

NEWMARK

Newmark CRE Services Pvt. Ltd.

INTERNSHIP REPORT

By: A.Shushrutha

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CHAPTER-1

ABOUT ORGANIZATION

Introduction:

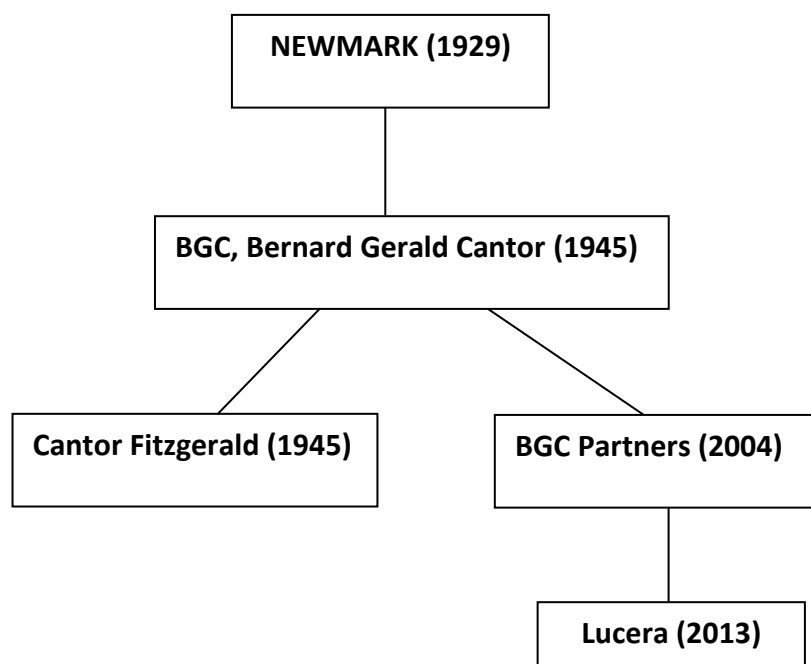
Cantor Fitzgerald, BGC Partners, and Newmark Companies are three prominent entities in the financial services industry.

The relationship between these companies can be traced back to their common origins.

- Cantor Fitzgerald and BGC Partners were both founded by Howard Lutnick, and they were initially part of the same company. However, following the events of September 11, 2001, where Cantor Fitzgerald tragically lost many employees in the World Trade Center attacks, the firm restructured and formed two separate entities: Cantor Fitzgerald and BGC Partners.
- While BGC Partners and Cantor Fitzgerald are now distinct entities, they maintain close ties. BGC Partners acts as a broker-dealer for Cantor Fitzgerald's products and services. Additionally, Cantor Fitzgerald owns a significant stake in BGC Partners.
- Newmark is a subsidiary of BGC Partners. It operates as a separate business unit within the BGC Partners family and focuses exclusively on commercial real estate services.

Each organization plays a significant role within its respective sector, offering a wide range of services to clients worldwide.

This report provides a comprehensive overview of these four companies.



1.1 NEWMARK



Newmark Group Inc. is a commercial real estate advisory and services firm headquartered in New York City. It operates as Newmark and is listed on the NASDAQ Global select market under the symbol 'NMRK'. Newmark was founded in 1929 in Manhattan by 'Dave Newmark'. The CEO of Newmark is 'Barry M Gosin'. Newmark parent organization is 'Cantor FitzGerald'. Newmark operates in 170 locations as of 2022, serving clients worldwide. According to Real capital Analytics, Newmark was the **Third-largest** investment broker in the Americas in 2020 measured by sell-side investment sales activity.

Newmark offers comprehensive real estate **services**, including:

- Capital Markets
- Global Corporate Services
- Industrial and Logistics services
- Landlord Representation
- Property Management
- Retail Services
- Tenant Representation
- Valuation & Advisory

1.2 CANTOR FITZGERALD



- Cantor Fitzgerald, L.P. is an American financial services firm that was founded in 1945 by Bernard Gerald Cantor and John Fitzgerald as an investment bank and brokerage business.
- It specializes in institutional equity, fixed-income sales, and trading, and serving the middle market with investment banking services, prime brokerage, and commercial real estate financing.
- It is also active in new businesses, including advisory and asset management services, gaming technology and e-commerce.
- Cantor Fitzgerald is one of 24 special firms that can trade with the Federal Reserve Bank of New York.
- Cantor Fitzgerald's 1,600 employees work in more than 30 locations, including financial centers in the Americas, Europe, Asia-Pacific, and the Middle East.
- Together with its affiliates, Cantor Fitzgerald operates in more than 60 offices in 20 countries and has more than 12,500 employees.
- In 2001, the firm's headquarters were destroyed in September 11 attack, killing 658 employees. In 1972, Cantor Fitzgerald builds the world's first computer-assisted screen for trading US Government Securities.
- In 2004, BGC Partners became independent from Cantor Fitzgerald.

1.3 **BGC PARTNERS**



BGC Partners is an American global financial services company based in New York City and London. It was founded in 1945. Bernard Gerald Cantor founded a brokerage service for inter-dealer fixed-income markets. The resulting company was B.G.Cantor and Company, which later became Cantor Fitzgerald. BGC Partners was originally a part of the Cantor Fitzgerald organization, but in 2004 it became a separate entity. In 2008, BGC Partners merged with eSpeed and becomes BGC Partners Inc. BGC Partners business model, and its vision is driven by two key attributes:

- **TALENT:** The talented brokers and employees within our business serve our clients from more than 20 major markets around the world.
- **TECHNOLOGY:** Strategic Investing in technology drives our competitive advantage.

BGC Partners **products** include:

- Commercial real estate
- Fixed-income securities
- Foreign exchange
- Structured Products

1.4 LUCERA



Lucera is a privately held company based in New York. When it was launched, it received initial financial support from Cantor Fitzgerald, a prominent global financial services firm. Furthermore, Cantor Fitzgerald is also an active customer of Lucera. Lucera was founded in 2013 and the CEO is Peter Durkan. The parent organization of Lucera is BGC Partners. Lucera is an industry leading technology service provider delivering performant, secure, and scalable solutions designed to power demanding financial applications.

A high-performance, low latency platform that provides a single API for aggregating and trading across **multiple markets** – FX, Rates, Futures, Crypto, and Credit.

Lucera offers comprehensive **services** including:

- Technical and Industry Expertise
- Faster Time-To-Market
- Platform as a Service
- Scalability and Lower costs
- End-To-End Visibility
- Security and Stability

1.5 Conclusion:

- My internship experience has provided me with valuable insights into the interconnected world of BGC Partners, Newmark, and Cantor Fitzgerald. These three companies, born out of a tragic event, have evolved into prominent entities within the financial services industry.
- Throughout my internship, I observed the close relationship and collaboration between BGC Partners and Cantor Fitzgerald.
- The lessons I have learned will undoubtedly shape my future endeavors and contribute to my growth as a professional in the finance sector.
- I am grateful for the opportunity to have been part of these dynamic organizations and to witness firsthand the resilience and transformation that have shaped BGC Partners, Newmark, and Cantor Fitzgerald into the industry leaders they are today.

