project seeks to generate investment suggestions that are tailored to each investor's unique circumstances. This includes identifying suitable investment opportunities, recommending diversification strategies, and optimizing portfolio risk levels in line with the investor's risk tolerance and financial goals. By aligning investment advice more closely with the investor's actual portfolio and risk appetite, the project aims to enhance investment decision-making, reduce the likelihood of unsuitable recommendations, and ultimately improve financial outcomes for a wider range of investors. This approach has the potential to revolutionize the field of personalized investment advice by integrating AI-driven insights with a comprehensive understanding of an investor's existing portfolio, thus ensuring more precise, relevant, and actionable guidance.

1.2 Project Objectives

The project, “Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile,” aims to provide more precise investment advice by considering both the investor's risk profile and their existing stock portfolio. The project objectives are as follows:

1. To enhance the personalization of investment advice by integrating the investor's current stock portfolio with their risk profile.
2. To develop a dynamic advisory tool that adapts to changes in an investor's portfolio and market conditions.
3. To provide comprehensive portfolio optimization strategies that consider diversification, risk management, and growth potential.

One of the primary objectives of this project is to focus on improving the relevance and accuracy of investment recommendations by considering not only the investor's risk tolerance but also the specific stocks they currently hold. By analyzing the composition of the investor's portfolio, the system can better understand their investment preferences and provide tailored suggestions that align with their financial goals and risk appetite. This personalized approach aims to reduce the likelihood of mismatched advice and improve overall portfolio performance.

Another key objective is to create an intelligent investment advisory system that continuously monitors both the investor's portfolio and real-time market trends. The system will adjust its recommendations as needed, offering timely advice that reflects current market conditions and any changes in the investor's holdings. This dynamic approach ensures that investors receive up-to-date guidance, helping them make informed decisions that adapt to evolving market dynamics and personal circumstances.

This project also aims to offer a holistic view of portfolio management by recommending strategies that balance risk and return while aligning with the investor's preferences. The system will not only suggest individual stocks but also provide guidance on how to diversify the portfolio effectively, manage risk levels, and maximize growth opportunities. By focusing on portfolio

optimization, the project seeks to empower investors with actionable insights that enhance their decision-making capabilities and investment outcomes.

1.3 Project Scope

The scope of this project is to develop a system that integrates ChatGPT (Large Language Models) to provide personalized investment advice based on both the user's risk profile and their existing stock portfolio. The system will analyze a combination of qualitative and quantitative data related to stock investments, such as portfolio composition, company performance, market trends, and financial reports, to deliver tailored recommendations that align with the user's specific risk appetite and portfolio needs. The following outlines the specific scope of this project:

1. Leverage ChatGPT to evaluate both qualitative and quantitative data for personalized investment advice.
2. Develop a dynamic advisory tool that provides real-time, personalized investment suggestions based on portfolio changes and market conditions.
3. Create a user-friendly interface that allows users to input their risk profile and stock portfolio details to receive customized investment recommendations.

The project aims to enhance the precision and relevance of investment advice by considering both the risk profile and portfolio of the user. By leveraging ChatGPT's capabilities, the system will provide a more tailored and dynamic approach to investment recommendations, ultimately improving investment outcomes and user satisfaction.

1.4 Contributions

The project “Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based On Investor Risk Profile” presents several novel contributions to the field of AI-driven investment advice and portfolio management.

Firstly, this project advances the use of ChatGPT to provide personalized investment advice tailored not only to an investor's risk profile but also to their existing stock portfolio. By combining these two critical dimensions, the system offers a more refined and accurate set of recommendations that consider both the investor's risk appetite and their current holdings. This dual focus represents a significant enhancement over traditional methods, ensuring that advice is better aligned with individual investor needs.

Secondly, the project aims to bridge the gap between general market advice and personalized investment strategies. Traditional financial advice often fails to account for the unique composition of an investor’s portfolio, which can lead to generic recommendations that do not fully optimize returns or manage risks effectively. By using a sophisticated AI model like ChatGPT to analyze both qualitative market data and quantitative portfolio information, this project provides investors with a tailored, data-driven approach that reflects their specific financial circumstances and objectives.

Additionally, the project contributes to the democratization of high-quality investment advice. By creating a tool that is both accessible and easy to use, it reduces the need for extensive financial knowledge or costly consultancy services. This project empowers a broader range of investors make informed decisions by providing them with insights that are both personalized and grounded in real-time data.

Overall, the project's contributions lie in improving the accuracy and personalization of investment advice through a novel integration of risk profiling and portfolio analysis. This not only enhances the user experience but also helps investors of all backgrounds achieve better financial outcomes by making informed, data-driven decisions in the stock market.

1.5 Report Organization

This report includes a total of five chapters. Chapter 1 introduces the project, outlining the problem statement, motivation, objectives, scope, and contributions. Chapter 2 provides a literature review of previous works on AI applications in financial and stock markets, discusses their limitations, and presents proposed solutions. Chapter 3 details the system methodology and approach, including the system architecture, use case, and activity diagrams. Chapter 4 covers the system design, including block diagrams, component specifications, circuits, and component interactions. Chapter 5 discusses the system implementation, hardware and software setup, configuration, and operational challenges. Chapter 6 focuses on system evaluation, including testing, performance metrics, and objective assessments. Chapter 7 concludes the report with a summary of findings and recommendations for future work.

Chapter 2

Literature Review

2.1 Previous Works on Application of Artificial Intelligence in Stock Market

2.1.1 Application of Artificial Intelligence and Data Mining Techniques to Financial Markets

The application of artificial intelligence (AI) and data mining techniques in financial markets has garnered significant attention from researchers and developers. This literature review aims to explore the existing research in this interdisciplinary field, shedding light on the approaches adopted, their strengths, limitations, and potential areas of improvement.

Researchers and developers have been actively working on harnessing the power of AI to address challenges within financial markets. The primary objective has been to discover mechanisms of adaptation in the constantly changing financial environment. Techniques such as data mining, expert systems, and agent-based computational intelligence have been employed to analyze vast datasets, predict market trends, and optimize investment strategies.

Data mining can help to find associations between assets and create forecasting models based on wide ranges of data. Utilizing historical data; short-term exchange rates [1]; interest rates [2]; and stock [3] can be forecasted.

Artificial intelligence, comprising symbolic and computational approaches, plays a crucial role in decision-making processes within financial markets. The paper rightly divides AI into expert systems, artificial neural networks (ANNs), genetic algorithms, fuzzy systems, and agent-based computational economics (ACE). Artificial Neural Networks (ANNs), a subset of AI, stand out as a linchpin in the realm of economics. These computational constructs, inspired by the intricate web of neurons in the human brain, have become indispensable in solving problems of classification, prediction, and control within economic systems. ANNs excel at discerning non-linear relationships and patterns that elude conventional statistical models. This attribute empowers them to navigate the complex and ever-evolving landscape of economic data, offering invaluable forecasting capabilities. ANNs are widely used to solve problems of classification, prediction, and control [4]. Figure 2.1 depicts the process of data transformation in ANN applied on Tokyo Stock Exchange.

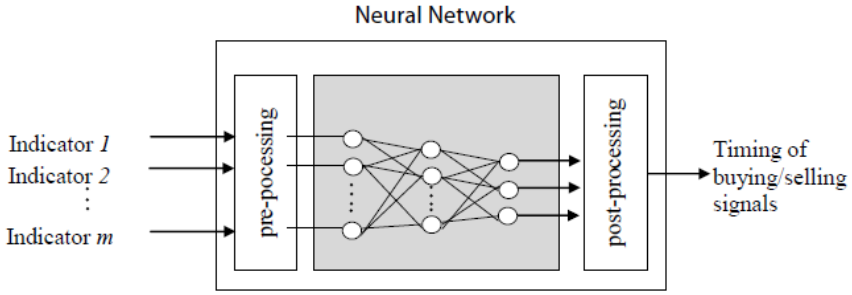

Figure 2.1: Prediction system composed of ANNs and indicators of technical analysis as inputs into network on TOPIX.

ANNs, known for their nonlinear modelling capabilities, have seen extensive use in financial markets. They have been employed to predict corporate bond ratings [5] and forecast interest rates [6]. [7] demonstrated the effectiveness of ANNs in modelling time series data for stock markets.

The strengths of AI and data mining solutions in financial markets are multifaceted. These technologies have demonstrated the ability to process and analyse large volumes of financial data rapidly, offering insights that may not be discernible through traditional methods. AI-driven systems can identify complex patterns, anomalies, and trends, aiding in informed decision-making for investors and financial institutions. Moreover, these systems can adapt to changing market conditions, making them valuable tools in dynamic environments.

To sum it up, the integration of AI and data mining techniques in financial markets is a dynamic field with a growing body of research. Studies have consistently demonstrated the potential of these technologies in enhancing decision-making processes, from stock price forecasting to portfolio optimization. As financial markets continue to evolve, the adoption of these innovative approaches is likely to increase, reshaping the landscape of financial analysis and trading strategies. Future research in this field should focus on addressing challenges such as data quality, model interpretability, and real-world implementation.

2.1.2 Can ChatGPT Forecast Stock Price Movements? Return Predictability and Large Language Models

ChatGPT, a formidable language model developed by OpenAI, is a product of the cutting-edge GPT architecture. This architecture has consistently demonstrated state-of-the-art performance

across a range of natural language processing tasks, encompassing language translation, text summarization, question answering, and text generation. Its proficiency in these domains has solidified its position as a transformative tool in the field of artificial intelligence. However, it's important to note that ChatGPT wasn't explicitly trained to predict stock returns or offer financial advice.

Nevertheless, a recent study has delved into the intriguing possibility of harnessing ChatGPT's capabilities, along with other large language models, to predict stock market returns. This study, focused on sentiment analysis of news headlines, revealed a promising correlation between ChatGPT scores and subsequent daily stock market returns. This finding implies that integrating advanced language models like ChatGPT into the investment decision-making process could potentially enhance the accuracy of predictions and bolster the performance of quantitative trading strategies.

