COMP7940 - Cloud Computing

Group Project – Group AG

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Link to project Github repository:

https://github.com/HOWaiLok/comp7940_project.git

Link to recording video:

https://drive.google.com/drive/folders/1Psi8S-jps4xWB-u9hT7P6c-BKLS4ZlX9?usp=sharing

Introduction

A Telegram chatbot called “FilmBuffDB_bot” is developed, enabling making film genres, main actor, actress suggestion and film description generation, as well as uploading the film description to your personal film database. It was deployed in a public cloud hosted by Amazon Web Services. The users of the chatbot application are supposed to be the developer’s families, relatives and some friends (less than 50 people).

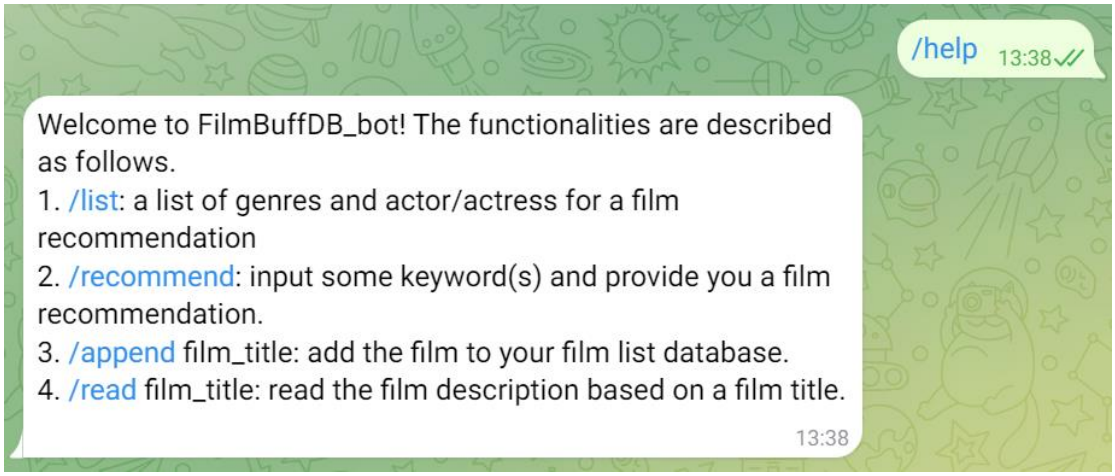
Functionalities

The username of the chatbot is called “FilmBuffDB_bot”. “FilmBuffDB_bot” is able to recommend some film genres, main actors, and actresses, write a film discription, and upload (resp. read) the film description to (resp. from) a remote database working as a personal film database to users. These functionalities are based on the use of 5 telegram commands.

The description of the 5 commands are introduced as follows.

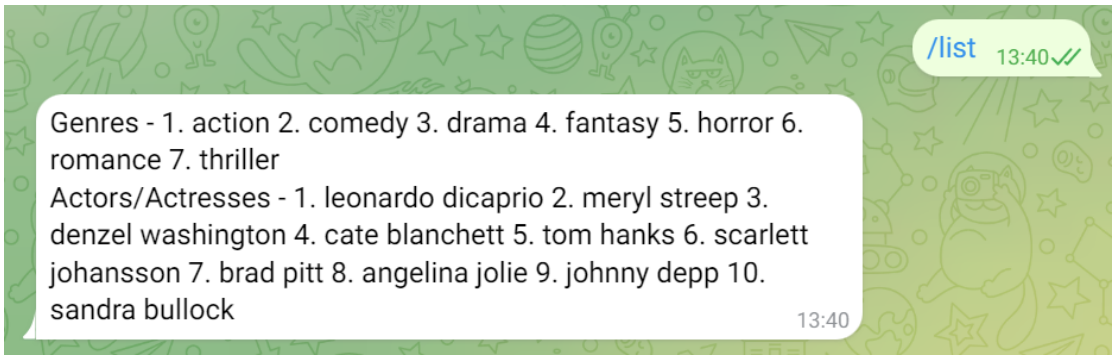
1. “/help” command

Entering “/help” command without any inputs can provide instructions on the usage of the other commands.



