

Sprint 4

Group Report

Les Misérables



By

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Abstract

The project aims to develop a website application that provides easy access to global unemployment rate information due to Covid-19. The report discusses objectives, legal considerations, and background of the project. A literature and technical review were conducted to ensure the validity and reliability of the research. The report concludes with a discussion of future research directions and presents literature referenced during system development as appendices. The literature review explores recent studies on the impact of COVID-19 on unemployment rates, and the technical review examines existing studies on unemployment rate information systems and OpenAI's information service. Both reviews emphasize the importance of designing user-centered AI systems that cater to user requirements. The need for a system that makes unemployment rate information more accessible and user-friendly is highlighted. The design or methodology section describes the process of building the unemployment rate information system using the Django web framework and OpenAI API. The system process involves identifying requirements, task assignment, project scope, stakeholder identification, and risk management. The project focuses on showcasing the use of an agile methodology that prioritizes customer feedback and continuous improvement. The implementation or results section includes the code and screens related to system development, as well as a system evaluation using project management techniques.

Declaration

I hereby certify that this report constitutes my own work, that where the language of others is used, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of others.

I declare that this report describes the original work that has not been previously presented for the award of any other degree of any other institution.

Date: 27th April 2023

Signed (apply signature below)

Taejin Kim

Azizul Islam

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Acknowledgements

The team members who participated in this study contributed without conflict with each other.

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1. Introduction

This project ‘Les Misérables’ team was carried out as a scrum team project as a way to produce quick results, and is ultimately an attempt to develop a website application related to global unemployment rate information due to Covid-19.

1.1 Aims

We design and implement a new interface system for easy access to unemployment rate information.

1.2 Objectives

The purpose of this report is to design and implement an interface system that provides easy access to global unemployment rate information, in line with the objectives outlined above. To this end, we basically focused on API (Application Programming Interface) functions that newly access data from the website to the database provided by the OCED web service.

1.3 Legal, Social, Ethical and Professional Considerations

When developing a system that uses information related to unemployment rates, there may be several issues related to legality, sociality, ethics and professionalism. The thing to keep in mind here is that accessibility and usability should be considered first. This is because when using this information, if it takes time to explore, it is no longer valuable as information. It is also assumed here that the project does not require formal ethical approval, as the goal is to build a simple web interface.

1.4 Background and overview

In the background of this project, a literature review for the development of an unemployment rate information web interface and related technical review were conducted in advance through existing research necessary to achieve the purpose of this report. Through this process, we will secure the reliability and validity of this project research and explore future research directions.

Therefore, this report describes the evaluation of the results based on the application of the applicable design or methodology through the review of existing studies. Finally, we present conclusions and future research, and present literature referenced during system development and findings produced during the process as appendices.

2. Literature and Technology Review

Here, we will look at recent studies related to the construction and development of unemployment information web systems. While this study, especially regarding the Covid-19 impact, is about system construction, here we will look at the latest research related to the unemployment rate information web system.

2.1 Literature Review

The objective of this section is to explore the recent unemployment rate in light of the COVID-19 pandemic, which has resulted in economic difficulties worldwide. To accomplish this, we conducted a search on Google Scholar using "COVID-19 unemployment rate" as the search term. We limited our search to literature from 2022 to the present, as this is the default option on Google Scholar. Our focus is on the studies that appear on the first page of the search results, as these are the most relevant to our search term. The purpose of this overview is to present the existing research on the subject.

The study of Su et al. (2022) analyzed COVID-19's effect on unemployment rates in five European countries and finds a significant increase in Germany, Spain, and the UK, indicating a negative impact on the European labor market, and suggests the need for active labor market policies. Specifically, the paper of Endris and Kassegn (2022) reviewed the impact of COVID-19 on unemployment and food insecurity in sub-Saharan Africa, finding significant disruptions to household livelihoods, emphasizing the need for social protection measures, regional cooperation, and a strong financial sector for economic recovery. Also, according to Pompili et al. (2022)'s study, unemployment is linked to higher rates of mental illness and depression, particularly among those who have lost their jobs, and being female and living in southern Italy increases the odds of job loss, but losing a job does not necessarily increase the risk of suicidal ideation. Similarly, this study of Guo et al. (2022) examined the relationship between economic factors and COVID-19 vaccination rates in US counties and found that per capita income and unemployment rates were positively associated with vaccination rates, but with differing effects on racial/ethnic disparities. The study underscores the importance of considering economic factors in public health efforts to improve vaccination rates and reduce disparities. In addition to previous research, according to Parvez et al. (2022)'s research, technological expansion and pandemic disruption have negatively impacted employees' well-being, with attitudes towards robots affecting their experience, and the pandemic potentially leading to increased service robot use and job loss, especially for entry-level employees. Also, this study of Gunn et al. (2022) investigated the impact of COVID-19 on non-standard and unemployed workers in six countries, revealing adverse effects on work arrangements, income, benefits, mental health, and workplace protections, and highlighting the need for tailored pandemic responses and recovery strategies to protect these workers. Finally, as the recent research

(Bianchi et al., 2023), this study uses a time-series approach to analyze the impact of COVID-19-related unemployment on mortality rates and life expectancy in the US, revealing that the shock will have significant adverse effects, particularly on African Americans and women, resulting in an estimated 0.8 million additional deaths over the next 15 years.