Crucially, the study's results highlighted that more basic models such as GPT-1, GPT-2, and BERT lacked the predictive prowess demonstrated by ChatGPT. This underlines the idea that the capacity to forecast returns effectively appears to be an emerging trait of complex models like ChatGPT.

Furthermore, the research unveiled that the predictability of stock returns using ChatGPT appears to be more pronounced among smaller stocks and particularly prominent for firms associated with unfavorable news. This observation aligns with the concept of limits-to-arbitrage arguments, suggesting that ChatGPT's predictive capabilities could be attributed to market dynamics and investor behavior rather than inherent market inefficiencies.

In summary, while ChatGPT's primary function lies in natural language understanding and generation, recent research has unveiled its potential utility in the realm of stock market predictions through sentiment analysis, offering exciting prospects for the integration of advanced language models into financial decision-making processes.

2.1.3 Predicting Stock Market Behavior using Data Mining Technique and News Sentiment Analysis

From [8], Predicting stock market behavior and price trends has been a subject of extensive research, with numerous studies employing diverse methodologies. Among these approaches, sentiment analysis of news articles and social media tweets, in conjunction with stock prices, has

gained substantial attention. This multidimensional analysis is crucial as it recognizes that the stock market is influenced not only by quantitative factors but also by the sentiments and perceptions of market participants.

Additionally, researchers have delved into the intricacies of price prediction across various time frames, underscoring the importance of considering different temporal aspects in forecasting stock prices. By incorporating short-term and long-term perspectives, these studies acknowledge the dynamic nature of financial markets and aim to provide more robust predictive models. A consistent finding in this body of research is the strong correlation between financial news and fluctuations in stock prices. This correlation underscores the significance of integrating textual information into prediction models, as it reflects the impact of news and public sentiment on market dynamics. Consequently, studies have explored techniques to enhance prediction accuracy by harnessing text mining methods, which extract meaningful insights from vast textual data sources.

Furthermore, some research has striven to create holistic prediction models by combining textual information from news articles and social media with traditional stock price charts and tickers. Figure 2.2 shows the proposed model to achieve the required target and the following tasks are as shown.

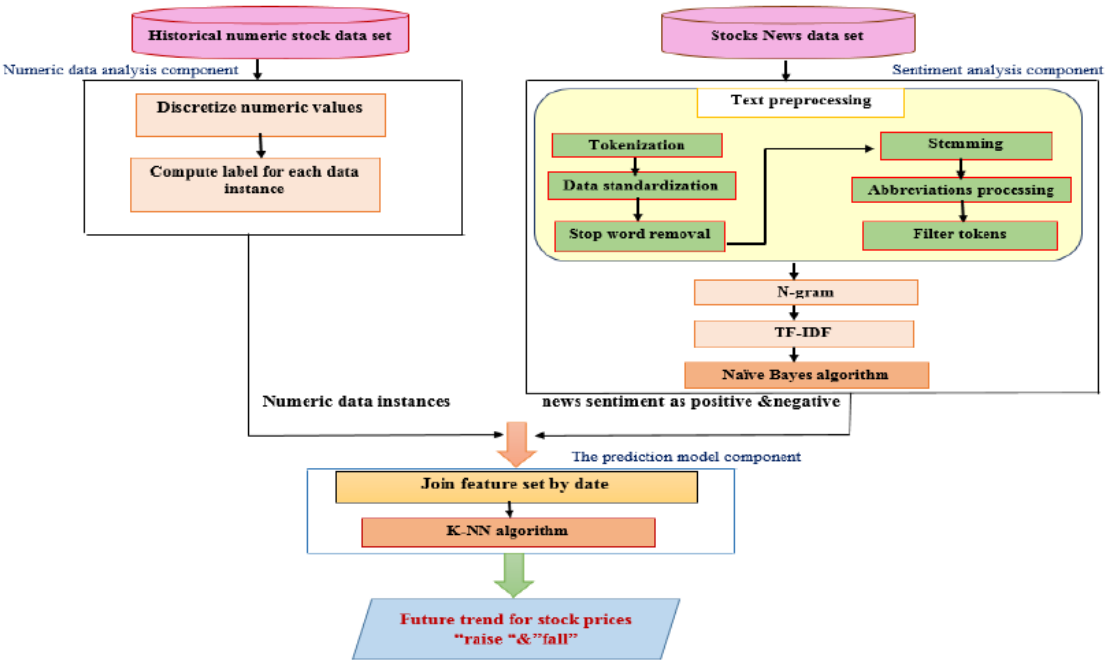

Figure 2.2: The Proposed Model for Stock Trend Prediction

This integrative approach aims to capture a more comprehensive understanding of market behavior by considering both quantitative and qualitative factors. Nonetheless, despite the progress made in predictive modelling, dealing with unstructured data remains a persistent challenge. Textual information, often characterized by its complexity and diversity, poses difficulties in terms of data preprocessing, feature extraction, and sentiment analysis.

Consequently, there is a pressing need for the development of more effective techniques to handle the intricacies of textual data. Addressing this challenge is vital for improving the accuracy and reliability of stock market prediction models and for better equipping investors and financial analysts with valuable insights into market trends and behavior.

In sum, the literature on predicting stock market behavior and price trends has made notable strides, but ongoing efforts are necessary to tackle the intricacies of textual data and create more robust predictive frameworks.

2.2 Limitation of Previous Studies

For the first paper, there are notable limitations to the application of AI and data mining in financial markets. One significant challenge is the interpretability of AI models. While these models can make accurate predictions, understanding the underlying logic and factors contributing to these predictions remains a complex task. Additionally, AI models can be sensitive to the quality of input data, and errors or biases in the training data can lead to unreliable outcomes. Moreover, AI-based financial systems often require significant computational resources, making them less accessible to smaller market participants.

For the second paper, while the study explores the intriguing potential of ChatGPT and other large language models in predicting stock market returns through sentiment analysis of news headlines, it is crucial to acknowledge several limitations in its scope. Notably, the research primarily hinges on sentiment analysis and does not encompass other critical factors that influence stock prices, such as financial indicators, market trends, or company-specific information. Additionally, the study solely investigates the correlation between ChatGPT scores and daily stock market returns, lacking a more comprehensive analysis of ChatGPT's predictive power across various market conditions or over extended time horizons. Furthermore, the focus on smaller stocks and firms with unfavorable news may curtail the generalizability of findings to larger stocks or those with positive news. The study also omits a discussion of potential limitations or biases associated with sentiment analysis as a predictive method, which could impact result accuracy and reliability. Finally, the absence of a comparative analysis with existing sentiment analysis methods or financial prediction models leaves room for a more comprehensive assessment of ChatGPT's relative effectiveness in this domain.

For the third paper, while the study brings valuable insights into predicting stock market returns through sentiment analysis, it grapples with certain limitations that warrant consideration. Firstly, the study's dataset encompasses only three companies, potentially limiting its representativeness of the broader stock market. Moreover, the prediction accuracy achieved in the study, ranging from 72.73% to 89.80%, implies that there remains room for refinement and improved precision in the predictive model. The absence of information regarding the specific time frame for which predictions are made poses a constraint on the model's practical applicability. Lastly, previous research referenced in the paper has achieved accuracies within a relatively constrained range of

75 to 80 for stock trend prediction, indicating the ongoing challenge in accurately forecasting stock market behavior. These limitations collectively underscore the complexity of predicting stock market outcomes and the need for further research to enhance predictive models in this domain.

2.3 Proposed Solutions

The integration of data scraping techniques presents a compelling avenue for enhancing ChatGPT and similar large language models (LLMs) in their stock market prediction capabilities. Data scraping can play a pivotal role in enriching the training data for these models, allowing them to glean insights from a more comprehensive and up-to-date dataset. This synergy between advanced language models and data scraping holds the promise of not only improving predictions but also providing a more nuanced understanding of market dynamics. By continuously feeding relevant and real-time financial data into these models, it can anticipate even more accurate and informed results in the realm of stock market investments.

Chapter 3

System Methodology

3.1 System Design Diagram

3.1.1 System Architecture Diagram

The architecture of our system is inspired by key principles of the CRISP-DM methodology (Cross-Industry Standard Process for Data Mining). This methodology involves phases such as understanding the problem, data understanding, data preparation, modeling, evaluation, and deployment. Our system adopts these elements, encompassing stages like data source collection to comprehend data, data preprocessing for preparation, model construction, model evaluation, and a user interface (UI) for interaction, which aligns with the deployment phase in CRISP-DM.

As illustrated in Figure 3.1: General Work Procedures of System, our system architecture is divided into two main segments: the Admin and the User. The admin section, highlighted in light yellow, handles tasks such as collecting data sources, preprocessing data, and refining the model to enhance its accuracy and reliability. This section focuses on managing data flow, optimizing the model, and evaluating its performance to ensure it meets the desired objectives.

Conversely, the User section, shown in pink, represents the user interaction layer. It includes a graphical user interface (UI) where users input their preferences, receive personalized investment recommendations, and view relevant results. The UI is designed to provide an intuitive experience, allowing users to explore different investment scenarios and understand the rationale behind the recommendations based on their risk profiles.