CHAPTER-2

AZ-900 MICROSOFT AZURE FUNDAMENTALS

2.1 INTRODUCTION:

During my internship program, I had the opportunity to enhance my skills through training in Microsoft Azure Fundamentals Course, as Newmark and Cantor Fitzgerald use Microsoft Tools. The purpose of this course was to provide us with a basic understanding of Azure and its core services.

This report aims to provide an overview of the Azure Fundamentals course and highlight the key topics covered in the training.

2.2 COURSE OVERVIEW:

- Getting Started with Azure
- Cloud Concepts
- Azure Architecture
- Compute and Networking (Core Services)
- Storage – Database
- Security
- Authentication and Authorization
- Monitoring and Management
- Pricing and Support

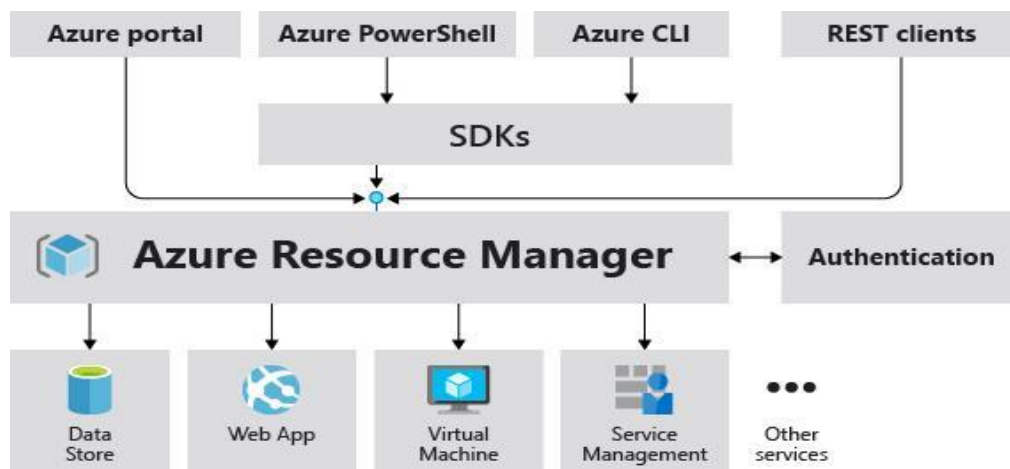


2.2.1 GETTING STARTED WITH AZURE: Azure Portal, CLI, Power Shell, Cloud Shell, ARM

In this section I have learnt about

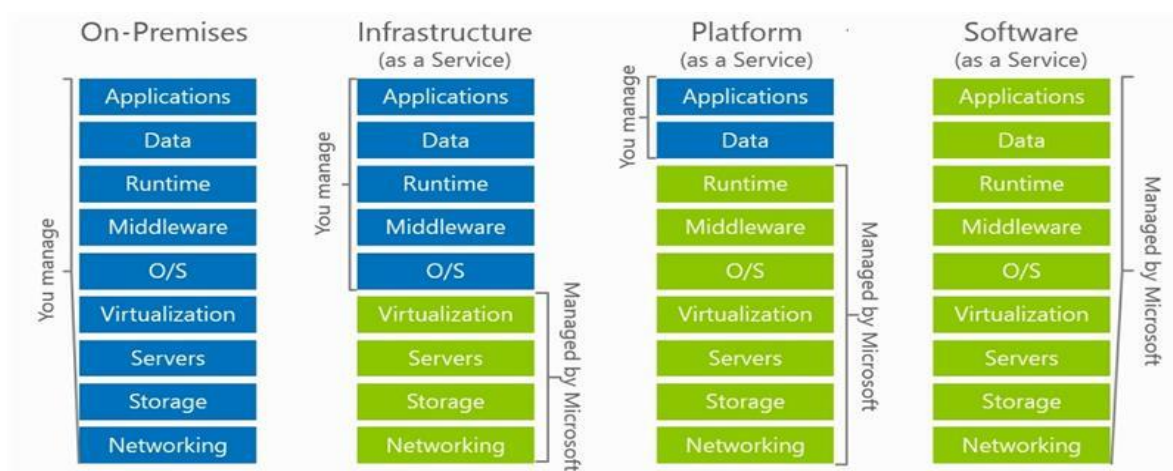
- **Azure portal**, which is a web-based interface provided by Microsoft for managing and interacting with Azure resources.
- **Azure CLI**, which is a command-line tool that allows us to manage Azure resources using commands in a terminal or command prompt.
- **PowerShell**, which is a powerful scripting language and automation framework developed by Microsoft.
- **Cloud shell**, which is an interactive, browser-accessible shell environment provided by Microsoft.

- **Azure Resource Manager**, which is the deployment and management framework for Azure resources.



2.2.2 CLOUD CONCEPTS:

- In this section I was introduced to cloud computing concepts, providing a clear understanding of the benefits and advantages of utilizing cloud services.
- I learned about scalability, elasticity, and cost-efficiency, which are fundamental aspects of cloud computing.
- Furthermore, the course introduced me to the different cloud service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).
- I also explored various deployment models, including public, private, and hybrid clouds, and their respective use cases.