As mentioned earlier, the latest research shows empirical evidence that Covid-19 has had a high impact on unemployment. Therefore, it shows the need for service provision to provide recent trends in unemployment rates so that relevant analyses can be made. Through this, we are sure that building this system is a meaningful approach.

2.2 Technology Review

In this technical review, the process of theoretical literature review described above was followed, and keywords were searched in Google Scholar by entering 'Unemployment rate information system' in Google Scholar. We also briefly looked at OpenAI in terms of access to information services.

The article of Alkhayyat et al.(2022) analyzed the ability of three classifiers to predict post-graduation unemployment periods based on university major and discusses the potential for developing real-life applications using this research. Similarly, this research by Han et al.(2022) analyzed the impact of platform self-regulations on crime rates in the home-sharing market, finding that such regulations can reduce crime, with variations in the impact based on the type of crime and neighborhood characteristics. Also, according to the research by Ang and Dong (2022), the study examines the relationship between movement restrictions, COVID-19 infection cases, and unemployment rate, revealing a tradeoff between public health and the economy and finding that unemployment rates rise when governments impose more stringent movement restrictions but also that a higher unemployment rate leads to lower stringency of movement restrictions.

Considering the brief technical literature as above, the attempt of this project is meaningful in that there are not many studies on the unemployment rate information system. So, additionally, research related to the OpenAI system was explored with a focus on the goal of information service access.

According to Mijwil et al. (2023)'s study, ChatGPT is a large language model developed by OpenAI that generates human-like responses and can be used for various tasks such as chatbots, translation, text completion, and creative writing, and can be applied across different industries. As well, the study by Kirtania and patra (2023) analyzed the contents generated by OpenAI ChatGPT using selected terminologies from the Library and Information Science (LIS) field and finds that only 13% similarity was detected after checking the content with a plagiarism tool, indicating the potential usefulness of ChatGPT for generating academic content with high academic integrity. Similarly, Perlman (2022)'s research discussed the release of OpenAI's ChatGPT chatbot, its potential to transform various aspects of society, and the regulatory and ethical issues it raises, highlighting that

the disruptions from AI are no longer in the distant future. Recently, the study by Panda and Kaur (2023) explored the feasibility of using ChatGPT-based chatbot systems as an alternative to traditional knowledge base-based chatbot systems in library and information centers, finding that ChatGPT-based chatbots are a viable alternative with advantages and limitations, and providing insights for future use of this technology in the information service industry.

It can be seen that most recent studies related to OpenAI's information service are mostly about ChatGPT. Therefore, it shows that a system that makes unemployment rate information more accessible is necessary to be made by OpenAI. So, the technical studies related to OpenAI system development share a common feature - they prioritize designing AI systems that cater to the user's requirements. Therefore, this project also acknowledges the importance of user requirements and prioritizes designing user-centered AI systems, which should serve as the foundation for future developments in AI platforms.

3. Design or Methodology

This section describes the part of the design in which the project was performed. In particular, the project was originally designed to build information-providing systems. However, it is presented accordingly as an application of the OpenAI system to reflect the latest technological trends and changes in user needs.

Basically, this project will develop the system through the process shown in the figure below.