2. “/list” command

Entering “/list” command without any inputs followed can list at least 7 genres and at least 10 main actors/actresses as an inspiration for your potentially favorable film description / recommendation generation.

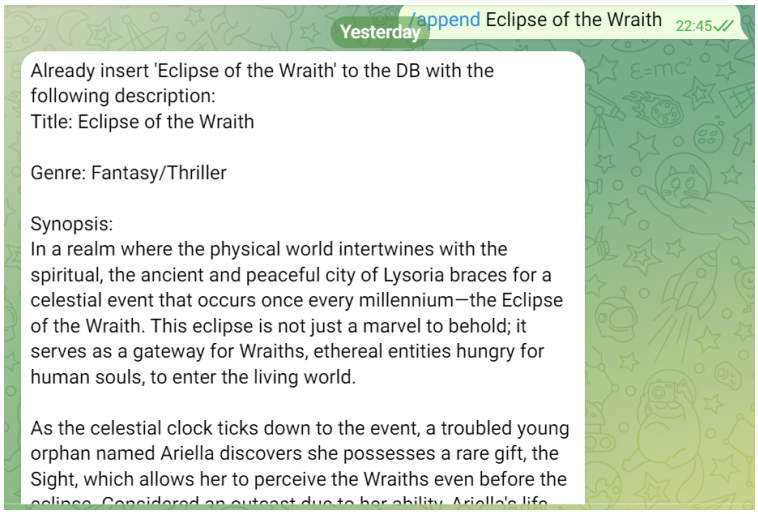


3. “/recommend”

If users enter “/recommend ” command followed by some keyword(s) like “/recommend dark hero”, then some relevant film description(s) / suggestion(s) with film title, genre(s), plot, and other characteristics will be provided.

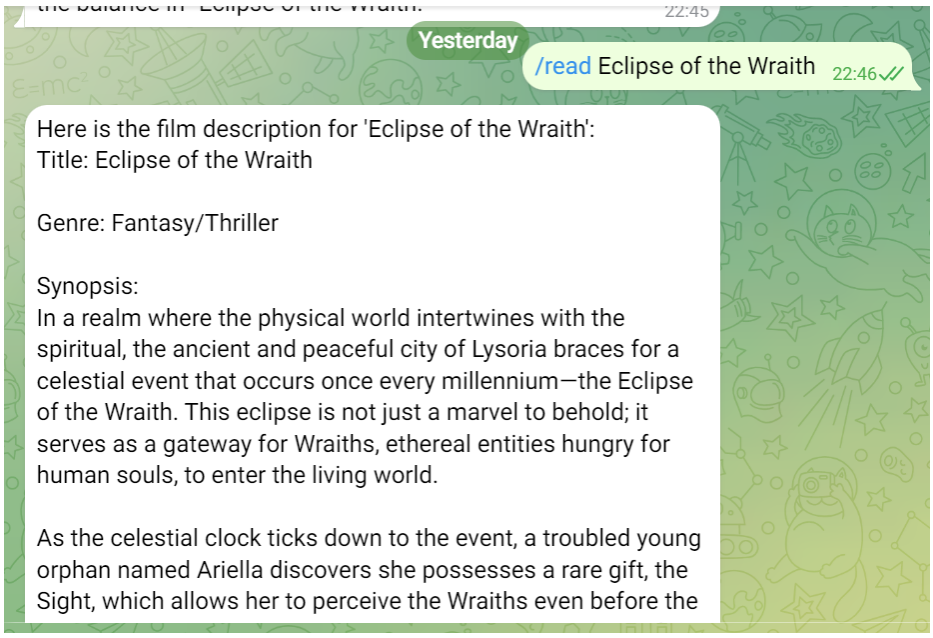
4. “/append”

When user enters “/append” command followed by a film title, the corresponding film description will be generated and Telegram will inform the film description is successfully uploaded to a remote database, working as a personal film database for users. Different film description information is stored in the database by Telegram user ID and indeed, information is not shared among users.



5. “/read”

Users are feel free to enter “/read” followed by a film title to read the film description uploaded to the remote personal film database.