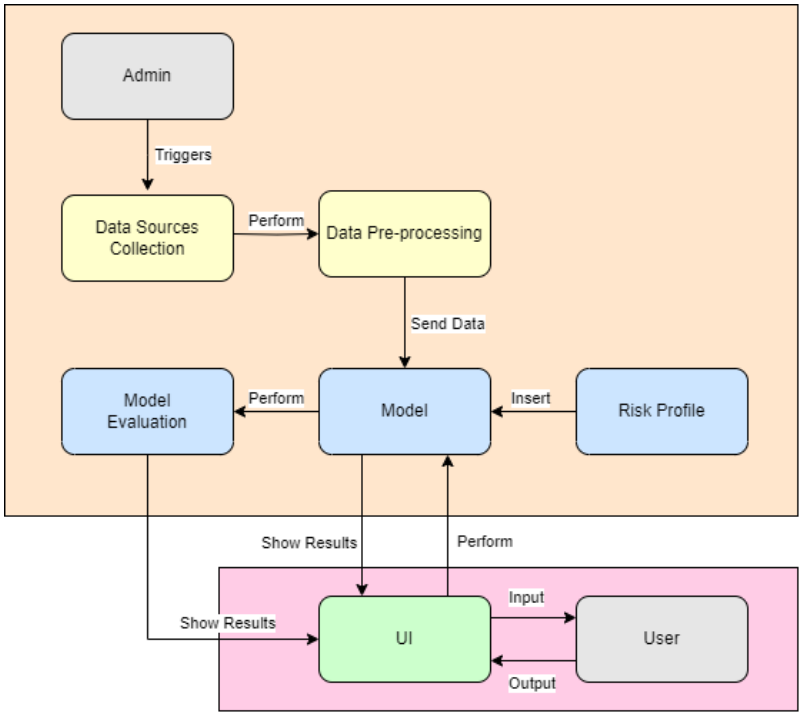

Figure 3.1. General Work Procedures of System.

3.1.2 Use Case Diagram and Description

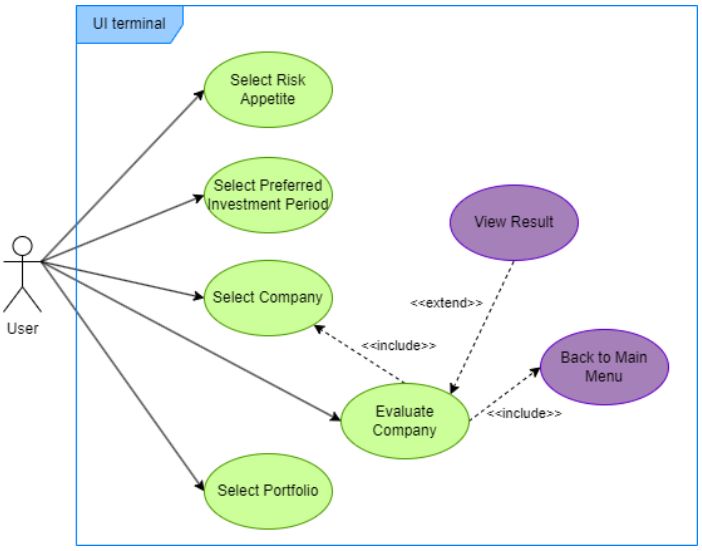

Figure 3.2. Use Case Diagram for the Program.

The primary users of our system are investors who interact with the system through the user interface (UI) terminal. The use case diagram above illustrates the various actions users can perform within the system to evaluate their investment options. Users start by selecting their risk appetite, which defines the level of risk they are willing to take on for their investments. Following this, they choose a preferred investment period, specifying the duration over which they aim to hold their investments (short-term, medium-term, or long-term). Once the risk profile and investment period are selected, users can proceed to choose a company for evaluation. The "Evaluate Company" use case is the central function of the system and depends on the selected risk appetite, investment period, and company data. During the evaluation, users can also select a portfolio to see how different asset allocations might align with their preferences. After the company evaluation is completed, users will get to view the results, which provides a detailed analysis of the company's suitability for their chosen investment profile. If they wish to conduct further analysis or make different selections, they can return to the main menu to adjust their inputs accordingly.

3.1.3 Activity Diagram

Main Function as Analyze the Company

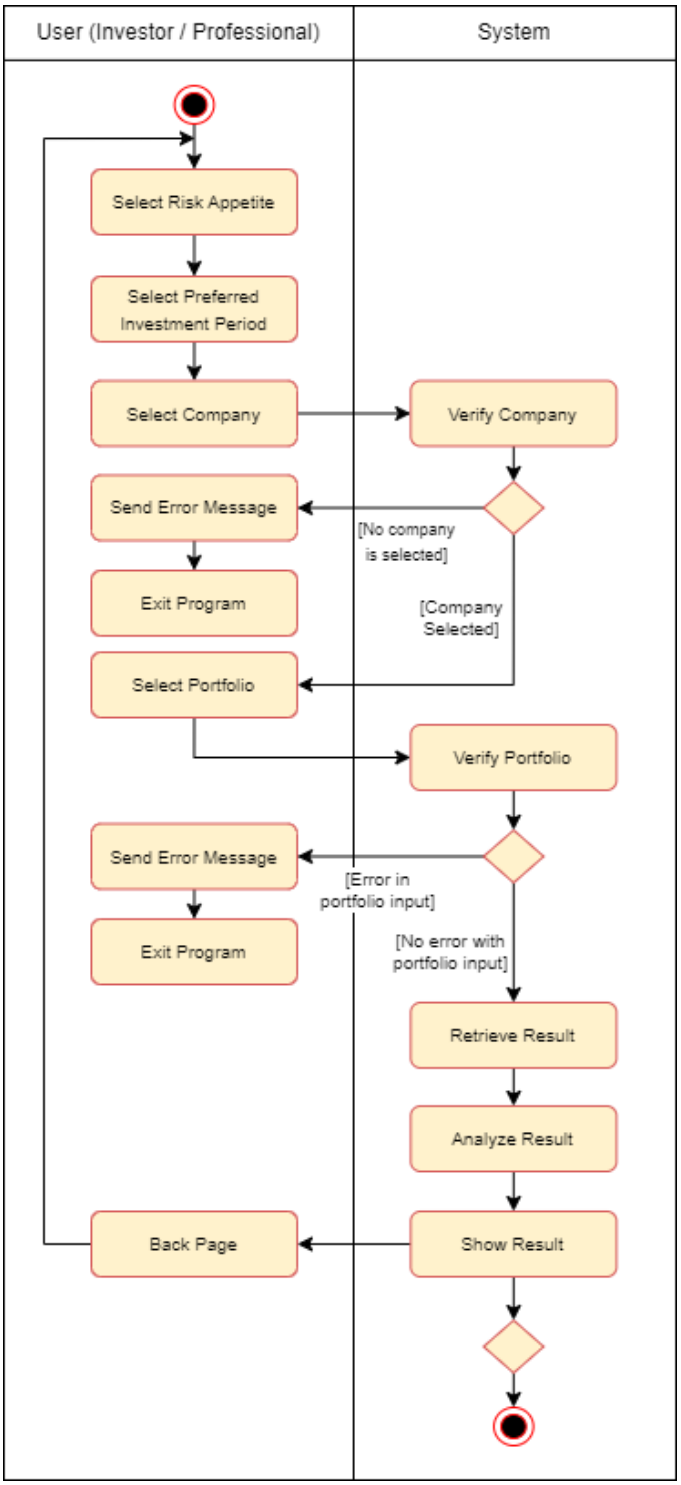

Figure 3.3. Activity Diagram of Analyzing the Company.

Chapter 4

System Design

4.1 System Block Diagram

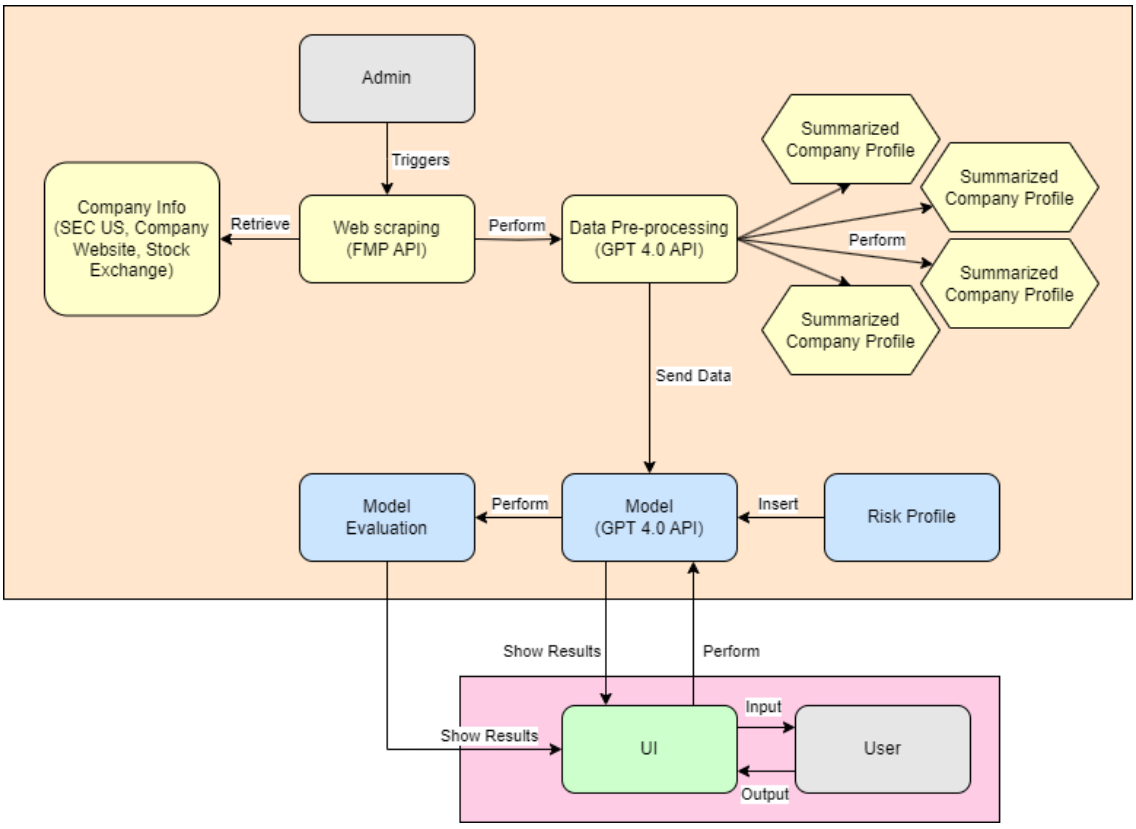

Figure 4.1. Block Diagram of System.