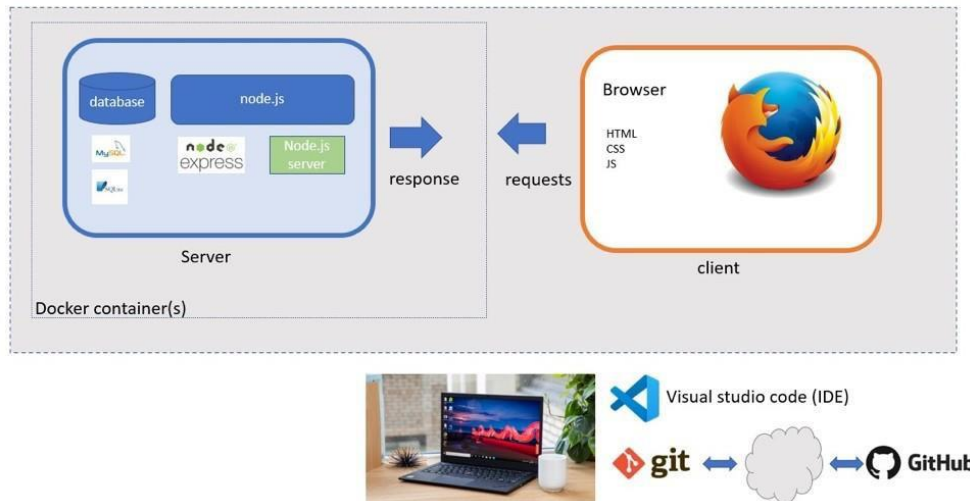


Figure 1. Original system design and process

First, it is a process of providing the information stored in the server in the Docker container in the format requested by the user through the Internet browser. In order to build this design, it is a process of mutual communication between team members such as code work on github. In detail, a backend framework is a tool for creating server applications that handles behind-the-scenes work such as bringing data from the database for display on the screen, validating logins, and sending information to the web or mobile. It is traditionally seen as the server component of a client-server architecture, but with the emergence of full stack technologies that directly interact with databases on the client side, the distinction between client and server is becoming less clear. Here, we tried using Node.js, which uses the JavaScript language.

However, this approach was changed into a project change form (see Appendix) through discussions with project group members. That is, the original plan was to utilize Node.js as a backend device as a server. However, in view of the recent research trend, group members agreed that the use of OpenAI is necessary. Therefore, a change was requested through the process shown in the following figure..

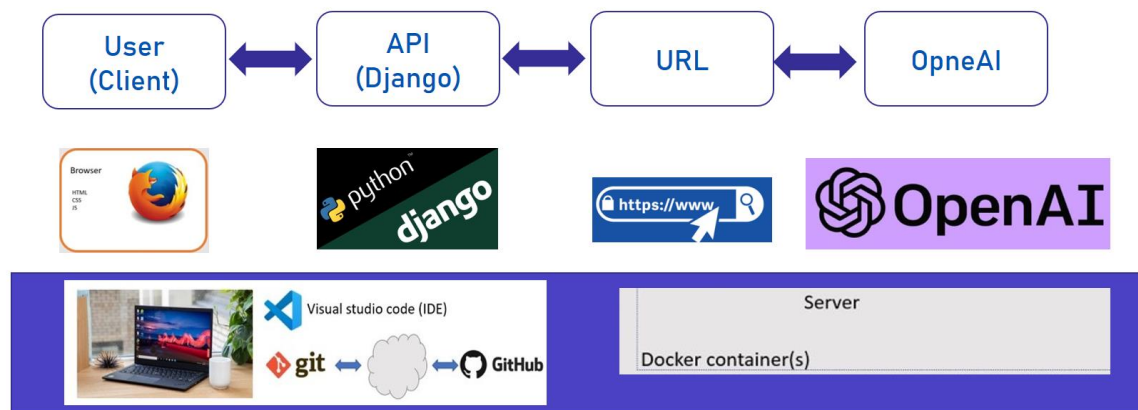


Figure 2. Changed system design and process

The goal of this project is to identify post-Covid-19 unemployment rates and provide easy information on future trends. However, with the recent development of OpenAI, all information provision can be easily accessed in human language. Therefore, the following changes were made based on the latest research results: ‘The technical review searched for relevant studies using Google Scala and found Alkhayyat et al.(2022), Han et al.(2022), and Ang and Dong (2022) studies. These studies analyzed the ability to predict post-graduation unemployment, impact of platform self-regulations on crime rates, and relationship between movement restrictions, COVID-19 cases, and unemployment. The project aims to create an unemployment rate information system, which is lacking in research. OpenAI was found to be useful for generating academic content with high integrity, and studies emphasized designing user-centered AI systems for future developments.’

Hence, this project has been expanded to a design that allows users to easily find the information they want through natural language processing of the latest information. Therefore, in this project, the Django framework was used as the backend framework, which can be written in python code, and we ultimately wanted to use openAI. Finally, this project will demonstrate the process of developing a web assistance application using the Django web framework and the OpenAI API. Django is a robust web framework that facilitates the creation of intricate, data-driven websites, while the OpenAI API is a machine-learning platform that empowers you to train and implement AI models.

In order to design and implement a new unemployment rate information system, which is the original purpose of this project, to make it easily accessible, we tried to utilize the database provided by the OECD. However, with ChatGPT, all data can be accessed in real time through natural language processing.