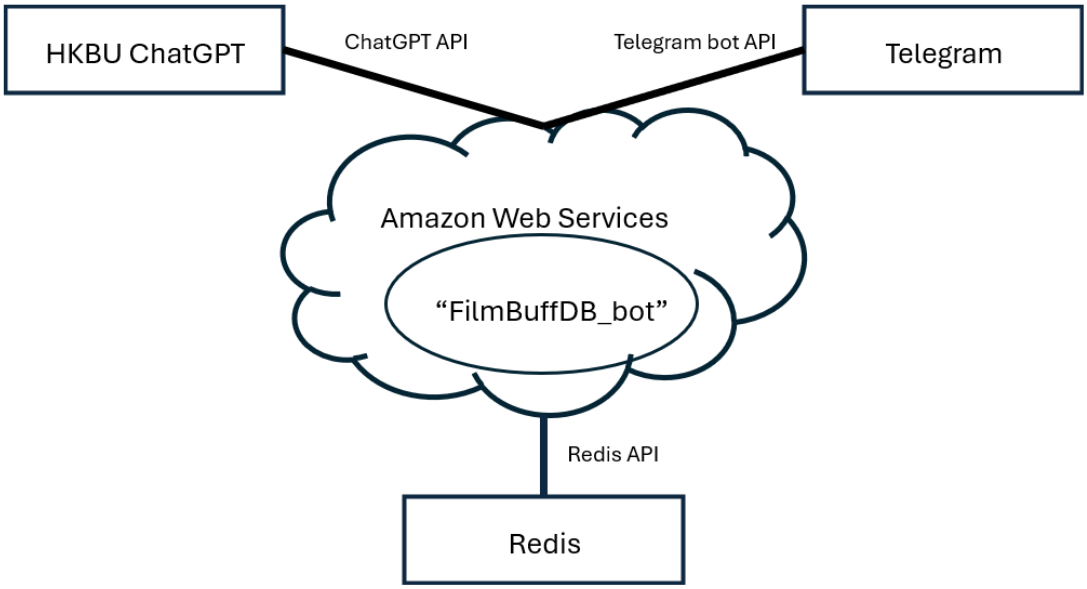


A demonstration will be provided in the recording video deliverables to have a better understanding of the chatbot functionalities.

Advantages of the use of “FilmBuffDB_bot”

When users are seeking for some film suggestions, “FilmBuffDB_bot” is able to suggest some film genres, popular actors / actresses for inspiration. It can even generate some film description / suggestion based on the input of some keyword(s). Also, users don’t need to spend time writing the film description on their own. They can feel free to share the film description to others, like families, friends for film recommendation. Also, users can upload the film description to their personal database as a remark of their favorable, watched, or to be watched film list.

Technological Architecture on “FilmBuffDB_bot”