4.1.1 Web Scraping (FMP API)

The web scraping component of the system utilizes the Financial Modeling Prep API (FMP API) to automatically gather essential financial data from online sources. The FMP API facilitates the efficient collection of key financial metrics, including stock prices, company profiles, financial statements, and financial ratios, specifically for the past five years. This historical data is crucial for conducting a thorough analysis of portfolio performance, enabling more accurate and personalized investment

recommendations based on different investor risk profiles. The API's daily reset schedule allows for renewed data collection every day; however, there is a strict limit of 250 API calls per day. To manage this constraint, the system prioritizes the most relevant and critical data needed for evaluation, ensuring that the API call limit is not exceeded while still providing comprehensive financial insights. By integrating the FMP API, the system can efficiently access a broad range of historical data and financial statements, reducing manual effort and allowing for a more focused analysis of the companies' performance over the past five years. This approach enhances the overall accuracy and relevance of the investment recommendations provided to users.

4.1.2 Data Preprocessing (GPT-4.0 API)

To streamline the data preprocessing tasks, we have distributed the workload across multiple instances of the GPT-4.0 API rather than relying on a single "Model" for all tasks, as depicted in Figure 4.1. This distributed approach minimizes the number of input tokens, reducing both the cost and processing time associated with calling the GPTs. We have designated four separate GPTs to handle distinct data preprocessing tasks, as follows:

i. Company Profile

The GPT designated for the company profile task extracts key information from the company's public disclosures and market data. This includes details such as the company's founding date, headquarters, management team, business operations, industry classification, and market positioning. The output is structured to provide a comprehensive overview of the company’s core identity and strategic orientation. This profile serves as the foundational context for further analysis in the investor portfolio and risk profile evaluation.

ii. Income Statement

For the income statement task, another GPT is tasked with summarizing the key elements of a company’s revenue, expenses, and profitability over the past five years. This summary captures essential metrics such as gross profit, operating income, net

profit, and margins. The analysis identifies trends, such as revenue growth or decline, cost management, and profitability, providing insights into the company's financial health and operational efficiency. This output forms one part of the comprehensive financial analysis for each company.

iii. Balance Sheet

A separate GPT focuses on summarizing the company's balance sheet data, which includes assets, liabilities, and equity for the past five years. Key elements such as current assets, long-term liabilities, shareholder equity, and liquidity ratios are extracted and analyzed to assess the company's solvency, financial stability, and risk profile. This structured summary helps in understanding the company's capacity to meet its short-term obligations and its overall financial resilience.

iv. Cash Flow Statement

The GPT assigned to the cash flow statement task concentrates on summarizing the cash inflows and outflows associated with operating, investing, and financing activities over the past five years. This involves identifying trends in net cash flow, capital expenditures, dividend payments, and debt repayments. The analysis provides insight into the company's liquidity, cash management strategies, and investment activities. This summary is critical for understanding the company's ability to generate cash and fund its operations and growth.

After completing the individual summaries for the company profile, income statement, balance sheet, and cash flow statement, a final consolidated summary for each company is generated. This comprehensive summary integrates the key findings from all four data preprocessing tasks, providing a holistic view of the company's performance, financial health, and strategic positioning. The final summary is then used for evaluating investor portfolios and risk profiles, enabling more accurate and personalized investment recommendations.

4.1.3 Model (GPT-4.0 Turbo API)

In this project, the GPT-4.0 Turbo API is used as the primary model for performing detailed analysis and generating professional investment recommendations based on the preprocessed financial data. The decision to use GPT-4.0 Turbo is driven by its superior ability to handle complex financial queries and provide nuanced insights, which are crucial for evaluating investment portfolios and matching them with specific investor risk profiles.

During the initial development phase, different versions of the GPT API were tested to determine the most effective model for the system. While the GPT-4.0 Turbo model provided the highest accuracy and most comprehensive analysis, its higher cost required careful consideration. To balance cost and performance, preliminary tests were conducted using the GPT-4.0 mini version, which demonstrated better results than GPT-3.5 Turbo while being more economical than GPT-4.0 Turbo. This approach allowed for a more cost-effective trial phase without compromising the quality of the output.

The model processes summarized data from company profiles, income statements, balance sheets, and cash flow statements to generate a final consolidated summary for each company. This comprehensive summary is then used to evaluate potential investment opportunities and align them with the risk profiles of different types of investors. The GPT-4.0 Turbo API is leveraged to deliver high-quality, context-aware recommendations that take into account both the current financial health of a company and its potential for future growth.

By focusing on a single, powerful model, the system ensures that the investment advice provided is consistent, accurate, and tailored to the needs of various investor types. The use of GPT-4.0 Turbo enhances the overall reliability of the investment analysis, ensuring that users receive well-supported recommendations based on the most up-to-date and relevant financial data available.

4.1.4 Model Evaluation

In our model evaluation method, we focus on validating the recommendations and justifications generated by the system to ensure they are accurate, reliable, and aligned with the specified

investor risk profiles. To achieve this, at least two different tests were conducted for each risk profile to produce contrasting results, which serve to verify the model's consistency and robustness. For each risk profile, the selected companies and portfolios were deliberately chosen to produce distinct scenarios: one where the recommendations make logical sense and align with the investor's risk appetite, and another where the recommendations are evidently misaligned. This approach allows for a clear assessment of whether the generated results accurately reflect the input data and intended risk profile. By evaluating the model against these contrasting cases, we can effectively determine the credibility and precision of the system's output. This method of evaluation also helps in identifying any inconsistencies or biases within the model, ensuring that the recommendations provided to users are both fact-based and tailored appropriately to different types of investors.

4.1.5 UI (Terminal)

The system's user interface (UI) is implemented through the PyCharm terminal, allowing users to interact with the application in a straightforward manner. Users can evaluate a company's stock by selecting their desired risk profile and investment period. Upon conducting the evaluation, the terminal displays the results, which include a final summary, suggestion, and ratings, each accompanied by a detailed explanation. The final summary provides an overview of the company's performance, while the suggestion offers tailored advice based on the user's risk appetite and investment period. The ratings section presents a quantitative score summarizing the company's suitability for the specified risk profile. The terminal interface enables users to select their risk appetite and investment period, choose a company and portfolio for evaluation, view detailed results, and navigate back to the main menu for further actions. This simplified, terminal-based approach ensures that users receive comprehensive insights efficiently, without requiring a complex web interface.

Chapter 5

System Implementation

5.1 Hardware Setup

The hardware involved in this project is a computer only.

Table 5.1 Specifications of laptop

Description	Specifications
Model	ASUS TUF Gaming FX505GM
Processor	Intel Core i5-8300H
Operating System	Windows 11
Graphic	NVIDIA GeForce GTX 1060
Memory	8GB RAM
Storage	512GB SSD

5.2 Software Setup

The key software tools used in this project, along with a brief description, are outlined below:

1. **PyCharm**

   PyCharm is a widely used integrated development environment (IDE) for Python, created by JetBrains. It includes numerous features that enhance Python development, such as code completion, syntax highlighting, debugging tools, and integration with version control systems like Git. PyCharm also supports web development frameworks like Django and Flask, along with scientific computing tools like NumPy and pandas.

2. **OpenAI**

   OpenAI is recognized for its innovative AI models and technologies, including ChatGPT, which is known for its sophisticated language processing capabilities. The OpenAI API plays a crucial role in our project, enabling effective analysis of documents and data to provide users with customized recommendations and supporting evidence.

Table 5.2 Specifications of Software Tools

Particulars	Tools
Operating System	Microsoft Windows 11
Integrated Development Environment (IDE)	PyCharm
Programming Language	Python
Libraries	OpenAI

5.3 Setting and Configuration

In configuring the system for portfolio evaluation based on investor risk profiles, the OpenAI API's "temperature" parameter plays a crucial role in controlling the variability and creativity of the model's responses. The temperature parameter is set as a numerical value ranging from 0 to 1. A lower temperature, closer to 0, produces more deterministic and predictable outputs, which is suitable for scenarios requiring precise and consistent responses. Conversely, a higher temperature, closer to 1, encourages the model to generate a broader range of outputs, adding creativity and diversity to its responses.

For this project, the temperature is set to 0.2 to balance factual accuracy with a slight degree of flexibility in interpretation. This configuration ensures that the system provides reliable, fact-based recommendations while still allowing for some variation in response style to accommodate different investor profiles and market conditions. The selected temperature setting is particularly effective for generating well-grounded investment evaluations that reflect both current market dynamics and individual risk preferences. By maintaining this moderate temperature, the system remains focused on delivering accurate, personalized investment advice, aligning with the project's objective of providing tailored portfolio recommendations to diverse investors.

5.4 System Operation (with Screenshot)

Develop a sleek and user-friendly terminal interface, as depicted in Figure 5.1, our specialized data analysis system.

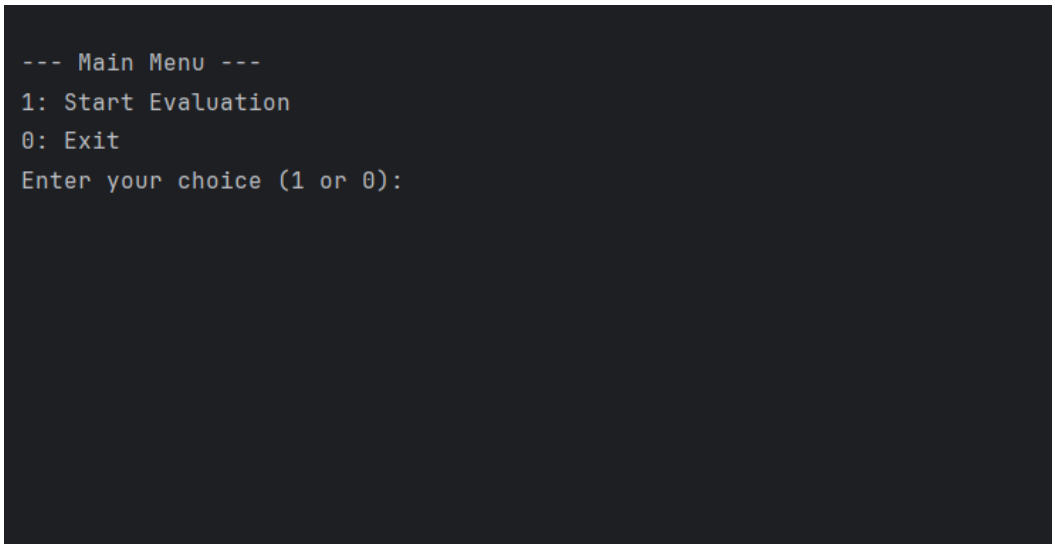

Figure 5.1. Menu Page for the program

Figure 5.2. Selection of Risk Appetite for User.