Therefore, the system process of this project should include:

- Identification of requirements (functional and non-functional)
- Task assignment

- Identify project scope
- Stakeholder identification
- Risk management

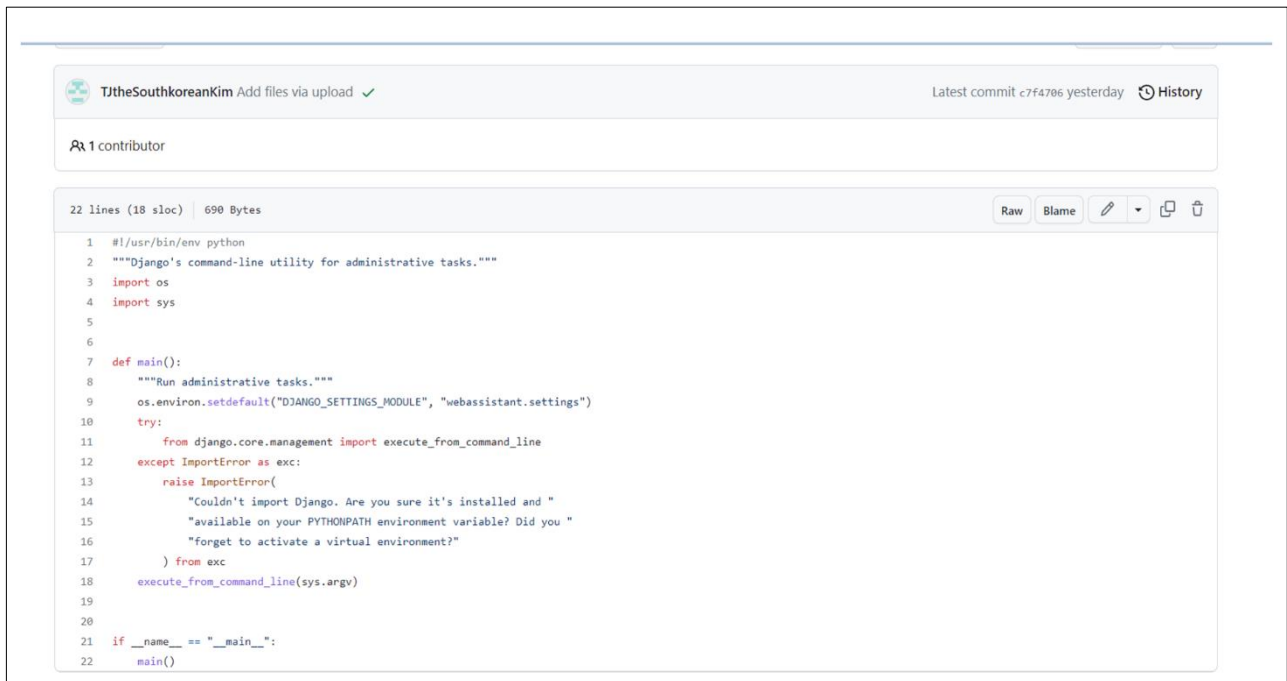
The main focus of this project is to showcase the use of an agile methodology in the development process, which enables quick responses to user requirements. Unlike the traditional waterfall model that follows a step-by-step approach to software development, which can result in significant delays and setbacks if any issues arise in the middle, the agile methodology prioritizes customer feedback and continuous improvement. It is a coding-based approach to development that emphasizes flexibility and adaptability over strict adherence to pre-planned development steps, as opposed to document-based development approaches like the spiral model. This approach allows for faster development cycles and easier project management.

4. Implementation or Results

In this section, first, the code related to system development and the resulting screen are shown, and the system evaluation is performed according to the project management technique.

4.1 System development

This section presents the results of work performed on the project. It contains minimal code as a gist and outlines how the design for the implementation actually came together. This project was implemented using Django as API for the backend and for the frontend. That is, the backend also makes a connection to OpenAI and sends a request to the frontend. A part of the code related to this is presented as the following figure (code screenshot from <https://github.com/TJtheSouthkoreanKim/Les-Mis-rables/blob/master/webassistant/manage.py>).



```

1  #!/usr/bin/env python
2  """Django's command-line utility for administrative tasks."""
3  import os
4  import sys
5
6
7  def main():
8      """Run administrative tasks."""
9      os.environ.setdefault("DJANGO_SETTINGS_MODULE", "webassistant.settings")
10     try:
11         from django.core.management import execute_from_command_line
12     except ImportError as exc:
13         raise ImportError(
14             "Couldn't import Django. Are you sure it's installed and "
15             "available on your PYTHONPATH environment variable? Did you "
16             "forget to activate a virtual environment?"
17         ) from exc
18     execute_from_command_line(sys.argv)
19
20
21 if __name__ == "__main__":
22     main()

```

Figure 3. Code

(Source: <https://github.com/TJtheSouthkoreanKim/Les-Mis-rables/blob/master/webassistant/manage.py>)

The following shows the github website with contents related to the development process.