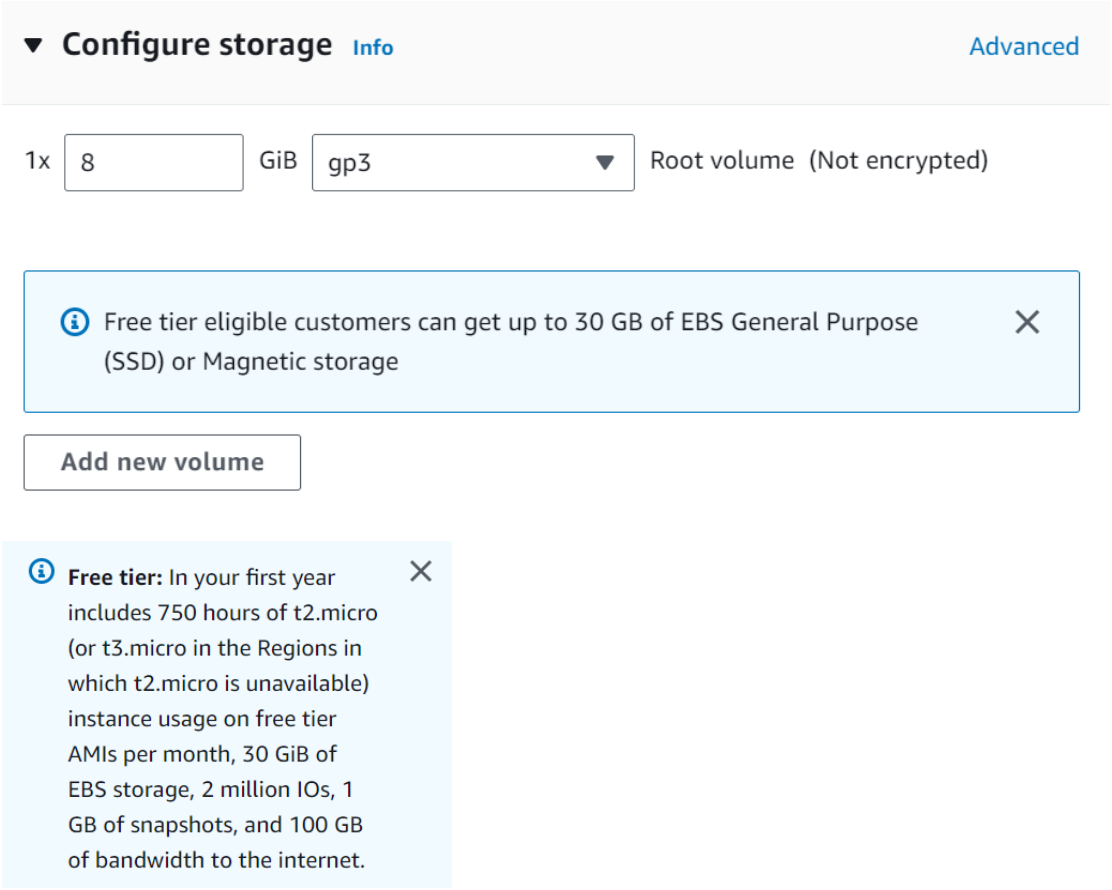


“FilmBuffDB_bot” provides film recommendation and data storage services by leveraging the ChatGPT API, Telegram bot API, and Redis API services among HKBU ChatGPT, Telegram, Redis, and the “FilmBuffDB” application. First, “FilmBuffDB_bot” was developed by Python and deployed onto a public cloud hosted by Amazon Web Services. Then, for example, “FilmBuffDB_bot” performs the

“/recommend” command for film recommendation. The Python application receives the keyword(s) specified by users from Telegram (as a social media interface for the bot) and forwards the keyword(s) to a large language model HKBU ChatGPT. The Python programs instruct ChatGPT to generate a film description based on the keyword(s) and ChatGPT returns the film description to the programs. Then the content is forwarded to Telegram for response. Similarly, for “/append” and “/read” services, Python application obtains (resp. reads) the user Telegram ID and film description and uploads to (resp. from) Redis database server. Notably, the communication and data exchange between the different components of the application rely on the powerful capabilities provided by the API services.