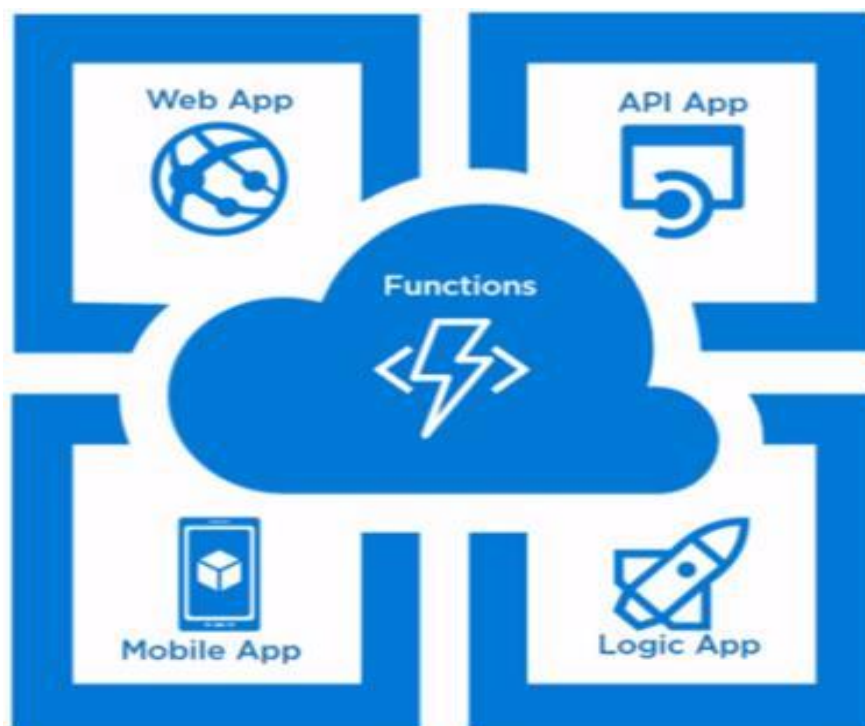


2.2.3 AZURE ARCHITECTURE:

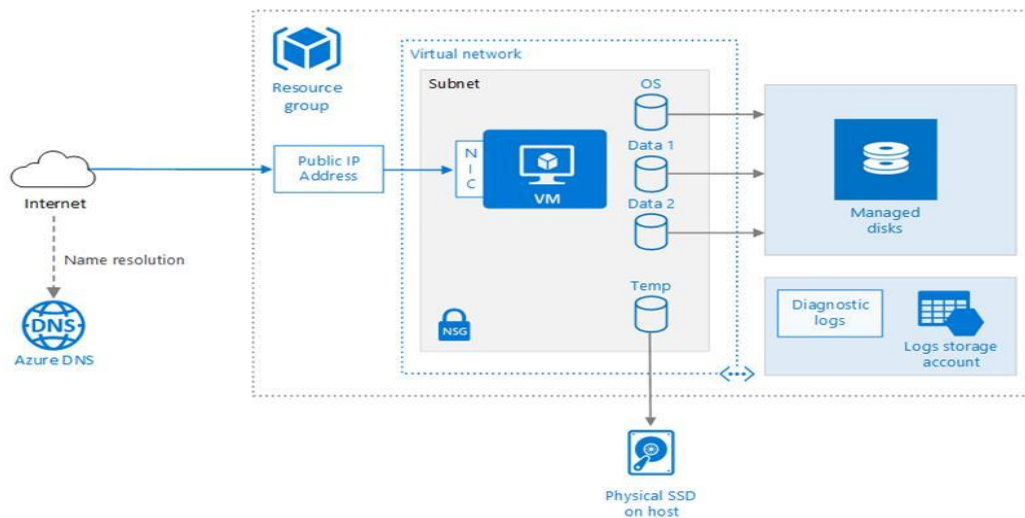
- Understanding the Azure architecture was a key focus of the course. I gained insights into the global infrastructure of Azure: Azure Resource Manager (ARM) model, including its regions and availability zones.
- The course explained Azure subscriptions and resource groups, resources, and resource providers which proved valuable for organizing and managing Azure resources effectively.
- Moreover, I learned about Azure management groups and policies, which enable governance and control across multiple subscriptions.

2.2.4 Compute and Networking (Core Services):

- This section focuses on the core compute and networking services offered by Azure.
- I received in-depth knowledge about virtual machines (VMs), including how to create, configure, and manage them, also about virtual machine scale sets, enabling me to provision and manage compute resources efficiently.
- Additionally, I explored Azure App Services, a powerful platform for developing and hosting web and mobile applications.
- The course also emphasized networking concepts, such as virtual networks, subnets, and network security groups, allowing me to understand how to establish connectivity between on-premises networks and Azure using VPN gateways.



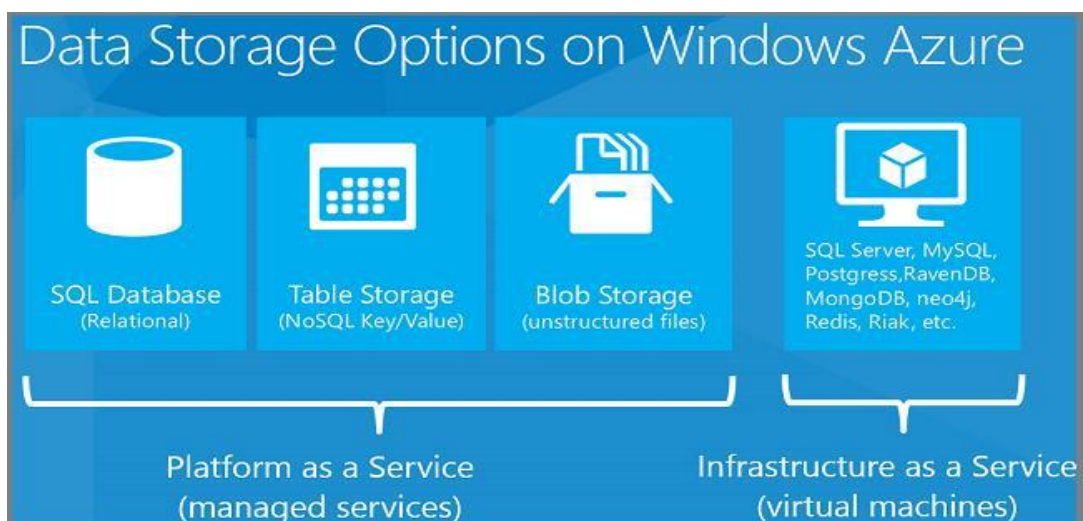
Azure App services



Azure Virtual Machines and Virtual Subnets

2.2.5 STORAGE-DATABASE:

- Azure provides various storage options, and this section explores them in detail.
- I learned about various storage services, including Blob storage which is used to store unstructured data such as images and documents, File storage, Azure Files, Tables, Queues and Azure Disk Storage.
- Moreover, the course introduced me to Azure databases, such as Azure SQL Database, Azure Cosmos DB, and Azure Database for MySQL and PostgreSQL.
- This knowledge helped me differentiate between these storage options and identify the most appropriate choice for specific use cases.



2.2.6 SECURITY:

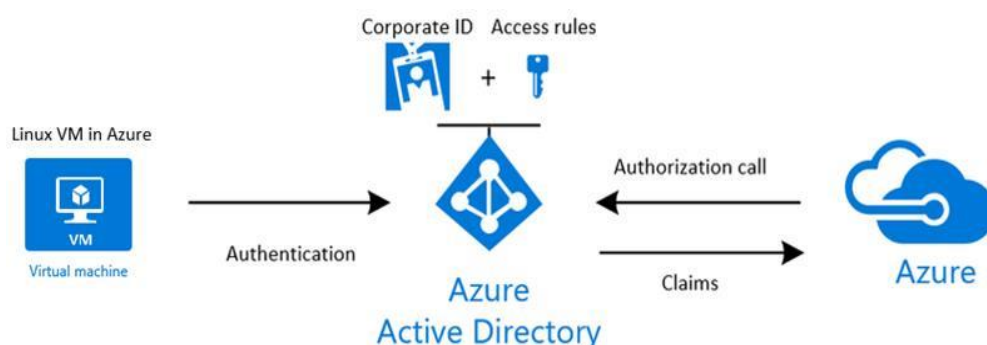
Security is a critical aspect of cloud computing, and this section emphasizes best practices for securing Azure resources.

- I gained an understanding of Azure Active Directory (Azure AD), which enables identity and access management for Azure resources.
- The course provided insights on managing users, groups, and roles within Azure AD.
- I also explored Azure Security Centre, which assists in monitoring and protecting Azure resources against potential threats.
- Additionally, I gained knowledge about network security groups, Azure Firewall, and Azure DDoS Protection, essential components in ensuring the security of our Azure deployments.



2.2.7 AUTHENTICATION AND AUTHORIZATION:

- This section focuses on authentication and authorization mechanisms in Azure.
- I learned about various Azure AD authentication options, including multi-factor authentication (MFA) and conditional access policies.
- I was introduced to the concept of role-based access control (RBAC) and how to assign and manage roles within Azure, providing me with the necessary tools to ensure appropriate access control across our Azure resources.