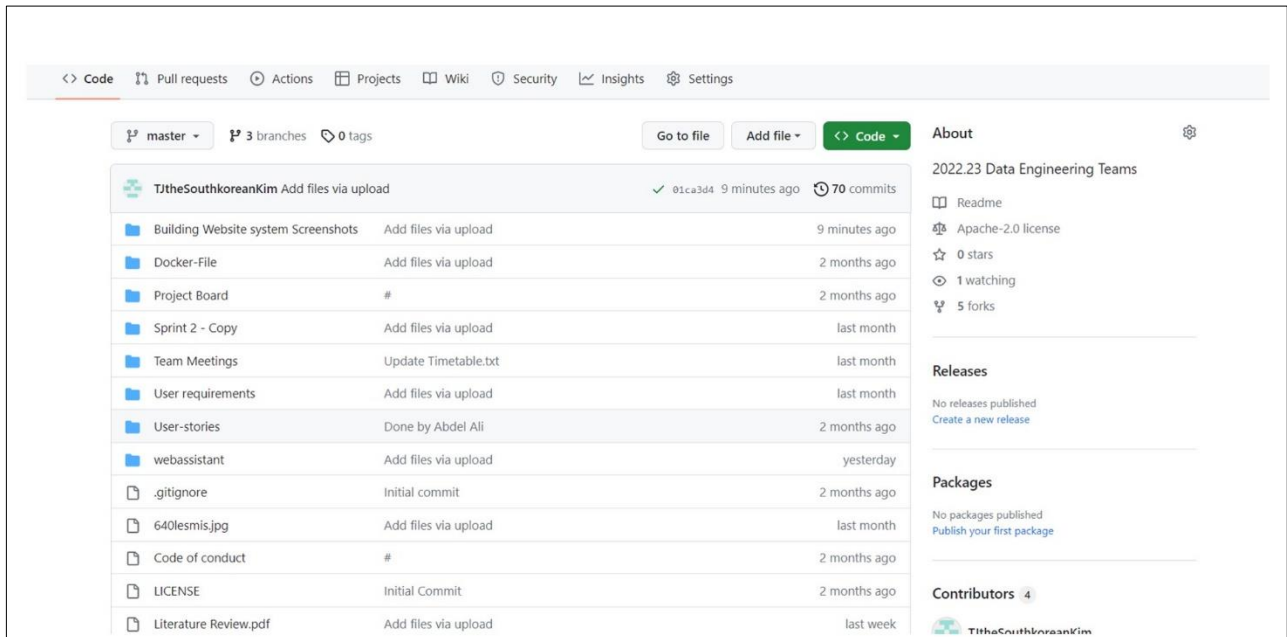


Figure 4. Developing process by Github

(Source: <https://github.com/TJtheSouthkoreanKim/Les-Mis-rables>)

Now, if users enter the desired information in natural language on the next result screen, an accurate answer will be provided.

Firstly, when asked whether Covid-19 has affected the unemployment rate in the presented system, the unemployment rate is shown as a percentage result.



Figure 4. Output screen 1

Additionally, if users ask the question about the unemployment rate on OECD website, you will get the result as shown in the following figure.

