AFOUR
TECHNOLOGIES

Date: 26 May 2023

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Ankit Kumar Mishra**, student of Master of Computer Applications (MCA) of Goa University, Goa, is currently undergoing his final semester project (Semester IV) at our organization, **AFour Technologies Pvt. Ltd.**, since March 23 and will complete by August 23.

During his tenure so far, he met the expectations of his team lead/mentor/guide and was regular and sincere.
This certificate is being issued on his request to be submitted with the project report at Goa University.

The final internship completion certificate will be provided on completing his internship.

For AFour Technologies Pvt. Ltd.

CHADHA
NEHA RAVISH

Neha Chaddha

Senior HR - Manager

GOA UNIVERSITY

GOA BUSINESS SCHOOL

CERTIFICATE OF EVALUATION

This is to certify that **Mr. Ankit Kumar Mishra** has successfully completed his internship at Afour technologies, Pune, Maharashtra, India, in partial fulfillment of the award of the degree in Master of Computer Application.

Examiner 1

Examiner 2

Place: Goa University
Date: 16/06/2023

Dean, Goa Business School

AFOUR TECHNOLOGIES

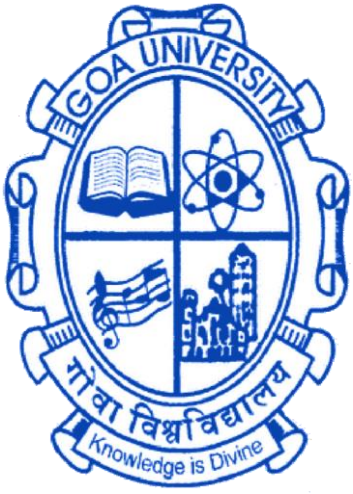
INTERNSHIP REPORT

iSynopsis

ANKIT KUMAR MISHRA

MCA SEMESTER IV

2125



iSynopsis

Completed by

ANKIT KUMAR MISHRA

Roll no: 2125

for the partial fulfillment of

MCA Degree for Semester IV

Discipline of Computer Science and Technology,

Goa Business School,

Goa University.

At

Afour Technologies pvt. ltd

Pune, Maharashtra, India

Under the guidance of

Vijay Makhijani

(Lead Software Development Engineer, Afour tech)

Date: 26 May 2023

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Acknowledgement

I would like to express my deepest gratitude and appreciation to everyone who has supported me throughout the completion of this report.

First and foremost, I would like to extend my sincere thanks to **Vijay Makhijani**, my mentor at Afour Tech. His guidance, expertise, and constant encouragement have been invaluable to me during my internship. I am truly fortunate to have had the opportunity to work under his leadership. His managerial skills, technical knowledge, and commitment to excellence have inspired me and contributed significantly to my professional growth.

I would also like to acknowledge and thank my teammates at AfourTech. **Shiddhesh Girse**, as a senior software engineer, has been an incredible source of knowledge and support. His expertise in the field of AI/ML and his willingness to share his insights have been instrumental in shaping my understanding of the subject. I am grateful for the collaborative and stimulating work environment that my teammates, **Amit Kumar Singh** and **Fahad Abdul**, created. Their dedication, teamwork, and willingness to help have made my internship experience truly enriching.

Furthermore, I would like to express my gratitude to **Goa University** for providing me with the opportunity to intern at Afour Tech. This experience has allowed me to apply the theoretical concepts I learned during my academic studies to real-world projects. I am grateful for the exposure and practical experience that this collaboration has provided, enabling me to enhance my skills and broaden my perspective.

I would also like to acknowledge the faculty members and staff at Goa University who have played a significant role in shaping my academic journey. Their dedication to imparting knowledge and their unwavering support have been instrumental in my growth and development.

Finally, I would like to express my heartfelt appreciation to my family and friends for their unwavering support and encouragement throughout this internship. Their belief in my abilities has been a constant source of motivation.

In conclusion, I am truly grateful to everyone mentioned above and to all those who have contributed to my professional growth. This experience has been invaluable in shaping my understanding of AI/ML and preparing me for future challenges. I am confident that the knowledge and skills I have gained during this internship will continue to guide me in my future endeavors.