Figure 5.3. Selection of Preferred Investment Period for User.

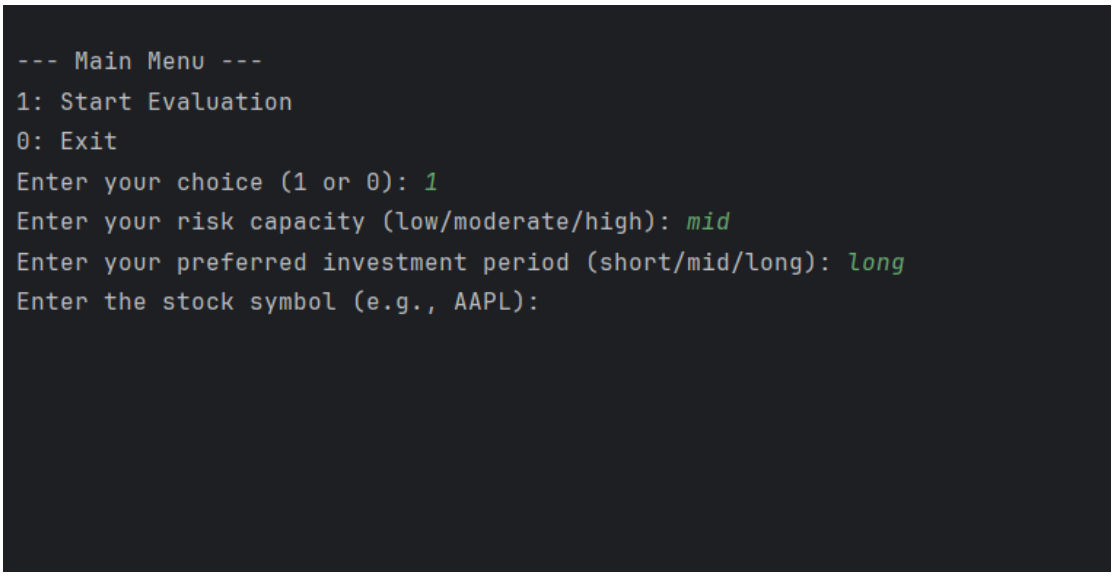

Figure 5.4. Selection of Preferred Company for User to Invest.

```
--- Main Menu ---
1: Start Evaluation
0: Exit
Enter your choice (1 or 0): 1
Enter your risk capacity (low/moderate/high): mid
Enter your preferred investment period (short/mid/long): long
Enter the stock symbol (e.g., AAPL): NVDA
Enter companies under your portfolio('none' if there is none):
```

Figure 5.5. Selection of Companies Under User's Portfolio.

After selecting the risk appetite, preferred investment period, company to invest in and companies under portfolio, the system will display the results, which typically take about 45 to 55 seconds to appear, depending on server response times, as shown in Figure 5.6. Additionally, users can return to the menu page at any time by inputting 1.

```
Summary:
NVIDIA Corporation (NVDA) presents a compelling investment opportunity, particularly for investors with a mid-risk appetite and a preference for long-term investments. The
 company's recent financial performance is impressive, with a staggering revenue growth of 126.3% year-over-year, driven by its dominance in the semiconductor industry and
 increasing demand for AI and gaming technologies. Despite its higher beta of 1.673, indicating greater volatility, NVIDIA's robust cash flow generation, with $28.09
 billion in operating cash flow and a free cash flow of $27.02 billion, underscores its financial health and operational efficiency. However, its modest dividend yield may
 not align perfectly with the income-focused aspect of a mid-risk investor's profile. In contrast, Coca-Cola (KO) offers a stable, low-risk investment with a strong history
  of dividend payments, making it a suitable pairing for conservative investors. While NVDA's growth potential is significant, its volatility and speculative nature may not
  align with the conservative investment strategy preferred by mid-risk investors. Therefore, while NVDA can complement a diversified portfolio, it may not be the ideal fit
  for an investor primarily focused on capital preservation and steady income.

Suggestions:
For an investor with a mid-risk appetite, it may be prudent to consider a balanced approach that includes both NVDA and KO in their portfolio. While NVDA offers substantial
  growth potential, its volatility necessitates a careful allocation to ensure that the overall portfolio remains aligned with the investor's risk tolerance. A suggested
 strategy could involve maintaining a core position in KO for stability and income, while allocating a smaller portion to NVDA to capitalize on its growth prospects. This
 strategy would allow the investor to benefit from the growth potential of NVDA while mitigating risk through the stability provided by KO. Additionally, diversifying
 further into other sectors or asset classes could enhance the portfolio's resilience against market fluctuations.

Ratings:
8/10
NVIDIA Corporation receives a rating of 8 out of 10 due to its strong growth trajectory, robust financial health, and strategic positioning in a high-demand sector.
 However, its higher volatility and lower dividend yield compared to Coca-Cola may pose challenges for a mid-risk investor primarily focused on capital preservation and
 steady income. The potential for significant capital appreciation exists, but the investor must be prepared for the inherent risks associated with investing in a
 high-growth technology company. Balancing this with stable investments like KO can create a well-rounded portfolio that aligns with the investor's long-term goals.

Do you want to start a new evaluation? (1 for Yes, 0 for No):
```

Figure 5.6. Evaluation Result based on user input.

5.5 Implementation Issues and Challenges

Throughout the implementation of the project, several challenges were encountered that affected the functionality and overall performance of the system. A significant issue was the variability in responses generated by different GPT models. For example, GPT-3 often produced lower-quality results, while GPT-4o offered better answers at a more affordable cost. Meanwhile, GPT-4 Turbo, although providing the highest-quality responses, was considerably more expensive. This variation in output quality made it difficult to maintain consistent results and added complexity in selecting the most suitable model for different tasks.

Another challenge involved the reliance on the GPT servers, which are occasionally prone to downtime or outages. Such interruptions disrupt the functionality of the system, leading to delays in generating and delivering the portfolio evaluations. During these periods, the system's ability to provide timely and accurate recommendations was compromised, impacting the user experience.

Additionally, ensuring the accuracy and reliability of the generated data remained a critical concern. Given the differences in model outputs and the potential for errors, it was necessary to manually verify the information provided by the GPT models during the preprocessing phase. This step was crucial to maintain the integrity of the analysis and to ensure that subsequent insights were based on precise and dependable data. Addressing these challenges required careful model selection and continuous monitoring of server status to mitigate the impact on the project's outcomes.

5.6 Concluding Remark

In summary, Chapter 5 has detailed the various aspects of the system implementation, including the setup and configuration of both hardware and software components, as well as the operational procedures involved in leveraging OpenAI's GPT API for stock and portfolio evaluation based on investor risk profiles. The chapter also highlighted the practical challenges encountered during the development process, such as managing the variability in GPT model outputs and mitigating the

impact of server downtimes. Despite these hurdles, the project successfully established a functional and adaptable system capable of generating tailored investment recommendations. The insights gained from the implementation phase underscore the importance of optimizing model selection, ensuring robust data verification, and maintaining a flexible approach to overcome any obstacles. Overall, the implementation of this system serves as a significant step toward enhancing the accessibility and effectiveness of portfolio evaluations in the field of finance and investment.

Chapter 6

System Evaluation and Discussion

6.1 System Testing and Performance Metrics

As previously outlined, the reliability of our system—ensuring that the analysis provided is accurate and based on factual data—will undergo rigorous testing. For the Financial Modeling Prep (FMP) API, each analysis requires 16 API calls when four companies are included as input, encompassing both the company being evaluated for investment and those in the portfolio. The cost associated with the OpenAI GPT-4.0 API for performing a complete analysis with four companies as input ranges between USD 0.31 to 0.33. Given these parameters, our testing approach will involve evaluating a selected set of companies from our data input. These evaluations will focus on ensuring that the system's outputs are consistent and align with the intended investor risk profiles. By systematically applying this testing procedure across multiple scenarios, we can effectively measure the system's performance metrics, including accuracy, consistency, and cost-efficiency, ensuring that the analysis provided is both reliable and financially viable for users.

6.2 Testing Setup and Result

Table 6.1. Testing Result for Type A Prospect (Conservative Investor).

Company (Portfolio)	System's Analysis (Conservative)	System Clarification
TSLA (PLTR, ARKK, ROKU)	**4/10** (The rating reflects the mismatch between the investor's low-risk tolerance and the high volatility associated with TSLA, PLTR, ARKK, and ROKU.)	- Tesla's high beta and the speculative nature of the other stocks in the portfolio present a level of risk that is likely to be uncomfortable for a conservative investor seeking to preserve capital and achieve steady, long-term growth - Absence of dividends across these investments further detracts from their suitability
NVDA (TLSA, PLTR, ARKK)	**7/10** (For the investor's existing portfolio comprising TSLA, PLTR, and ARKK, these selections further tilt the risk profile towards higher volatility and speculative investments, diverging from the conservative strategy.)	- Each of these stocks and the ARKK ETF are known for their high growth potential but also significant price swings and exposure to sector-specific and market-wide risks.
KO (PEP, JNJ, WMT)	**9/10** (This rating is justified by their collective attributes of low volatility, strong financial health, consistent dividend payments, and strategic positioning in their respective industries, which align with the investor's goals of capital preservation, income generation, and minimal risk exposure.)	- The deduction of one point acknowledges the inherent risks associated with KO's high leverage and the need for continuous monitoring of the companies' adaptation to market changes.

Table 6.2. Testing Result for Type B Prospect (Moderate Investor).