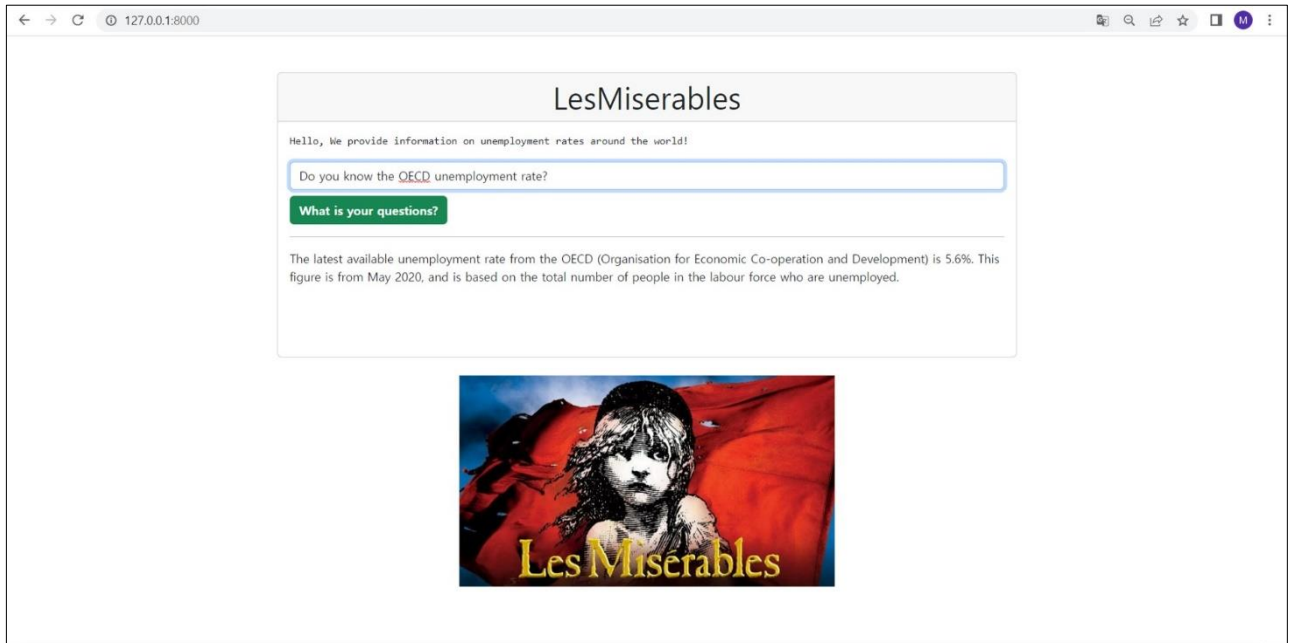


Figure 5. Output screen 2

It also presents results when asked about future projections of UK unemployment rates, and expects somewhat positive results.