Table of Content

Introduction

This report documents my internship experience at Afour, a renowned organization in the field of technology solutions, as a partial fulfillment of the requirements for Semester IV. The internship commenced on March 23 and will conclude on August 23, encompassing a period of three months. Throughout this duration, I had the opportunity to gain practical exposure and apply the knowledge acquired during my academic studies.

The primary objective of this internship was to gain valuable insights into the industry and develop professional skills through hands-on experience. This report serves as a comprehensive record of my activities, contributions, and accomplishments during this period.

The report is structured into several sections, providing a detailed account of my internship journey. It begins with an overview of Afour, including a description of the company's profile and its prominent position within the industry. Following that, I outline my designated role within the organization, highlighting the responsibilities and tasks assigned to me.

The problem statement section presents an overview of the specific challenge or project I worked on during my internship. It describes the scope, objectives, and significance of the project, providing a clear context for the subsequent sections.

Throughout the report, I elaborate on the contributions I made to the project, detailing the various tasks undertaken and the outcomes achieved. Additionally, I discuss the tools and technologies employed during the internship, showcasing my proficiency and adaptability in utilizing these resources effectively.

The report also includes screenshots and visual representations that provide a visual demonstration of the work completed. These visuals enhance the understanding of the projects and provide a tangible representation of the outcomes achieved.

In addition to the primary project, I had the opportunity to engage in other supplementary tasks, which are outlined in the "Other Additional Tasks" section.

These tasks allowed me to expand my skill set and contribute to diverse aspects of the organization's operations.

Furthermore, the report presents an overview of the knowledge I gained throughout the internship, highlighting the specific skills, industry insights, and practical experience acquired during this period. This knowledge will undoubtedly prove beneficial as I progress further in my academic and professional journey.

The conclusions and summary section provides a comprehensive wrap-up of the internship experience, encapsulating the key findings, lessons learned, and personal reflections. It serves as a reflection of my growth and development over the course of the internship.

The report concludes with an internship timeline, outlining the major milestones and activities completed during each phase of the internship. Finally, a list of references is provided to acknowledge the sources consulted during the internship project.

Overall, this report aims to provide a comprehensive account of my internship experience at Afour, showcasing the valuable insights gained, skills developed, and contributions made during the internship period. It serves as a testament to my commitment, dedication, and enthusiasm in applying theoretical knowledge to real-world scenarios.

Company Profile

Afour Technologies Pvt Ltd is a leading technology solutions company headquartered in Pune, India. Established in the year 2007, Afour has emerged as a trusted name in the industry, offering a wide range of services and innovative solutions to clients across various sectors.

At Afour, the focus is on delivering cutting-edge technology solutions that enable businesses to thrive in today's rapidly evolving digital landscape. The company's diverse portfolio includes services in the areas of software development, quality engineering, DevOps, cloud computing, cybersecurity, and product engineering.

With a team of highly skilled professionals and domain experts, Afour is committed to delivering excellence in every project undertaken. The company emphasizes a customer-centric approach, understanding the unique requirements of each client and providing tailored solutions that meet their specific needs.

Afour prides itself on its strong emphasis on research and development, staying at the forefront of technological advancements. The company invests in the latest tools, technologies, and frameworks to ensure the delivery of high-quality solutions that drive business growth and enhance operational efficiency.

Collaboration and innovation are key values at Afour. The company fosters a culture of teamwork, encouraging open communication and knowledge sharing among its employees. This collaborative environment enables the team to leverage their collective expertise, resulting in effective problem-solving and the delivery of exceptional solutions.

Afour has established strong partnerships with renowned technology providers and industry leaders, enabling access to cutting-edge resources and facilitating the development of robust solutions. The company's commitment to quality and adherence to international standards has earned it various certifications and accolades, further cementing its position as a trusted technology partner.

Driven by a passion for excellence and a customer-centric approach, Afour Technologies Pvt Ltd continues to redefine the boundaries of technology solutions. With a strong track record of successful projects and a commitment

to staying ahead of the curve, Afour is well-equipped to meet the evolving needs of businesses in an increasingly digital world.
Furthermore, Afour Technologies Pvt Ltd is an integral part of the ACL organization, a prominent entity in the field of technology and artificial intelligence. Leveraging the power of AI and ML, Afour is at the forefront of driving innovation and competitiveness on a global scale. The company is dedicated to exploring and implementing advanced AI algorithms and machine learning models to deliver intelligent and data-driven solutions that revolutionize businesses.