Company (Portfolio)	System's Analysis (Moderate)	System Clarification
COIN (SNAP, RIVN, DKNG)	**4/10** (The rating reflects the high volatility and financial uncertainties associated with COIN, which may not align well with the investor's mid-risk profile.)	- The potential for growth in the cryptocurrency sector is tempered by the risks inherent in COIN's business model and recent financial performance. - The existing portfolio's exposure to similarly volatile stocks further complicates the suitability of adding COIN, suggesting that a more conservative approach may be warranted for this investor.
ADBE (V, CSCO, INTC)	**7/10** (The company demonstrates strong growth and financial health, but its higher volatility and lack of dividends may not fully align with the investor's preference for stability and moderate risk)	- ADBE could enhance growth potential in the portfolio, the investor should weigh this against the existing holdings' stability and consider a diversified approach to mitigate risk.
KO (MCD, V, ABBV)	**8/10** (Coca-Cola's strong fundamentals, stable dividend history, and lower volatility make it a solid fit for a mid-risk investor.)	- Concerns regarding its leverage and cash flow sustainability due to aggressive investing activities warrant a cautious approach. - The existing portfolio's diversity complements Coca-Cola's strengths, enhancing overall investment stability.

Table 6.3. Testing Result for Type C Prospect (Aggressive Investor).

Company (Portfolio)	System's Analysis (Aggressive)	System Clarification
PG (JNJ, KO, PEP)	**6/10** (PG is a reputable company with a strong financial foundation and consistent growth, its low volatility and conservative nature do not align well with the high-risk appetite of the investor.)	- The stock's characteristics suggest a more moderate investment approach, which may not fulfill the investor's desire for aggressive capital appreciation. - While PG is a solid investment, it does not perfectly match the investor's profile, leading to a rating of 6 out of 10.
HSBC (GS, MS, JPM)	**7/10** (The existing portfolio of MS, GS, and JPM is robust, and while HSBC could complement it, the investor should proceed with caution and remain vigilant regarding HSBC's performance and market conditions.)	- The declining revenue trend and operational inefficiencies raise concerns about its ability to deliver the high returns sought by aggressive investors. - The bank's strong liquidity and commitment to shareholder returns are positive factors.
TSLA (NVDA, AMD, SHOP)	**9/10** (Tesla's strong growth trajectory, solid financial health, and alignment with the investor's high-risk appetite make it an excellent fit for long-term investment.)	- The only caveat is the inherent volatility associated with high-growth stocks, which could lead to short-term fluctuations. - The existing portfolio of NVDA, AMD, and SHOP complements TSLA well, as these companies also operate in high-growth sectors, enhancing overall portfolio potential.

Table 6.4. Testing Result for Type D Prospect (Income Investor).

Company (Portfolio)	System's Analysis (Income)	System Clarification
TSLA (SNOW, ROKU, COIN)	**3/10** (Tesla's high volatility, lack of dividends, and the speculative nature of the current portfolio make it a poor fit for a conservative investor.)	- The company's financial health shows promise, but the risks associated with its operational efficiency and market fluctuations outweigh the potential benefits for an investor focused on capital preservation and steady growth. - The existing portfolio compounds this risk, as all included stocks are subject to significant market fluctuations, further misaligning with the investor's low-risk profile.
PFE (PG, CSCO, T)	**7/10** (The company has a solid market position and a commitment to dividends, which aligns with the income-focused strategy of conservative investors.)	- However, the significant decline in revenue and operating income, coupled with high debt levels, introduces risks that may not suit a low-risk profile. - The lower volatility indicated by its beta is a positive factor, but the overall financial health and recent performance trends suggest caution. - While PFE has merits, it may not be the ideal fit for a conservative investor at this time, especially when compared to the stability offered by the existing portfolio.
JNJ (KO, PEP, DUK)	**9/10** (The company's strong financial fundamentals, consistent dividend payments, and lower volatility make it an excellent choice for long-term investment.)	- The only area of concern is the recent decline in revenue, which could indicate potential challenges in maintaining market share. - The overall stability and growth potential of JNJ, along with its alignment with the investor's goals, justify a high rating.

Table 6.5. Testing Result for Type E Prospect (Speculative Investor).

Company (Portfolio)	System's Analysis (Speculative)	System Clarification
T (GIS, ED, DUK)	**6/10** (AT&T has shown signs of recovery and operational improvement, its high debt levels and negative cash flow projections present substantial risks that may not align with a high-risk investor's goals.)	- The existing portfolio of GIS, ED, and DUK offers more stability and income potential, making T a less suitable pairing. - The investor should weigh the potential for growth against the risks of volatility and financial strain before deciding.
PLTR (GME, SPCE, AMC)	**8/10** (The company's high beta aligns with the investor's risk profile, making it a suitable addition to a high-risk portfolio.)	- However, the negative retained earnings and reliance on equity financing for cash needs introduce some risk factors that warrant caution. - Overall, PLTR's strategic initiatives and market positioning provide a favorable outlook for mid-term capital appreciation, justifying its inclusion in the investor's portfolio.
NVDA (AMD, META, TSLA)	**9/10** (NVIDIA's strong growth trajectory, robust financial health, and strategic market positioning justify a high rating.)	- The company's ability to generate substantial cash flow and its focus on innovation in high-demand sectors like AI and gaming make it a standout choice. - The inherent volatility associated with high-growth tech stocks and potential market corrections warrant a slight deduction in the rating.

6.3 Objectives Evaluation

In this project, we have developed an innovative approach for evaluating stock portfolios based on individual investor risk profiles using GPT-4.0 Turbo API. Our system aims to provide a more accessible and cost-effective alternative to traditional methods, such as self-directed learning or hiring professional fund managers, thereby democratizing access to sophisticated investment analysis and decision-making tools. Traditionally, self-learning for stock investment requires significant time and effort, involving activities such as researching financial markets, studying investment strategies, reading books, attending seminars, and enrolling in courses. This process is often challenging and can take years to master, especially for beginners. Our system shortens this learning curve by directly providing actionable insights and personalized recommendations tailored to different risk profiles. By leveraging the capabilities of GPT-4.0 Turbo API, the system offers clear and understandable analysis, which not only serves as a powerful decision-making tool but also as an educational resource that guides users in understanding market dynamics, investment principles, and the rationale behind each recommendation.

Unlike the option of hiring a fund manager, which can be prohibitively expensive and does not guarantee positive returns, our system operates on a more economical pay-as-you-go model. Users pay only for the analysis they need, based on the usage of GPT-4.0 Turbo API and FMP API, allowing them to make informed decisions at a fraction of the cost associated with traditional fund management services. This cost-effective approach makes high-quality investment analysis accessible to a wider audience, from beginners to more experienced investors who prefer not to rely on costly professional services.

Furthermore, our system simplifies the process of value investing by integrating several features designed to enhance user experience and efficiency. Unlike conventional methods that require extensive data gathering and manual analysis, our system provides streamlined access to relevant information through features like automated data collection, preprocessing, and real-time market trends. These functionalities reduce the time and effort needed to evaluate companies and

portfolios, allowing users to focus on making strategic investment decisions based on comprehensive, up-to-date information.

Our system's unique focus on different investor risk profiles adds another layer of value by catering to the specific needs of diverse investor types, from conservative to speculative. Each recommendation is aligned with the risk appetite and investment horizon of the user, ensuring that the guidance provided is both relevant and actionable. By verifying the recommendations and justifications through rigorous testing against multiple scenarios, the system ensures reliability and validity in its analysis, making it a trustworthy tool for investors.

Finally, our approach is grounded in fundamental analysis, focusing on a deeper understanding of a company's financial health, market position, strategic direction, and potential for long-term growth. By evaluating investments over different timeframes—short-term, medium-term, and long-term—our system moves beyond the limitations of short-term speculation. Instead, it provides a holistic view of a company's potential, making it an essential tool for investors looking to build sustainable, long-term investment strategies. Overall, this project successfully meets its objectives by delivering a comprehensive, user-friendly, and cost-effective investment analysis system that empowers users to make informed decisions aligned with their unique risk profiles and investment goals.

6.4 Concluding Remark

Chapter 6 has demonstrated the effectiveness of our system in evaluating stock portfolios based on individual investor risk profiles by employing a combination of GPT-4.0 Turbo and Financial Modeling Prep APIs. Through comprehensive testing and analysis, we verified that the system provides reliable, consistent, and cost-efficient outputs aligned with different risk appetites and investment periods. The evaluation covered various investor profiles, confirming the system's capability to deliver accurate and actionable insights tailored to user needs. This chapter also highlighted the advantages of our approach in offering a cost-effective and user-friendly solution that democratizes access to sophisticated financial analysis, ultimately empowering users to make well-informed investment decisions with confidence.

Chapter 7

Conclusion and Recommendations

7.1 Conclusion

In conclusion, this project offers an innovative approach to portfolio evaluation by leveraging ChatGPT's capabilities to provide personalized investment analysis based on distinct investor risk profiles. The traditional methods of portfolio evaluation often rely heavily on static data and generic financial metrics, which may not adequately capture the unique preferences, risk tolerance, and objectives of individual investors. This project addresses these limitations by incorporating AI-driven analysis that dynamically adapts to each investor's profile, thereby offering more tailored and meaningful recommendations.

The project advances beyond conventional quantitative analysis by integrating qualitative insights, such as market conditions and investor sentiment, which are often overlooked in traditional models. This approach aims to deliver a more holistic evaluation of potential investments, enhancing decision-making for a wide range of investors, from conservative to aggressive profiles. The ability of the system to provide both comprehensive and targeted portfolio assessments makes it a valuable tool for individual investors and financial advisors alike.

Moving forward, further enhancements could include expanding the range of data inputs, refining the model’s accuracy, and exploring additional applications beyond stock investments. These improvements could further solidify the system's role as a robust tool in personalized portfolio management, potentially transforming how investment advice is provided and consumed in the future.