2.2.8 MONITORING AND MANAGEMENT:

- The monitoring and management module focused on Azure Monitor, a comprehensive solution for monitoring and diagnosing Azure resources.
- I gained insights into setting up alerts and dashboards to monitor resource performance and availability effectively.
- The course also introduced Azure Log Analytics, enabling centralized logging and analysis of data from various Azure services.
- Furthermore, we explored Azure Automation, which allows for the automation of common management tasks through runbooks and configurations, streamlining our operations.

2.2.9 PRICING AND SUPPORT:

- The pricing and support module provides an overview of Azure pricing models, including pay-as-you-go, reserved instances, and Azure Hybrid Benefit.
- Additionally, we explored Azure support options and resources, such as Azure Service Health and Azure Advisor, which provided valuable recommendations for optimizing and troubleshooting our Azure deployments.

2.3 CONCLUSION:

- The Azure Microsoft Fundamentals course really helped me understand how Azure can benefit organizations by offering improved scalability, flexibility, and cost-effectiveness.
- Throughout the course, I got to explore core Azure services like virtual machines, storage, networking, and databases, which allowed me to effectively deploy and manage resources.
- Learning about important topics such as security, identity management, and compliance made me realize just how crucial it is to create secure cloud environments.
- The course also provided insights into monitoring and management tools and techniques, empowering me to monitor Azure resources, troubleshoot issues, and implement efficient management practices. Now I feel confident in my ability to leverage Azure's capabilities and make informed decisions for my organization's cloud initiatives.

CHAPTER-3

PROJECT REPORT

PROJECT TITLE & INTRODUCTION

Project-1: Provide Administrative Interface to LumeFX Modules

Objective:

The project aims to develop an administrative interface that allows users to query the internal state of various processes within LumeFX.

Key Functionality:

The interface will provide users with real-time information, such as the status of an order, specific configurations, and the current order book status, etc.

Purpose:

The administrative interface will streamline operations, enhance decision-making processes, and improve overall efficiency at LumeFX.

Integration:

The interface will integrate with relevant LumeFX modules to access and utilize their data and functionalities.

User Experience:

The interface will be designed to be user-friendly, providing authorized users with seamless navigation and easy access to desired information.

Project-2: Proof of Concept to Use ChatGPT OpenAI for LumeFX

Objective:

The project aims to explore the feasibility and benefits of integrating ChatGPT, a natural language processing model, into LumeFX operations.

Potential Applications:

ChatGPT will enable the development of a chat interface, allowing users to interact naturally and access relevant information.

Training on Knowledge Base:

ChatGPT will be trained on LumeFX's (Atlassian Confluence) proprietary knowledge base, enabling it to provide accurate responses to user queries.

User Benefits:

The integration of ChatGPT will enhance user experience, productivity, and operational efficiency within the LumeFX system.

Implementation Details:

The report will discuss the methodology used to train the ChatGPT model, including data preprocessing, fine-tuning, and any customizations made.

Chat Interface:

The report will cover the implementation of the chat interface, focusing on user experience design and ease of information retrieval.

Future Considerations:

Potential future enhancements and scalability considerations for integrating ChatGPT into LumeFX's operations will be discussed.

PROJECT SUPERVISOR:

Mr. Naik Nagaraj, Senior C++ Engineer, Lucera-Development, served as my supervisor throughout the project.

COLLABORATION AND SUPPORT:

Additionally, Mr. Procacci, Paul: Systems Administrator, Lucera – Infrastructure, has helped us in generating SSH Key pairs and provided Lucera Lab Server Access.

TOOLS USED:

- Vs Code IDE
- Jupyter Notebook
- Google Colab

OPERATING SYSTEM AND LANGUAGES USED:

- Operating System: Unix
- Languages: Python, C++

KEY LEARNINGS:

The projects provided an excellent opportunity to gain hands-on experience and several valuable insights and skills. Some of the key learnings from these projects include:

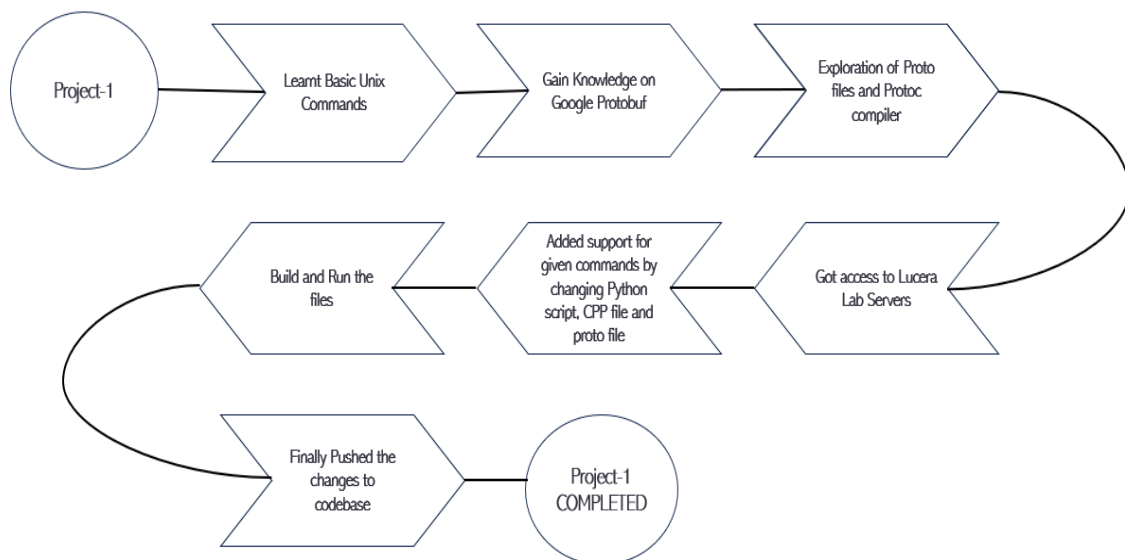
- Basic Unix Commands
- G-Test
- Google Protobuf
- Protobufs and Protoc compiler
- Chatgpt3 API Courses:
 - (i) ChatGPT Prompt Engineering for Developers
 - (ii) Building Systems with the ChatGPT API

PROJECT AND STATUS

PROJECT-1: Provide Administrative Interface to LumeFX Modules

S no.	Details	Description
1.	Project	Provide Administrative Interface to LumeFX Modules
2.	Assigned	Nagaraj Naik
3.	Tools and Languages Used	Putty, Python, C++
4.	Access Given	Lucera Lab Server
5.	Progress	Completed