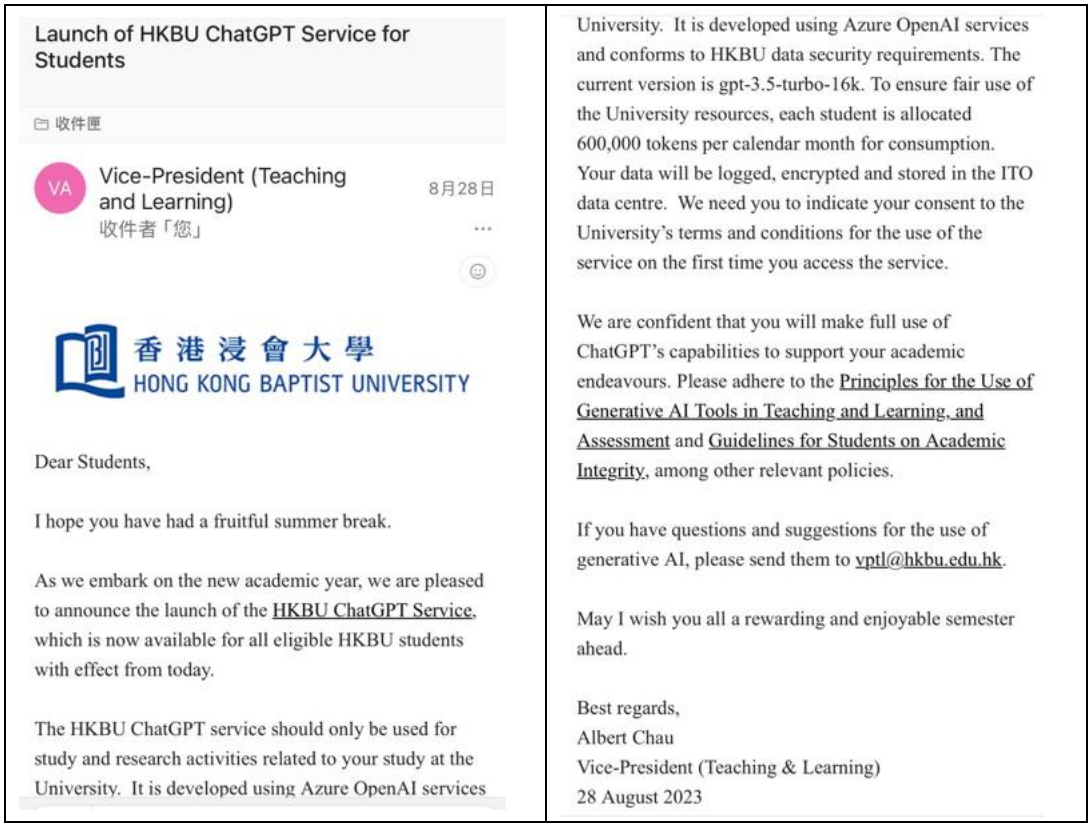
Amazon Web Services

“FilmBuffDB_bot” application is deployed onto the public cloud hosted by Amazon Web Services under a first 12-month free plan Amazon EC2 (AWS Free Tier, 2024). Amazon EC2 provides a total of 750 hours servers time (shared by server instances) with scalable capabilities. The server image in use is called “t2.micro” which is based on Linux platform with one 8GB CPU and one general purpose SSD, as well as 100 GB bandwidth for networking assigned.



HKBU ChatGPT Services

The HKBU ChatGPT API service is offered to HKBU students for free with monthly 0.6 million tokens allocated (see the student email from Teaching & Learning Department, HKBU).



Launch of HKBU ChatGPT Service for Students

收件匣

VA Vice-President (Teaching and Learning) 8月28日
收件者「您」

香港浸會大學
HONG KONG BAPTIST UNIVERSITY

Dear Students,

I hope you have had a fruitful summer break.

As we embark on the new academic year, we are pleased to announce the launch of the HKBU ChatGPT Service, which is now available for all eligible HKBU students with effect from today.

The HKBU ChatGPT service should only be used for study and research activities related to your study at the University. It is developed using Azure OpenAI services and conforms to HKBU data security requirements. The current version is gpt-3.5-turbo-16k. To ensure fair use of the University resources, each student is allocated 600,000 tokens per calendar month for consumption. Your data will be logged, encrypted and stored in the ITO data centre. We need you to indicate your consent to the University's terms and conditions for the use of the service on the first time you access the service.

We are confident that you will make full use of ChatGPT's capabilities to support your academic endeavours. Please adhere to the Principles for the Use of Generative AI Tools in Teaching and Learning, and Assessment and Guidelines for Students on Academic Integrity, among other relevant policies.

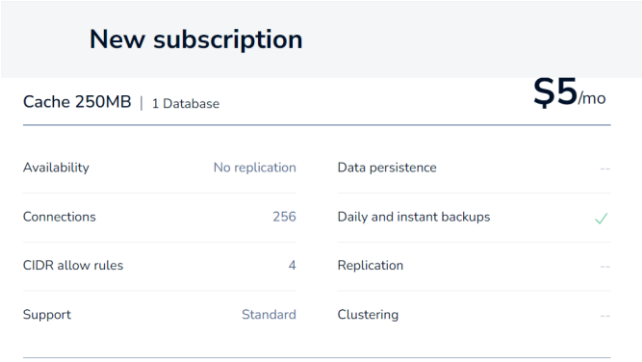
If you have questions and suggestions for the use of generative AI, please send them to vptl@hkbu.edu.hk.

May I wish you all a rewarding and enjoyable semester ahead.

Best regards,
Albert Chau
Vice-President (Teaching & Learning)
28 August 2023

Redis Remote Database Service

A monthly database subscription plan I registered is billed with 5 USD (approx. 39.15 HKD). The plan offers 250 MB caches and 256 available client connections. The data storage is not explicitly mentioned and It is assumed to be unlimited.