7.2 Recommendations

To further enhance the effectiveness and robustness of the proposed portfolio evaluation system using ChatGPT, several recommendations can be considered. Firstly, increasing the diversity and volume of data sources is essential to improve the model's accuracy and generalizability. Integrating additional financial datasets, news sources, market analysis, and real-time economic indicators would enable the system to provide more comprehensive and nuanced investment insights. This expansion would help in reducing bias and enhancing the reliability of the personalized investment recommendations.

Secondly, incorporating more advanced natural language processing techniques and sentiment analysis could enhance the model's ability to interpret and assess qualitative data more accurately. Techniques like fine-tuning the model on financial-specific datasets or leveraging domain-specific language models could significantly improve the precision of insights derived from complex financial texts and news articles. Additionally, using reinforcement learning methods to refine the model's recommendations based on user feedback could help in continuously improving its performance over time.

Lastly, expanding the system's capabilities to support multi-asset class analysis and cross-market evaluation would make it more versatile and applicable to a broader range of investors. Providing users with the ability to analyze portfolios that include different asset classes, such as bonds, commodities, or real estate, alongside stocks, could offer a more holistic view of their investment options. Moreover, incorporating a tutorial or guided interface within the system to educate users about the underlying principles of risk profiles, portfolio management, and the AI-driven evaluation process would enhance user experience and engagement, especially for novice investors.

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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 2, Year 3	**Study week no.: 2**
Student Name & ID: Chin Zhi Liang (22ACB00648)	
Supervisor: Prof Ts Dr. Liew Soung Yue	
Project Title: Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

No.

2. WORK TO BE DONE

Research for new sources to use for analysis
Explore data needed for better evaluation

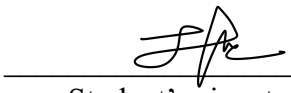
3. PROBLEMS ENCOUNTERED

No.

4. SELF EVALUATION OF THE PROGRESS

Good.

Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 2, Year 3	**Study week no.: 4**
Student Name & ID: Chin Zhi Liang (22ACB00648)	
Supervisor: Prof Ts Dr. Liew Soung Yue	
Project Title: Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Found FMP API.

2. WORK TO BE DONE

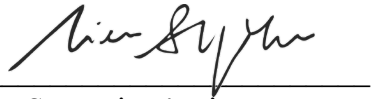
Try implementing FMP API.
Plan to include investor portfolio in project.

3. PROBLEMS ENCOUNTERED

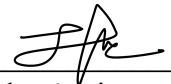
No.

4. SELF EVALUATION OF THE PROGRESS

Good.



Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 2, Year 3	**Study week no.: 6**
Student Name & ID: Chin Zhi Liang (22ACB00648)	
Supervisor: Prof Ts Dr. Liew Soung Yue	
Project Title: Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Decided to include investor portfolio in analysis
Connected FMP API to program

2. WORK TO BE DONE

Verify data scraped from FMP
Include portfolio input

3. PROBLEMS ENCOUNTERED

No.

4. SELF EVALUATION OF THE PROGRESS

Good.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 2, Year 3	**Study week no.: 8**
Student Name & ID: Chin Zhi Liang (22ACB00648)	
Supervisor: Prof Ts Dr. Liew Soung Yue	
Project Title: Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Done portfolio input
FMP API data verified

2. WORK TO BE DONE

Streamline input and output

3. PROBLEMS ENCOUNTERED

No.

4. SELF EVALUATION OF THE PROGRESS

Good.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 2, Year 3	**Study week no.: 10**
Student Name & ID: Chin Zhi Liang (22ACB00648)	
Supervisor: Prof Ts Dr. Liew Soung Yue	
Project Title: Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Streamlining input and output

2. WORK TO BE DONE

Verification of results

3. PROBLEMS ENCOUNTERED

No.

4. SELF EVALUATION OF THE PROGRESS

Good.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Trimester 2, Year 3	**Study week no.: 12**
Student Name & ID: Chin Zhi Liang (22ACB00648)	
Supervisor: Prof Ts Dr. Liew Soung Yue	
Project Title: Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Completion of a system that can generate results
Implemented back to main menu feature for new evaluation

2. WORK TO BE DONE

Writing of report.

3. PROBLEMS ENCOUNTERED

No.

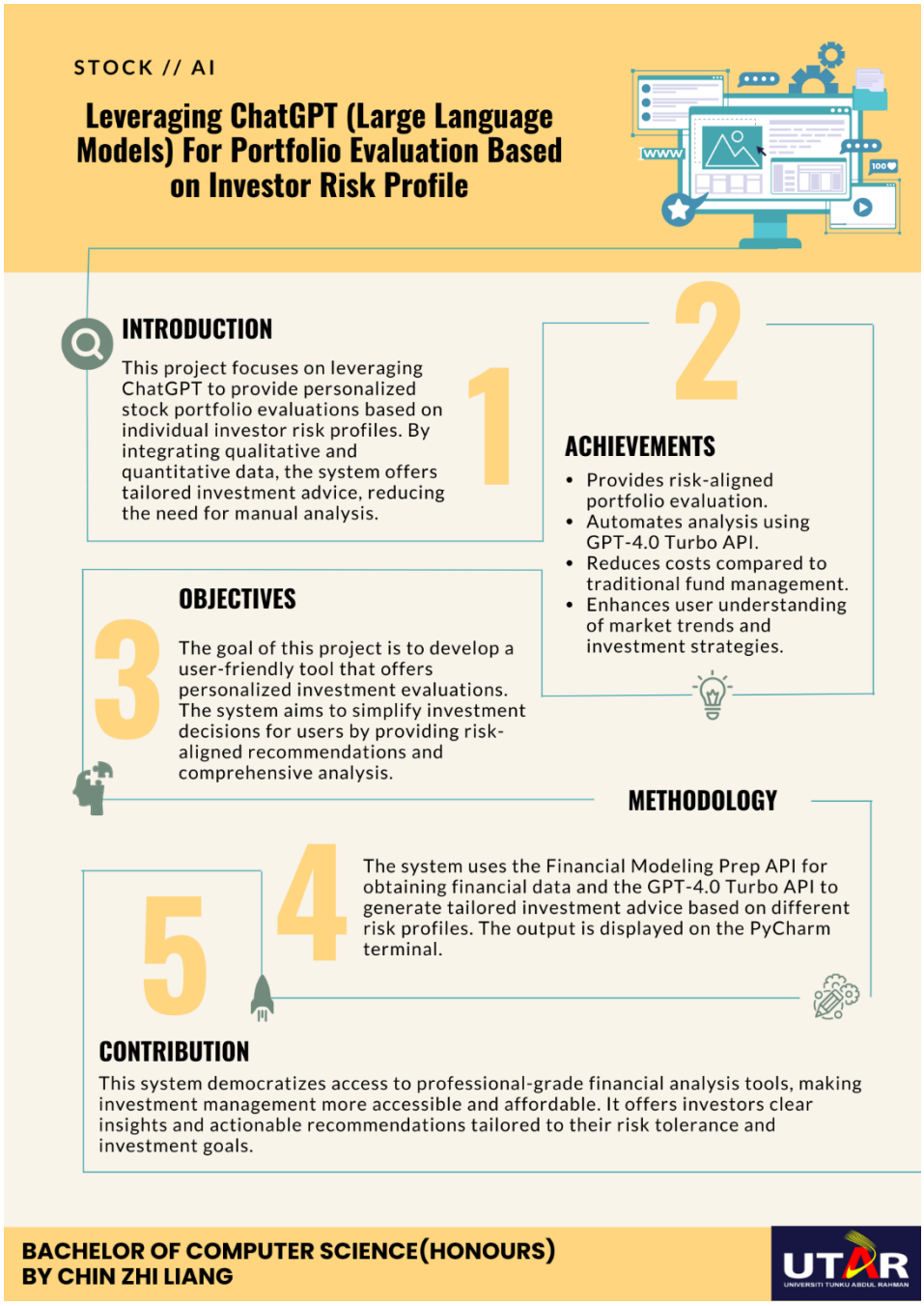
4. SELF EVALUATION OF THE PROGRESS

Good.