Afour Technologies Pvt Ltd is renowned not only for its technological expertise but also for its exceptional work culture and employee well-being. The company values its employees as the cornerstone of its success and fosters a supportive and inclusive work environment. Recognizing the importance of work-life balance, Afour provides flexible working arrangements, including a robust work-from-home policy. This enables employees to maintain productivity and achieve a healthy work-life integration, resulting in increased job satisfaction and motivation.

The commitment to employee welfare extends beyond flexible work arrangements. Afour places a strong emphasis on professional growth and personal development, offering continuous learning opportunities, training programs, and mentoring initiatives. By nurturing talent and empowering individuals, the company ensures that its employees are equipped with the skills and knowledge necessary to excel in their roles.

Moreover, Afour Technologies Pvt Ltd consistently promotes collaboration and knowledge sharing among its employees. The company encourages a culture of innovation and provides a platform for creative thinking and idea generation. This collaborative approach facilitates the exchange of expertise and ideas, fostering a dynamic and forward-thinking work environment that fuels innovation and drives continuous improvement.

Afour's dedication to excellence and customer satisfaction has earned it a solid reputation in the industry. By delivering high-quality solutions tailored to meet the unique needs of its clients, the company has garnered trust and loyalty from a diverse range of sectors. Afour's commitment to upholding international standards and certifications further reinforces its position as a reliable and trusted technology partner.

In summary, Afour Technologies Pvt Ltd stands as a distinguished technology solutions provider, dedicated to delivering cutting-edge solutions in the realms of AI/ML, software development, and more. With a strong focus on employee well-being, a supportive work environment, and a commitment to excellence, Afour continues to drive innovation, empower businesses, and shape the future of technology.

My Designation in Company

During my internship at Afour Technologies Pvt Ltd, I had the privilege of working as an intern in the AI/ML team. As a member of this esteemed team, I was actively involved in various projects that utilized artificial intelligence, NLP, Computer vision and machine learning technologies to solve real-world problems.

As an intern, my primary responsibility was to contribute to the development and implementation of AI/ML solutions. I had the opportunity to work on several projects, each presenting unique challenges and opportunities for growth. The projects ranged from data preprocessing and model development to deploying machine learning models as APIs and developing user-friendly web applications.

To fulfill these responsibilities, I extensively utilized Python as my programming language of choice. Python's versatility and extensive library ecosystem allowed me to effectively implement machine learning algorithms, perform data analysis, and build robust AI systems. In particular, I leveraged the FastAPI framework to develop efficient and scalable APIs for machine learning models. FastAPI's high performance and ease of use enabled me to create endpoints that seamlessly integrated with the ML models, facilitating smooth data processing and prediction capabilities.

Furthermore, I utilized Streamlit, a powerful Python library, to develop interactive and user-friendly web applications. With Streamlit, I could create visually appealing interfaces that allowed end-users to interact with the ML models effortlessly. This facilitated the seamless integration of AI technologies into practical applications, making complex ML processes more accessible and understandable to users.

Throughout my internship, I actively collaborated with the AI/ML team members, participating in brainstorming sessions, code reviews, and knowledge-sharing discussions. This collaborative environment allowed me to gain valuable insights, exchange ideas, and learn from experienced professionals in the field.

In summary, as an intern in the AI/ML team at Afour Technologies Pvt Ltd, my primary role involved working on diverse projects encompassing the

development of machine learning models, API creation using FastAPI, and the development of user-friendly web applications using Streamlit. These experiences have enriched my understanding of AI/ML concepts, strengthened my programming skills in Python, and provided me with practical experience in applying AI technologies to real-world scenarios.

The subsequent sections of this report will provide a detailed account of my contributions, project outcomes, tools and technologies utilized, as well as a comprehensive overview of the knowledge gained during my internship at Afour Technologies Pvt Ltd.

Problem Statement

The problem at hand during my internship at Afour Technologies Pvt Ltd was to develop a versatile and efficient text summarizer application. The application needed to provide summarization capabilities for various types of textual inputs, including URLs, document files, and direct textual input for any kind of big documents and give output in Audio format too, so that it will save reading time.