New subscription

Cache 250MB | 1 Database $5/mo

Availability	No replication	Data persistence	--
Connections	256	Daily and instant backups	✓
CIDR allow rules	4	Replication	--
Support	Standard	Clustering	--

Therefore, the total bill for the cloud services used is 39.15 HKD per month.

Scalability of the application

If there is a need to scale up the cloud services (e.g. hosting the application server for the billed users with subscription). The cloud services offered by Amazon Web Services (AWS pricing calculator, 2024), Redis (Redis Cloud Pricing, 2024), large language model (e.g. changing to the use of DeepAI (Pricing, n.d.)) can be easily scaled up based on the demand.

Security Measurements

Environment variables (inspired by HKBU ChatGPT) are used to protect the sensitive information and credentials (e.g. HKBU ChatGPT token, Telegram Bot access token, Redis password) from the source codes uploaded to the public cloud. Cloud service providers provide secure mechanisms for environment variable management, ensuring the data is not easily accessible to unauthorized users. Also, the use of environment variables can reduce the data exposure between multiple developers in maintenance and development.

Work Schedule

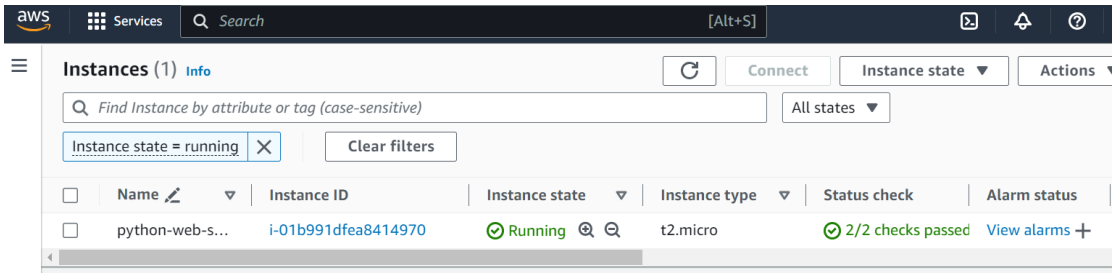
Since this project contains only one group member, no job division among members should be provided. However, the work schedule can be shared.

Phrase	Tasks to be completed	Complete Date
1	Conceptual design of the chatbot; Development (able to test with the server hosted by local machine with the	17/3

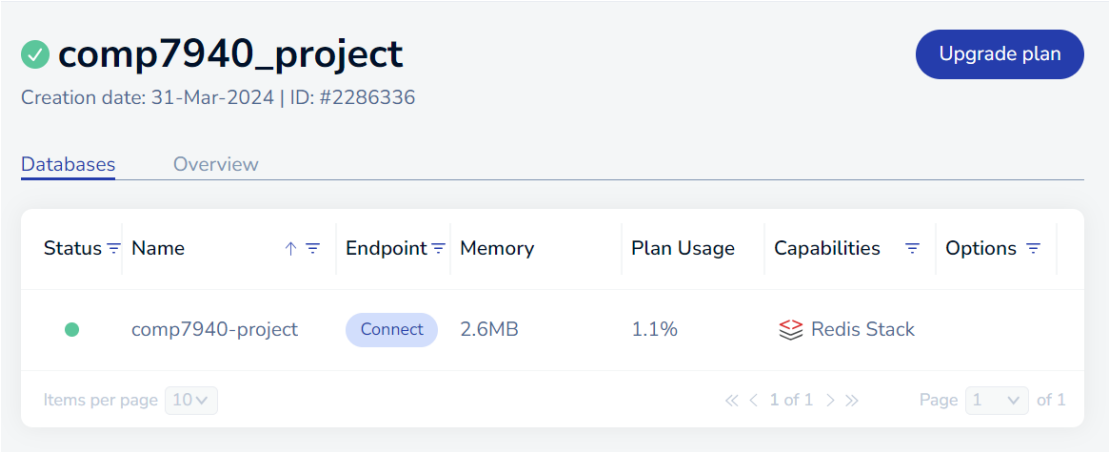
	designed functionalities)	
2	Deployment (able to deploy to a public cloud and); Enhance the application with the use of environment variables	25/3
3	Video recording; Reporting, Finalize Deliverables	31/3

Evidences of fulfilling the technical requirements

I deployed the chatbot application onto a server hosted by Amazon Web Services.