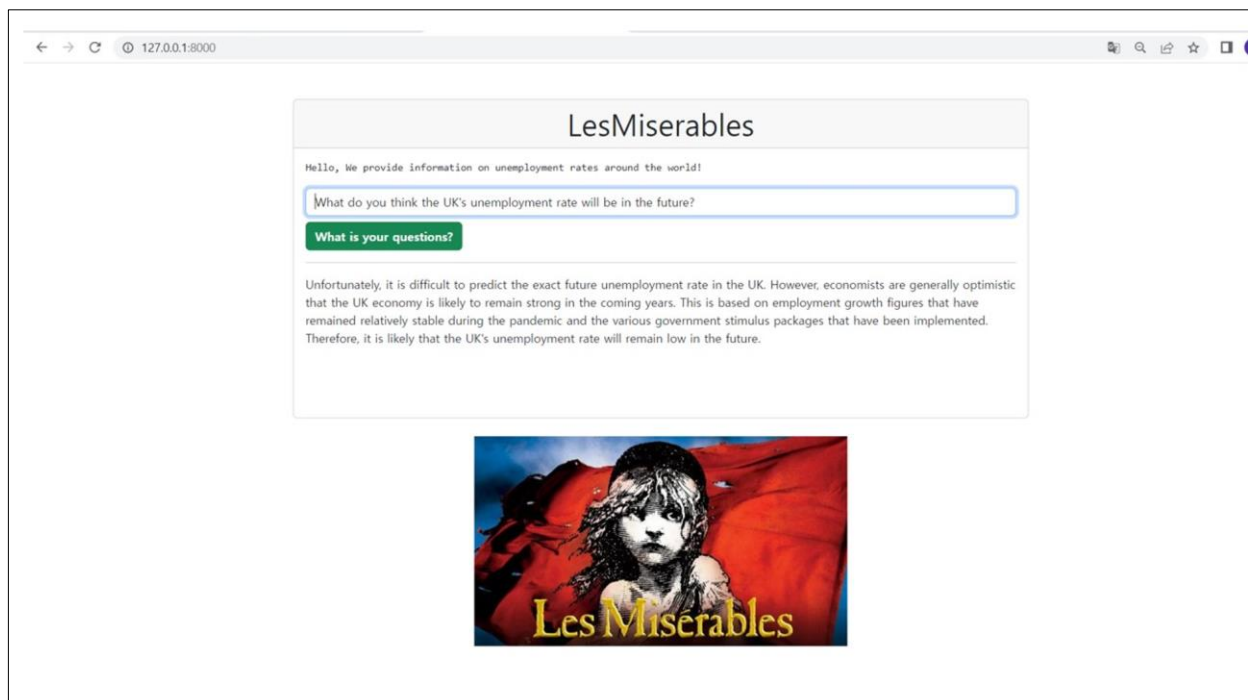


Figure 6. Output screen 3

4.2 System evaluation

Evaluation involves applying rigorous methods to assess the extent to which the developed system achieves defined impact targets. It is the process of systematically and objectively assessing, as far as possible, the relevance, effectiveness, effectiveness and impact of a program in the context of the objectives mentioned above. The final product yielded meets most of the requirements and needs improvement. So while the design is simple and the webpage is easy to navigate and read, it could be improved. Reports can be accessed through different pages. However, this project tried to build an interface as a frondend limited to unemployment rate information, but due to the activation of OpedAI, it is a system capable of exploring all information. Therefore, when you want to search for the information you want, you must enter the correct question in order to provide an accurate answer. The full evaluation table, along with explanations of these evaluations, is below. Therefore, in this section, the project's performance indicators were created and evaluated. Here, the performance indicators for this project can be continuously checked and presented as performance measurement indicators as shown in the table below. Here, the index provided by the Project Management Institute (PMI) was modified for reference and used as an evaluation table (Martinelli & Milosevic, 2016; Schwalbe, 2015).

Here, as a result of measuring the evaluation table with team members, the Advancement of industry aspect came out as low as 2.5 points. Therefore, it can be interpreted as an evaluation result that needs to be supplemented.

Table 1. Performance index

Performance object	Performance measuring index	Measurement (5point basis)
System convenience	Convenience which users of system feel	5
	Satisfaction depending on convenience	
Advancement of industry	Effect for corresponding industry	2.5
	Degree of advancement for corresponding industry	
	Possibility to respond for other industry	
	Effect for international standardization	
Increase of efficiency and improvement of productivity	Proper planning	4
	Innovation of quality control	
	Establish standard data of enterprise	
Accumulation of technology	Degree of technical accumulation	4
	Degree of construction ability and knowhow	
	Interworking with other systems	
Total		3.875

The project members' evaluations determine the items and ratings in this section, which assess the

project's progress. Later, detailed reflections are presented based on these evaluations. The project received a score of 3.875 out of 5, suggesting that there is room to increase the potential for application in other industries.

5. Conclusions

5.1 Summary

The project aims to develop a user-friendly website application that provides easy access to global unemployment rate information due to Covid-19. The report includes a literature and technical review, a discussion of the design and methodology used, and an evaluation of the implementation or results. The project highlights the importance of designing user-centered AI systems that cater to user requirements and emphasises the need for a system that makes unemployment rate information more accessible and user-friendly.

5.2 Reflection

In this section, we will discuss the lessons learned during the project and provide a template for future projects. The score of 10 in the Lessons Learned section can be used as an indicator of high motivation among project members and can be used to provide incentives. We will use risk management as a case example to evaluate the lessons learned during this project. To do this, we will refer to the table presented by Martinelli & Milosevic (2016).

Table 2. Documentation template including the evaluation of the lesson learned

Project Name: Les Misérables											
Prepared by: Team members											
Date: 21 st April 2023											
Lesson Learned Number: #1											
Project Team Role: Design and development of 'Unemployment Rate' information service systems											
Process Group:			Initiating		Planning		Executing		Controlling		Closing
What is the specific Lesson Learned?											
<p>1. What was the success criteria listed in the project scope statement?</p> <ul style="list-style-type: none"> ✓ The risk management process involves monitoring and controlling risks, as well as detecting changes in the risk environment. ✓ Risk re-evaluation should also be performed in cases where unexpected results arise during the project. <p>2. Reflect on whether or not we met the project success criteria.</p> <ul style="list-style-type: none"> ✓ Risk reassessment ✓ Risk monitoring and control <p>3. In terms of managing the project, what were the main lessons our team learned?</p> <ul style="list-style-type: none"> ✓ During this project, our group learned valuable lessons, such as how to effectively structure a project into different departments and how to promote communication and problem-solving among them. ✓ We also gained a deeper understanding of both internal and external risks and their potential impact on the project. ✓ These experiences allowed us to undertake a more comprehensive and realistic project, further enhancing our skills and knowledge. <p>4. What will we do differently on the next project based on our experience working on this project?</p> <ul style="list-style-type: none"> ✓ It is anticipated that internal issues can be resolved through constructive dialogue or meetings. ✓ For the next project, the communication team will apply the lessons learned in risk management to ensure effective risk management. 											
Who should be informed about this Lesson Learned? (check one)											
		CEO		Project Manager(s)		Project Team(s)		All members			
Have you attached reference(s), example(s) and/or additional material(s)?								yes			
Evaluation of lessons learned selected: Please check the score you think.											
1 2 3 4 5 6 7 8 9 10											

5.3 Future Work

Here, based on the experiences and lessons learned from this project, we would like to describe the necessary improvements for the next project.