MILESTONES

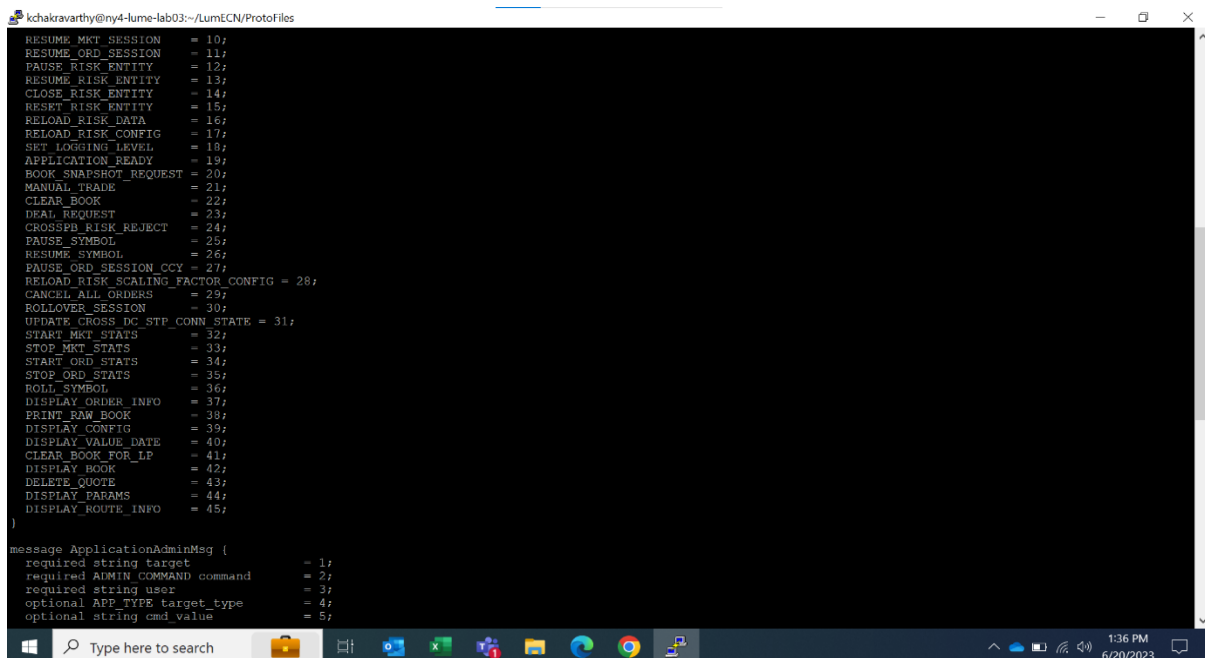


Approach: Adding changes to files to support new administrative commands.

- **Step-1:** I have created a proto file for the commands.
- **Step-2:** Ran the protoc compiler.
- **Step-3:** Created the Python file to add support to the commands.
- **Step-4:** Compiled and Tested the files.
- **Step-5:** After getting the required output, I have pushed my changes into the codebase.

The following are the commands that I have added:

- DISPLAY_ORDER_INFO
- PRINT_RAW_BOOK
- DISPLAY_CONFIG
- DISPLAY_VALUE_DATE
- CLEAR_BOOK_FOR_LP
- DISPLAY_BOOK
- DELETE_QUOTE
- DISPLAY_PARAMS
- DISPLAY_ROUTE_INFO



```
kchakravarthy@ny4-lume-lab03:~/LumECN/ProtoFiles
RESUME_MKT_SESSION = 10;
RESUME_ORD_SESSION = 11;
PAUSE_RISK_ENTITY = 12;
RESUME_RISK_ENTITY = 13;
CLOSE_RISK_ENTITY = 14;
RESET_RISK_ENTITY = 15;
RELOAD_RISK_DATA = 16;
RELOAD_RISK_CONFIG = 17;
SET_LOGGING_LEVEL = 18;
APPLICATION_READY = 19;
BOOK_SNAPSHOT_REQUEST = 20;
MANUAL_TRADE = 21;
CLEAR_BOOK = 22;
DEAL_REQUEST = 23;
CROSSPB_RISK_REJECT = 24;
PAUSE_SYMBOL = 25;
RESUME_SYMBOL = 26;
PAUSE_ORD_SESSION_CCY = 27;
RELOAD_RISK_SCALING_FACTOR_CONFIG = 28;
CANCEL_ALL_ORDERS = 29;
ROLLOVER_SESSION = 30;
UPDATE_CROSS_DC_STP_CONN_STATE = 31;
START_MKT_STATS = 32;
STOP_MKT_STATS = 33;
START_ORD_STATS = 34;
STOP_ORD_STATS = 35;
ROLL_SYMBOL = 36;
DISPLAY_ORDER_INFO = 37;
PRINT_RAW_BOOK = 38;
DISPLAY_CONFIG = 39;
DISPLAY_VALUE_DATE = 40;
CLEAR_BOOK_FOR_LP = 41;
DISPLAY_BOOK = 42;
DELETE_QUOTE = 43;
DISPLAY_PARAMS = 44;
DISPLAY_ROUTE_INFO = 45;
}

message ApplicationAdminMsg {
    required string target = 1;
    required ADMIN_COMMAND command = 2;
    required string user = 3;
    optional APP_TYPE target_type = 4;
    optional string cmd_value = 5;
}
```

Successfully added the admin commands

The files in which I have made changes are:

- Streamfx_discovery.proto
- Send_admin_command.py
- TakerProcessor.cpp
- lume_testing.py
- MsgFields.h
- test_admin.py
- send_admin_command.sh

After making the required changes we have built and run the files, after successful compilation we pushed our changes. Following is the code snippet:

```
-----
Running Tests
-----
Environment Name: local
Test Suite Directory: ['tests/integration', 'tests/onboarding', 'tests/performance', 'tests/tutorials', 'tests/manual']
Test Suite Pattern: tests/integration/admin/test_admin.py
Test Case Pattern: ALL
SFX_INSTALL_PATH: /home/kchakravarthy/lumefx
LogFile Dir: results/logs_06262023_05_34_00_local

==> Running test suite 'tests/integration/admin/test_admin.py'
* Running clear_book : [ OK ] (11.589s)
* Running clear_book_for_lp : [ OK ] (14.398s)
* Running delete_quote : [ OK ] (14.691s)
* Running display_book : vethd36f3c7: error fetching interface information: Device not found
[ OK ] (14.070s)
* Running display_config : [ OK ] (14.296s)
* Running display_order_info : [ OK ] (15.243s)
* Running display_params : [ OK ] (14.590s)
* Running display_route_info : [ OK ] (13.837s)
* Running display_value_date : [ OK ] (13.796s)
* Running print_raw_book : [ OK ] (13.638s)

Ran 10 tests, 10 succeeded, 0 failed (0 expected), 0 skipped (140.750s total)

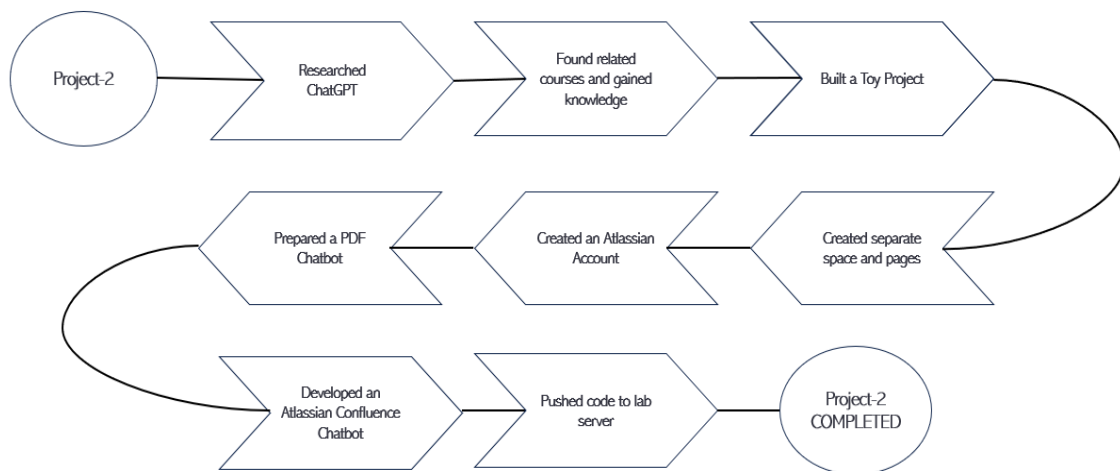
Summary: Ran 1 test suite, 10 tests, 10 succeeded, 0 failed (0 expected), 0 skipped
[kchakravarthy@ny4-lume-lab03 AutoTest]$
```