Supervisor's signature

Student's signature

POSTER


STOCK // AI
Leveraging ChatGPT (Large Language Models) For Portfolio Evaluation Based on Investor Risk Profile
1
INTRODUCTION
This project focuses on leveraging ChatGPT to provide personalized stock portfolio evaluations based on individual investor risk profiles. By integrating qualitative and quantitative data, the system offers tailored investment advice, reducing the need for manual analysis.
2
ACHIEVEMENTS
• Provides risk-aligned portfolio evaluation.
• Automates analysis using GPT-4.0 Turbo API.
• Reduces costs compared to traditional fund management.
• Enhances user understanding of market trends and investment strategies.
3
OBJECTIVES
The goal of this project is to develop a user-friendly tool that offers personalized investment evaluations. The system aims to simplify investment decisions for users by providing risk-aligned recommendations and comprehensive analysis.
METHODOLOGY
4
The system uses the Financial Modeling Prep API for obtaining financial data and the GPT-4.0 Turbo API to generate tailored investment advice based on different risk profiles. The output is displayed on the PyCharm terminal.
5
CONTRIBUTION
This system democratizes access to professional-grade financial analysis tools, making investment management more accessible and affordable. It offers investors clear insights and actionable recommendations tailored to their risk tolerance and investment goals.
BACHELOR OF COMPUTER SCIENCE(HONOURS)
BY CHIN ZHI LIANG
UTAR
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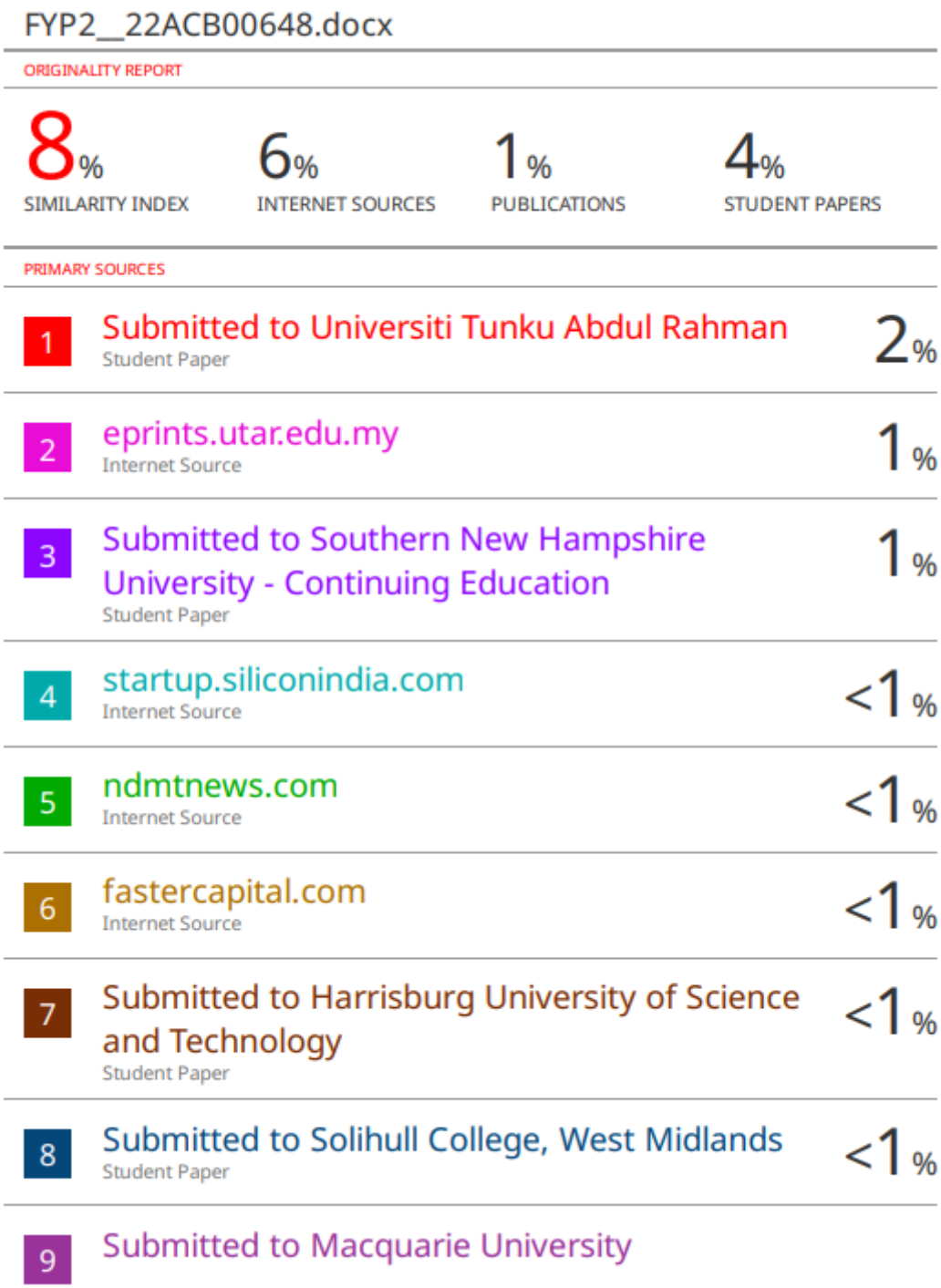

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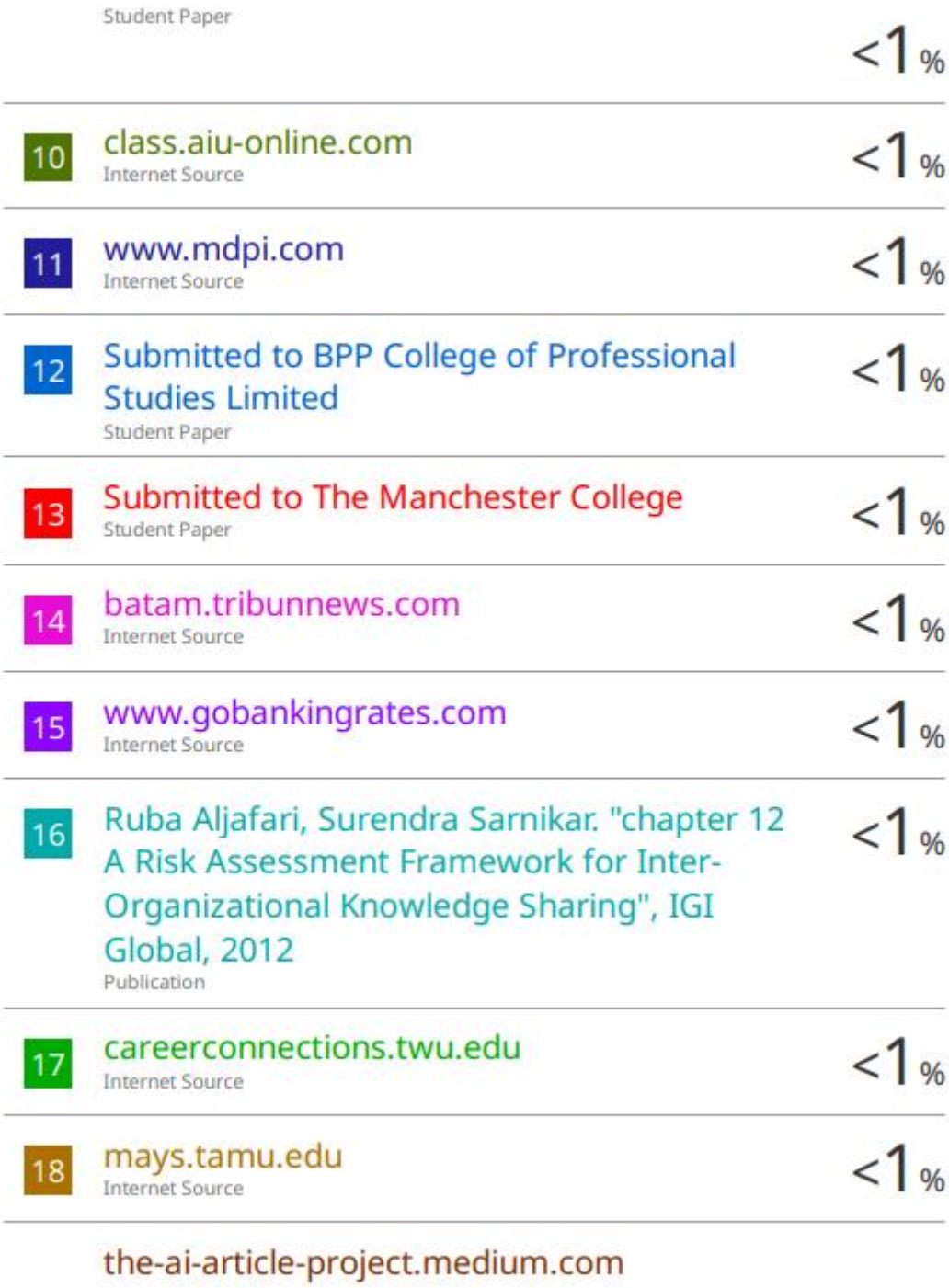
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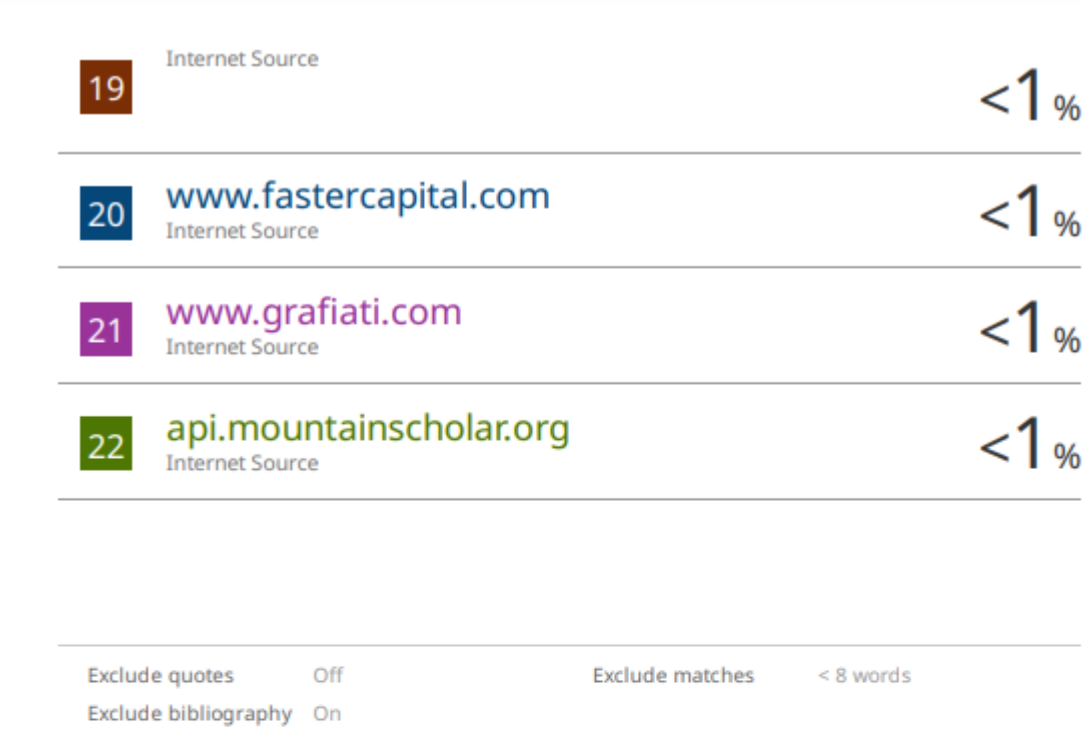
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Full Name(s) of Candidate(s)	Chin Zhi Liang
ID Number(s)	22ACB00648
Programme / Course	BACHELOR OF COMPUTER SCIENCE (HONOURS)
Title of Final Year Project	Leveraging ChatGPT (Large Language Models) for Portfolio Evaluation Based on Investor Risk Profile

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Date: 12/9/2024

Signature of Co-Supervisor

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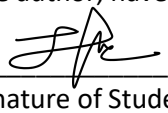

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