First of all, if the next project starts, internal problems will be resolved through regular discussions or meetings for efficient integrated project management. In particular, it is necessary to carry out the project more efficiently through communication between team members and division of work. Based on this experience, it is expected that efficient activities will be possible in the next project. Also, based on the work methods and knowledge acquired through communication-related activities, it is expected to be helpful in completing any project. Internal risks are expected to be

resolved through discussions or meetings. In other words, if we do a project again in the future, we felt the need for a software development process while continuing to talk with the team members.

In terms of system technology, we plan to expand the system so that the currently presented service can additionally enable multiple-choice questions rather than just natural language processing.

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Appendix

Reference documents for key tasks are presented here as additional information while carrying out the project.

Project Proposal

Initially, the project proposal was presented in the following manner at the start of the project.

Table A-1. Project proposal

Summary	This document outlines the code of conduct for the "Les Misérables" team, who are collaborating on a group project for the "Data Engineering" module at the University of Roehampton. The provisions of this document are applicable throughout the duration of the project.
Goals	Our objective is to attain the coursework targets and surpass them in regards to both time and quality. Our goal extends beyond a successful submission to encompass maximizing our knowledge of the "Data Engineering" module and gaining experience in real-life projects and teamwork.
Deliverables	<p>The project entails building an information service application, which serves as a frontend to a database. It will provide a web-based interface for creating, reading, updating, and deleting data, with the database residing on a server powered by OpenAI. The tools described below will be utilized for the development of the application. The delivery dates for the project are specified below, and each delivery will be accompanied by a team presentation.</p> <ul style="list-style-type: none"> ✓ Sprint 1: 16 February ✓ Sprint 2: 09 March ✓ Sprint 3: 30 March ✓ Sprint 4: 27 April <p>Every sprint must be submitted as a compressed zip file, containing all the required files as per the coursework guidelines. The team leader or their designated backup, or any team member in case of absence or emergency, is responsible for submitting the sprint. The submission must be made before the specified deadline.</p>

Team meetings	<p>The team is required to attend at least one or two meetings per week, as outlined below:</p> <ul style="list-style-type: none"> ✓ A meeting is every Wednesday during the lab session in class, except during the reading week, when the meeting will be held online. ✓ A meeting every Thursday at 13:30 on Microsoft Teams. ✓ Team members are strongly advised to attend all meetings, unless there is an emergency or they are sick. ✓ In such cases, they should inform the rest of the team in advance. ✓ The Scrum Master is responsible for taking notes during each meeting and sharing them with the team afterward
Communication	<p>Outside of class hours, the team communicates through the university email system.</p> <p>In case of emergencies, mobile phones are used for communication, with Whatsapp being the primary means of contact.</p> <p>Online team meetings take place on Microsoft Teams.</p>

Project meeting form (weekly)

To ensure security, all significant communications among sub-stakeholders in this project were presented anonymously. As the project progresses, no modifications will be made, as long as the original design is adhered to.

Table A-2. Weekly Meeting form

Project Weekly Meeting	<p>Project Start Date: 01/02/2022 Projected Finish Date: 27/04/2022</p> <p>Date and time of this meeting: 20/04/2022 10 (AM 11:00)</p> <p>Meeting Objective: 'Group report' writing Agenda:</p> <ul style="list-style-type: none"> ✓ To discuss project report with team members ✓ To check project monitoring & controlling ✓ To confirm the next meeting date <p>Date and time of next meeting: 27/04/2022 (AM 11:00)</p>
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Change Request of project

Table A-3. Change Request form

Project Details:	
Project Name: <i>LesMiserables</i>	
Request #: 1	Date of Request: 16 th March 2023
Requested By: Taejin Kim	
Request Description:	
<p>The original plan was to utilize Nodejs as a backend device as a server. However, in view of the recent research trend, group members agreed that the use of OpenAI is necessary. Therefore, a change was requested through the process shown in the following figure.</p>	
Reasons for this Change Request:	
<p>The goal of this project is to identify post-Covid-19 unemployment rates and provide easy information on future trends. However, with the recent development of OpenAI, all information provision can be easily accessed in human language. Therefore, the following changes were made based on the latest research results.</p> <p>‘The technical review searched for relevant studies using Google Scala and found Alkhayyat et al.(2022), Han et al.(2022), and Ang and Dong (2022) studies. These studies analyzed the ability to predict post-graduation unemployment, impact of platform self-regulations on crime rates, and relationship between movement restrictions, COVID-19 cases, and unemployment. The project aims to create an unemployment rate information system, which is lacking in research. OpenAI was found to be useful for generating academic content with high integrity, and studies emphasized designing user-centered AI systems for future developments.’</p>	
Chosen solution:	
<p>Finally, the decision was made to modify the scope and process of the project to align with current trends.</p>	

Approval Signature(s) and Date(s):

Group members all, 22th March 2023