STATUS: COMPLETED

PROJECT-2: Proof of Concept to Use ChatGPT OpenAI for LumeFX

S no.	Details	Description
1.	Project	Proof of Concept to Use ChatGPT OpenAI for LumeFX
2.	Assigned	Nagaraj Naik
3.	Tools and Languages Used	Google Colab, VS Code, Python
4.	Access Given	Atlassian Confluence
5.	Progress	Completed

MILESTONES



Problem Statement:

I was assigned the task of creating a ChatGPT model specifically for our business domain (Confluence), which refers to collective knowledge, information, and documents relevant to the company's operations and processes.

Introduction:

- ChatGPT, short for Chat Generative Pre-Trained Transformer, is an advanced language model powered by artificial intelligence.
- It utilizes the GPT architecture, which stands for Generative Pre-trained Transformer, to generate human-like text based on the input it receives.
- ChatGPT has been widely used in various domains, including technology and the corporate field, due to its ability to understand and respond to user queries in a conversational manner.
- In the present technological landscape, ChatGPT models are employed in a range of applications.
- They are used in customer support systems, where they can handle frequently asked questions, provide automated assistance, and resolve common issues without human intervention.
- ChatGPT models are also utilized in chatbot development, enhancing the user experience by providing personalized responses and engaging in natural language conversations.
- In the corporate field, ChatGPT finds utility in multiple areas.
- It can be utilized for internal knowledge management, allowing employees to access information, guidelines, and company policies through conversational interfaces.
- ChatGPT can assist in streamlining communication within organizations, enabling employees to obtain quick answers to their queries and facilitating collaboration across teams.

User's Guide:

- The integration of our trained ChatGPT3 model with our Confluence platform brings numerous benefits to our users.
- By leveraging the power of conversational AI, employees within our organization can now effortlessly access and retrieve information from our knowledge base.
- This eliminates the need for manual navigation through Confluence, saving valuable time and effort.

- With the ability to engage in natural language conversations, the ChatGPT3 model provides a user-friendly and intuitive experience.
- Users can ask questions in their own words, and the model generates contextually relevant responses, ensuring accurate and helpful information.
- This enhanced knowledge access empowers employees to quickly find documents, guidelines, and resources, enabling them to work more efficiently.
- The virtual assistant-like capabilities of the ChatGPT3 model also offer real-time support, allowing employees to receive prompt answers to their queries related to company policies, procedures, or any other information stored in Confluence.
- Overall, the integration of ChatGPT3 with Confluence streamlines information retrieval, enhances productivity, and promotes effective knowledge management within our organization.

Advantages:

- Improved Client Support
- Enhanced Productivity
- Scalability
- Personalized User Experience

Security Issues Faced:

- When we tried to access the confluence data, we faced issues for accessing the content as Confluence data is very confidential and protected with high security.

Challenges Faced:

Error-1: RateLimitError

- Rate limit error occurs when a user or application exceeds the allowed number of requests or operations within a specific time.
- It is a mechanism implemented by service providers to prevent abuse, protect their infrastructure, and ensure fair usage for all users.
- Rate limits are commonly used in various APIs, web services, and online platforms.

```
db = FAISS.from_documents(chunks, embeddings)

WARNING:langchain.embeddings.openai:Retrying langchain.embeddings.openai.embed_with_retry.<locals>._embed_with_retry in 4.0 seconds as it raised RateLimitError: Rate limit reached for default-text-embedding-ada-002 in organization org-r1c1McivH1f1FBjKwbRd111o on tokens per min. Limit: 150000 / min. Current: 1 / min. Contact us through our help center at help.openai.com if you continue to have issues. Please add a payment method to your account to increase your rate limit. Visit https://platform.openai.com/account/billing to add a payment method.
WARNING:langchain.embeddings.openai:Retrying langchain.embeddings.openai.embed_with_retry.<locals>._embed_with_retry in 4.0 seconds as it raised RateLimitError: Rate limit reached for default-text-embedding-ada-002 in organization org-r1c1McivH1f1FBjKwbRd111o on tokens per min. Limit: 150000 / min. Current: 1 / min. Contact us through our help center at help.openai.com if you continue to have issues. Please add a payment method to your account to increase your rate limit. Visit https://platform.openai.com/account/billing to add a payment method.
WARNING:langchain.embeddings.openai:Retrying langchain.embeddings.openai.embed_with_retry.<locals>._embed_with_retry in 4.0 seconds as it raised RateLimitError: Rate limit reached for default-text-embedding-ada-002 in organization org-r1c1McivH1f1FBjKwbRd111o on tokens per min. Limit: 150000 / min. Current: 1 / min. Contact us through our help center at help.openai.com if you continue to have issues. Please add a payment method to your account to increase your rate limit. Visit https://platform.openai.com/account/billing to add a payment method.
WARNING:langchain.embeddings.openai:Retrying langchain.embeddings.openai.embed_with_retry.<locals>._embed_with_retry in 8.0 seconds as it raised RateLimitError: Rate limit reached for default-text-embedding-ada-002 in organization org-r1c1McivH1f1FBjKwbRd111o on tokens per min. Limit: 150000 / min. Current: 1 / min. Contact us through our help center at help.openai.com if you continue to have issues. Please add a payment method to your account to increase your rate limit. Visit https://platform.openai.com/account/billing to add a payment method.
WARNING:langchain.embeddings.openai:Retrying langchain.embeddings.openai.embed_with_retry.<locals>._embed_with_retry in 10.0 seconds as it raised RateLimitError: Rate limit reached for default-text-embedding-ada-002 in organization org-r1c1McivH1f1FBjKwbRd111o on tokens per min. Limit: 150000 / min. Current: 1 / min. Contact us through our help center at help.openai.com if you continue to have issues. Please add a payment method to your account to increase your rate limit. Visit https://platform.openai.com/account/billing to add a payment method.

RateLimitError                                Traceback (most recent call last)
<ipython-input-9-f21d82b933e8> in <cell line: 5>()
      3
      4 # Create vector database
----> 5 db = FAISS.from_documents(chunks, embeddings)

17 frames
/usr/local/lib/python3.10/dist-packages/openai/api_requestor.py in _interpret_response_line(self, rbody, rcode, rheaders, stream)
    761     stream_error = stream and "error" in resp.data
    762     if stream_error or not 200 <= rcode < 300:
--> 763         raise self.handle_error_response(
    764             rbody, rcode, resp.data, rheaders, stream_error=stream_error
    765         )

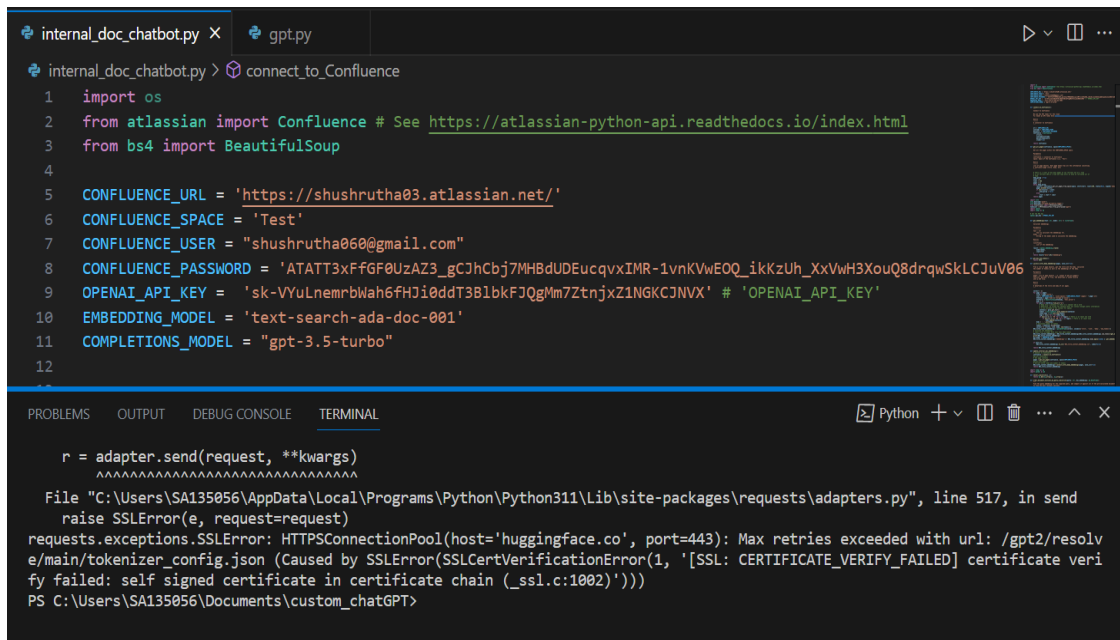
RateLimitError: Rate limit reached for default-text-embedding-ada-002 in organization org-r1c1McivH1f1FBjKwbRd111o on tokens per min. Limit: 150000 / min. Current: 1 / min. Contact us through our help center at help.openai.com if you continue to have issues. Please add a payment method to your account to increase your rate limit. Visit https://platform.openai.com/account/billing to add a payment method.
```