The challenge was to create a robust system that could accurately summarize text from different domains and categories. To address this, the text summarizer application was designed to cater to eight specific categories, namely: whitepaper, tech blog, medical, news, legal, other, chat, and scientific.

Each category presented unique characteristics and required specific approaches for accurate summarization. For instance, whitepapers and research papers demanded a thorough understanding of complex technical concepts, while tech blogs necessitated summarizing technical content in a more accessible manner. Medical documents required summarization of intricate medical terminology, whereas news articles required capturing the essence of current events concisely.

Legal documents needed to be summarized while preserving crucial legal terminology and context, while the other category encompassed generic articles that did not fit into the defined categories. The chat category posed the challenge of summarizing conversational data effectively, distilling important information from chat conversations. Lastly, scientific articles entailed summarization of complex scientific research and findings.

The problem statement required developing a text summarizer application that would accurately and effectively summarize text from all these diverse categories. The application needed to leverage natural language processing techniques, machine learning models, and advanced algorithms to generate concise summaries while maintaining the essence and important information of the input text.

Additionally, the text summarizer application needed to be user-friendly and accessible, allowing users to input various types of textual sources, such as URLs, document files, or direct textual input. The output summaries had to be

easily readable, providing users with a comprehensive overview of the input text in a concise format.

Addressing this problem statement involved implementing and fine-tuning state-of-the-art techniques in natural language processing, text understanding, and summarization algorithms. It required the integration of the Python programming language, along with relevant libraries and frameworks, to develop a robust and efficient text summarizer application.

Throughout my internship, I dedicated myself to developing and enhancing this text summarizer application, aiming to deliver accurate and concise summaries across multiple categories of textual inputs. The subsequent sections of this report will delve into the details of the application's development, the techniques utilized, and the outcomes achieved, showcasing the effectiveness and versatility of the text summarizer in addressing the problem statement.

Overview

During my internship at Afour Technologies Pvt Ltd, I undertook the task of developing an advanced text summarizer application named iSynopsis. This application aimed to provide accurate and concise summaries across a wide range of textual inputs, encompassing various categories such as whitepaper, tech blog, medical, news, legal, other, chat, and scientific.

To accomplish this, I employed state-of-the-art language models from the Hugging Face library. These pre-trained language models, such as BERT, GPT, and T5, serve as powerful tools for natural language processing and understanding. However, to ensure optimal performance for the specific text summarization task, I fine-tuned these models using domain-specific datasets.

The iSynopsis application is designed to accept input from diverse sources, including URLs, document files, and direct textual input. Users can conveniently input any relevant text for summarization, and iSynopsis leverages the power of fine-tuned language models to generate accurate and concise summaries.

One of the primary objectives of iSynopsis is to cater to various categories of text, adapting its summarization approach accordingly. For instance, in the whitepaper and research paper category, the application leverages its understanding of technical concepts and terminology to produce summaries that capture the essence of complex research. In the tech blog category, iSynopsis ensures that technical content is summarized in a manner accessible to a broader audience.

The medical category of iSynopsis tackles the challenge of summarizing intricate medical documents, distilling important information while retaining medical terminology. News articles, on the other hand, require capturing the key details and events in a concise manner, allowing users to quickly grasp the news story. In the legal category, iSynopsis summarizes legal documents, highlighting important legal terms and preserving context.

The other category encompasses generic articles that do not fit into specific domains. Here, iSynopsis utilizes its general understanding of language and context to generate meaningful summaries. In the chat category, iSynopsis summarizes chat conversations, extracting essential information from the conversational data.

Lastly, the scientific category presents the task of summarizing complex scientific articles, distilling research findings and key insights effectively. iSynopsis employs its understanding of scientific terminology and context to generate accurate summaries in this domain.

The iSynopsis application offers a user-friendly interface, allowing users to input their desired text sources and retrieve concise summaries with ease. The summaries are presented in a readable format, enabling users to quickly grasp the main points of the input text.

Throughout my internship, I focused on developing iSynopsis by integrating the fine-tuned language models, leveraging the power of the Hugging Face library, and implementing Python programming. The subsequent sections of this report will provide detailed insights into the end-to-end development process, the tools and technologies employed, as well as the outcomes achieved, demonstrating the effectiveness and versatility of iSynopsis as a powerful text summarizer application.