I made a Redis database subscription.



I enhanced the source codes of application with the use of some environment variables.

chatbot_main.py 3

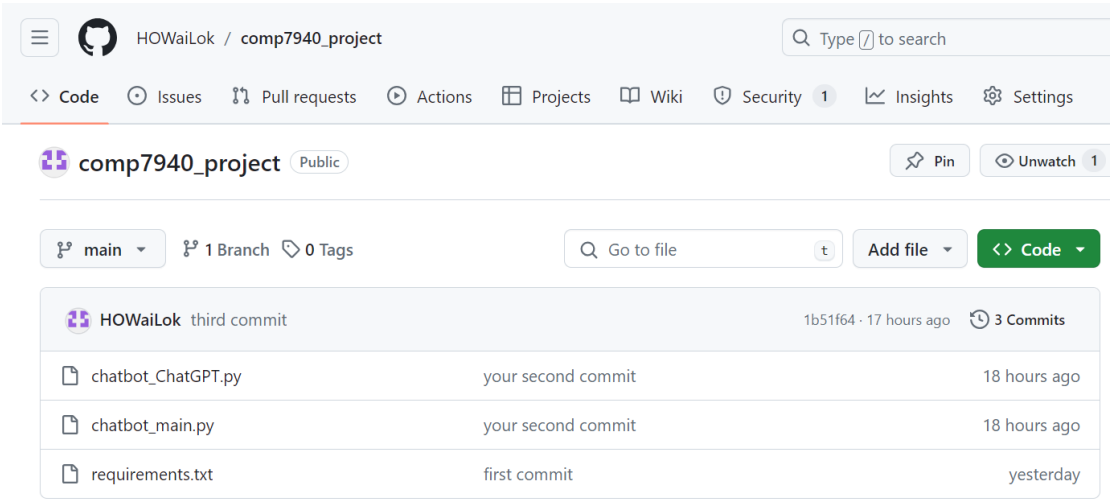
C: > Users > kin > COMP7940 > ver1.3 > comp7940_project > chatbot_main.py > ...

```python
from telegram import Update
from telegram.ext import (Updater, CommandHandler, MessageHandler, Filters,
                          CallbackContext)
# import configparser
import logging
import redis
from chatbot_ChatGPT import HKBU_ChatGPT

import os

TEL_ACCESS_TOKEN = os.environ["TEL_ACCESS_TOKEN"]
HOST = os.environ["HOST"]
REDISPORT = os.environ["REDISPORT"]
PASSWORD = os.environ["PASSWORD"]
BASICURL = os.environ["BASICURL"]
MODELNAME = os.environ["MODELNAME"]
APIVERSION =os.environ["APIVERSION"]
GPT_ACCESS_TOKEN = os.environ["GPT_ACCESS_TOKEN"]
```

Last but not least, the project files are managed by Git.



References

AWS Free Tier. (2024). Amazon Web Services, Inc. Retrieved from https://aws.amazon.com/free/?nc1=h_ls&all-free-tier.sort-by=item.additionalFields.SortRank&all-free-tier.sort-order=asc&awsf.Free%20Tier%20Types=*all&awsf.Free%20Tier%20Categories=*all

AWS pricing calculator. (2024). Amazon Web Services, Inc. Retrieved from https://calculator.aws/#/createCalculator/ec2-enhancement?refid=fa4fa111-b43a-4e17-8976-4c87239c8376

Pricing. (n.d.). DeepAI.org. Retrieved from https://deepai.org/pricing

Redis Cloud Pricing. (2024). Redis Ltd. Retrieved from https://redis.com/cloud/pricing/

AI generative tools usage and other resource usage

#	ChatGPT Prompt / resource	Usage	Tool
1	What is a dispatcher in web application development?	Program development	HKBU ChatGPT
2	How can the use of environment variable benefiting to sensitive data protection in web application development?	Page 8, citation added.	HKBU ChatGPT
3	COMP7940 lab4 materials (chatbot.py and ChatGPT_HKBU.py)	Program development	N.A.