Problem Solution:

- As we are using a free account, we get a limited number of requests per minute (two), so we tried doing it after waiting for few minutes. This took us longer time than expected.

Error-2: SSL Error

- SSL errors indicate that there is a problem with the encryption and authentication process, which can lead to a compromised or insecure connection.
- As we are connected to VPN, I encountered this error.



```
internal_doc_chatbot.py X gpt.py
internal_doc_chatbot.py > connect_to_Confluence
1 import os
2 from atlassian import Confluence # See https://atlassian-python-api.readthedocs.io/index.html
3 from bs4 import BeautifulSoup
4
5 CONFLUENCE_URL = 'https://shushrutha03.atlassian.net/'
6 CONFLUENCE_SPACE = 'Test'
7 CONFLUENCE_USER = "shushrutha060@gmail.com"
8 CONFLUENCE_PASSWORD = 'ATATT3xFfGF0UzAZ3_gCJhCb7MHbDUeucqvxIMR-1vnKVwEOQ_ikKzUh_XxVwH3XouQ8drqwSkLCJuV06'
9 OPENAI_API_KEY = 'sk-VYuLnemrbWah6fHJi0ddT3B1bkFJQgMm7ZtnjxZ1NGKCJNVX' # 'OPENAI_API_KEY'
10 EMBEDDING_MODEL = 'text-search-ada-doc-001'
11 COMPLETIONS_MODEL = "gpt-3.5-turbo"
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```

ApiPermissionError

atlassian.errors.ApiPermissionError: The calling user does not have permission to view the content

Traceback (most recent call last)

```
File "C:\Users\KC135058\AppData\Local\Programs\Python\Python311\Lib\site-packages\atlassian\confluence.py", line 532, in get_all_pages_from_space_raw
    response = self.get(url, params=params)
    ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
```

```
File "C:\Users\KC135058\AppData\Local\Programs\Python\Python311\Lib\site-packages\atlassian\rest_client.py", line 285, in get
    response = self.request(
```

```
File "C:\Users\KC135058\AppData\Local\Programs\Python\Python311\Lib\site-packages\atlassian\rest_client.py", line 257, in request
    self.raise_for_status(response)
    ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
```

```
File "C:\Users\KC135058\AppData\Local\Programs\Python\Python311\Lib\site-packages\atlassian\confluence.py", line 3087, in raise_for_status
    raise HTTPError(error_msg, response=response)
    ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
```

During handling of the above exception, another exception occurred:

```
File "C:\Users\KC135058\AppData\Local\Programs\Python\Python311\Lib\site-packages\flaskapp.py", line 2213, in __call__
    return self.wsgi_app(environ, start_response)
    ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
```

```
File "C:\Users\KC135058\AppData\Local\Programs\Python\Python311\Lib\site-packages\flaskapp.py", line 2193, in wsgi_app
    response = self.handle_exception(e)
    ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
```

Problem Solution:

- We checked confluence page for permissions and given all the necessary permissions required for user.

Approach:

I have created a model by leveraging an existing model. To accomplish this task, I have followed a two-step approach.

➤ Step-1:

Training with PDF as Source: Initially, I trained the model using PDF as a source of information. This likely involved using the PDF data to train the model and familiarize it with the content and language used in the business domain.

1. To train the ChatGPT model, I utilized Python code and installed the required libraries.
2. Data preprocessing involved extracting text from PDF sources, cleaning the data, and tokenizing it for further processing.
3. The model training process consisted of initializing the model architecture, defining the training loop, and loading the processed PDF data using code like the following snippet:

```

chat_history = []

def on_submit(_):
    query = input_box.value
    input_box.value = ""

    if query.lower() == 'exit':
        print("Thank you for using the State of the Union chatbot!")
        return

    result = qa({"question": query, "chat_history": chat_history})
    chat_history.append((query, result['answer']))

    display(widgets.HTML(f'<b>User:</b> {query}'))
    display(widgets.HTML(f'<b><font color="blue">Chatbot:</font></b> {result["answer"]}'))

print("Welcome to the Atlassian support chatbot! Type 'exit' to stop.")

input_box = widgets.Text(placeholder='Please enter your question:')
input_box.on_submit(on_submit)

display(input_box)

```

Following is the output:

```

input_box.on_submit(on_submit)

display(input_box)

```

Welcome to the Atlassian Support chatbot! Type 'exit' to stop.

Please enter your question:

User: what does HELP command do

Chatbot: The HELP command displays all available commands.

User: what does help do

Chatbot: The HELP command displays all available commands, which are: DISPLAY_ORDER_INFO, Print raw book, Clear book for a LP, Clear full book, Delete quote for an LP, QuoteID, Display params, Display value date, Display config, and Display route info.

User: what are the arguments for display_order_info

Chatbot: The argument for the DISPLAY_ORDER_INFO command is GroupID or ClientOrderID.

User: what are the questions can be raised according to given data

Chatbot: Questions that can be raised based on the given data include: Should the output be dumped in a log or sent back to the user? Should any additional commands be added? What should the argument for the Display Order Info command be? What should the output of the Display Order Info command be?

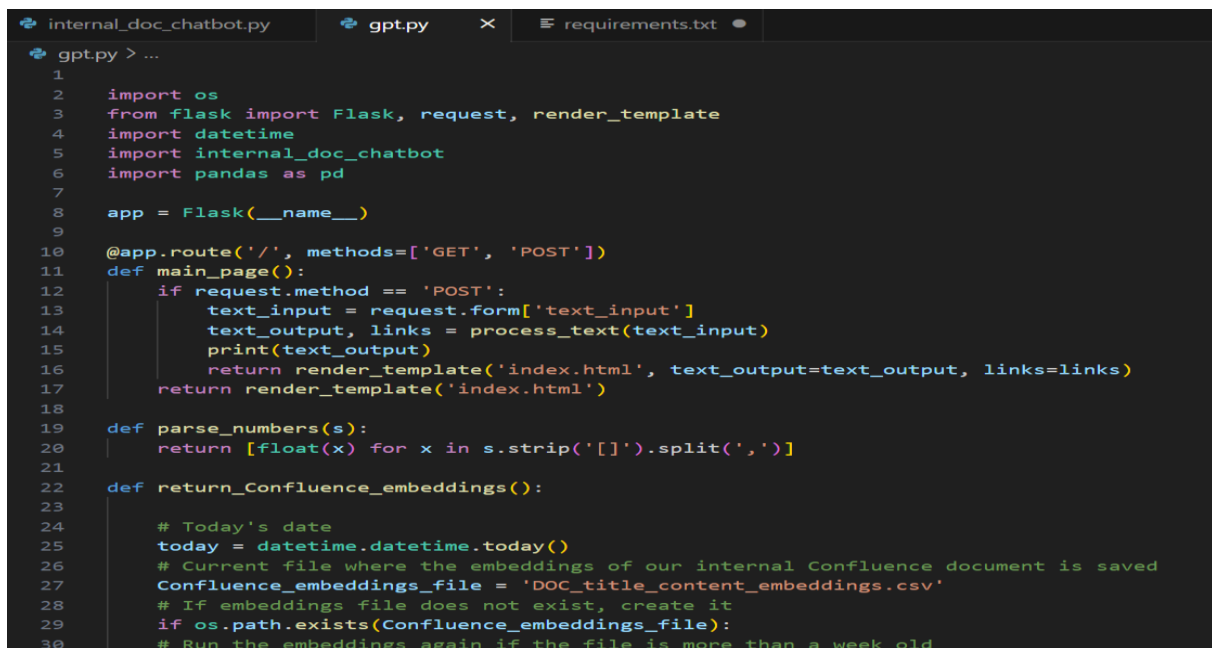
Libraries used:

- pypdf
- pandas
- matplotlib
- tiktoken
- texttract
- transformers
- OpenAI
- faiss-cpu

➤ Step-2:

Providing Confluence as a Source: After training the initial model, I fed My confluence data into it. This means I have inputted my own information, documents, or knowledge base into the model to make it more relevant and tailored to my needs.

1. To incorporate our confluence into the trained model, I developed code scripts that read and process internal documents, transforming them into a format suitable for training and inference.
2. Customization of the model was achieved by fine-tuning its parameters using code that adjusted hyperparameters and incorporated additional training data from our confluence.
3. The integration of confluence involved feeding the processed documents into the model's training pipeline through code like the following snippet:



```
internal_doc_chatbot.py  gpt.py  requirements.txt
gpt.py > ...
1
2 import os
3 from flask import Flask, request, render_template
4 import datetime
5 import internal_doc_chatbot
6 import pandas as pd
7
8 app = Flask(__name__)
9
10 @app.route('/', methods=['GET', 'POST'])
11 def main_page():
12     if request.method == 'POST':
13         text_input = request.form['text_input']
14         text_output, links = process_text(text_input)
15         print(text_output)
16         return render_template('index.html', text_output=text_output, links=links)
17     return render_template('index.html')
18
19 def parse_numbers(s):
20     return [float(x) for x in s.strip('[]').split(',')]
21
22 def return_Confluence_embeddings():
23
24     # Today's date
25     today = datetime.datetime.today()
26     # Current file where the embeddings of our internal Confluence document is saved
27     Confluence_embeddings_file = 'DOC_title_content_embeddings.csv'
28     # If embeddings file does not exist, create it
29     if os.path.exists(Confluence_embeddings_file):
30         # Run the embeddings again if the file is more than a week old
```


Following is the Output Interface:

Internal Confluence Chatbot

This is an exploratory use of ChatGPT on our internal Confluence documentation. Basically, we modify in the background your question to add some context.

The context is that of a Confluence note that appears to be the most similar to the question. Similarity in Natural Language Processing (NLP) is resolved by converting a text into a vector, also called embeddings, and a simple vector similarity metric is used to identify texts that are similar.

Once the most similar document is found, its content is added to the prompt. ChatGPT uses then the context to answer the question.

Although not perfect, the tool can provide a more useful choice for the document (or documents) to look at to answer your question with more depth.

Try it!

Type your question:

What are the new commands to be added?

Submit

[Also See](#)

STATUS: COMPLETED

Learnings & Experiences

- My internship experience involved working extensively with Linux commands to develop an administrative interface for LumeFX Modules.
- This allowed me to gain valuable hands-on experience in system administration and deepen my understanding of Linux operating systems.
- Throughout the internship, I successfully implemented various Linux commands to provide a user-friendly interface for managing LumeFX Modules.
- This involved creating commands to configure and monitor the modules, as well as handling administrative tasks efficiently.
- By leveraging my knowledge of Linux systems, I was able to enhance the functionality and usability of the modules.
- In addition to the Linux command-line interface work, I also explored the integration of ChatGPT, an OpenAI model, for LumeFX.
- I worked on a proof of concept to demonstrate how chatGPT can be utilized to enhance the user experience and provide interactive assistance to users interacting with LumeFX Modules.
- This endeavor allowed me to explore the potential of natural language processing and artificial intelligence in the field of lighting control systems.

Conclusion:

- Overall, this internship has provided me with a valuable opportunity to apply my skills and knowledge in Linux administration and explore emerging technologies.
- Through my work on the administrative interface and the proof of concept utilizing chatGPT, I have gained practical experience in software development, system administration, and artificial intelligence integration.
- I believe that the solutions developed during my internship will greatly contribute to the efficiency and usability of LumeFX Modules.
- The administrative interface will simplify the management of the modules, while the integration of chatGPT opens up exciting possibilities for enhanced user interaction and support.

INTERNSHIP SIGNATURE COLLECTION :
ACKNOWLEDGING PROFESSIONAL COLLABORATORS

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Harish Pasupuleti		