My Contribution

Throughout my internship at Afour Technologies Pvt Ltd, I made significant contributions to the development and implementation of the iSynopsis text summarizer application. My contributions can be summarized as follows:

Thorough Understanding and Research: I diligently studied and comprehended the problem statement, thoroughly understanding the requirements and challenges associated with text summarization across various categories. I engaged in discussions with my teammates, brainstorming innovative approaches and researching existing methodologies in the field.

Initial App Creation and Approval: I took the initiative to create a basic version of the iSynopsis application, incorporating the Streamlit framework and leveraging pre-trained BART models. I showcased the initial version to my mentor, who approved its functionality and potential.

Development of Backend and Simple Frontend: Upon receiving approval, I embarked on developing the backend infrastructure and a simple frontend for the iSynopsis application. I utilized my knowledge of Python and Streamlit to implement the necessary functionalities, allowing users to input text and receive concise summaries.

Demonstration and Positive Feedback: I organized a demonstration of the iSynopsis application for the entire company, showcasing its capabilities and advantages. The demonstration received positive feedback from the audience, indicating their satisfaction with the solution.

Deployment and Infrastructure Setup: After obtaining confirmation from the Managing Director and Director of Afour Technologies Pvt Ltd, I proceeded to deploy the iSynopsis application. I saved the fine-tuned models to an S3 bucket, mounted the S3 bucket to an EC2 instance, and successfully deployed the application on the EC2 instance.

SSH Certificate Installation: To enhance security and streamline access, I installed SSH certificates for secure remote login to the EC2 instance hosting the iSynopsis application. This ensured secure communication and facilitated efficient management of the deployed system.

Version 2 Development: As the project progressed, I actively contributed to the development of version 2 of the iSynopsis application. I created FastAPI endpoints to enhance the application's functionality, allowing for seamless integration with the frontend developed by the frontend team. I played a supportive role, assisting the frontend team in the development process.

Text and Audio Output: To improve user experience and save time, I implemented the capability for the iSynopsis application to provide summaries in both textual and audio formats. This feature allowed users to access summaries in a format that best suited their preferences and requirements.

In summary, my contributions to the iSynopsis text summarizer application included understanding the problem statement, conducting research, creating an initial app, receiving approval, developing the backend and simple frontend, demonstrating the application to the company, deploying the application to an EC2 instance, setting up SSH certificates, and actively participating in the development of version 2. The inclusion of text and audio output further enhanced the application's functionality and usability.

Tools and technologies used

During the development of the iSynopsis text summarizer application, I utilized a range of tools and technologies to ensure efficient and effective implementation. The following tools and technologies were instrumental in various aspects of the project:

1. **Python**: Python served as the primary programming language for developing the backend functionalities and creating the text summarization model. Its versatility, extensive library ecosystem, and ease of use made it an ideal choice for implementing the application.

2. **Streamlit**: The Streamlit framework played a crucial role in creating the web application interface for iSynopsis. Streamlit allowed me to develop an interactive and user-friendly frontend, enabling users to input text and receive concise summaries seamlessly.

3. **PyTorch and Transformers**: PyTorch, along with the Transformers library, was utilized for tokenization and working with pre-trained language models. These libraries provided a powerful and efficient platform for natural language processing tasks, allowing for effective text summarization using state-of-the-art models.

4. **FastAPI**: FastAPI was instrumental in creating the backend of the iSynopsis application. It enabled the development of efficient and scalable APIs, facilitating seamless communication between the frontend and backend components. FastAPI's high performance and intuitive design contributed to the overall responsiveness and robustness of the application.

5. **AWS EC2 Instance**: The deployment of the iSynopsis application was achieved using an Amazon Web Services (AWS) EC2 instance. The EC2 instance provided a reliable and scalable hosting environment, ensuring the application's availability to users.

6. **AWS S3 Bucket**: To save the fine-tuned models, I utilized an AWS S3 bucket. The S3 bucket served as a secure storage solution, enabling easy access and retrieval of the trained models during the application's runtime.

7. **gtts** (Google Text-to-Speech): The gtts library played a crucial role in converting the text summaries generated by iSynopsis into audio files. This functionality provided users with the option to listen to the summaries, enhancing the overall user experience and accessibility.

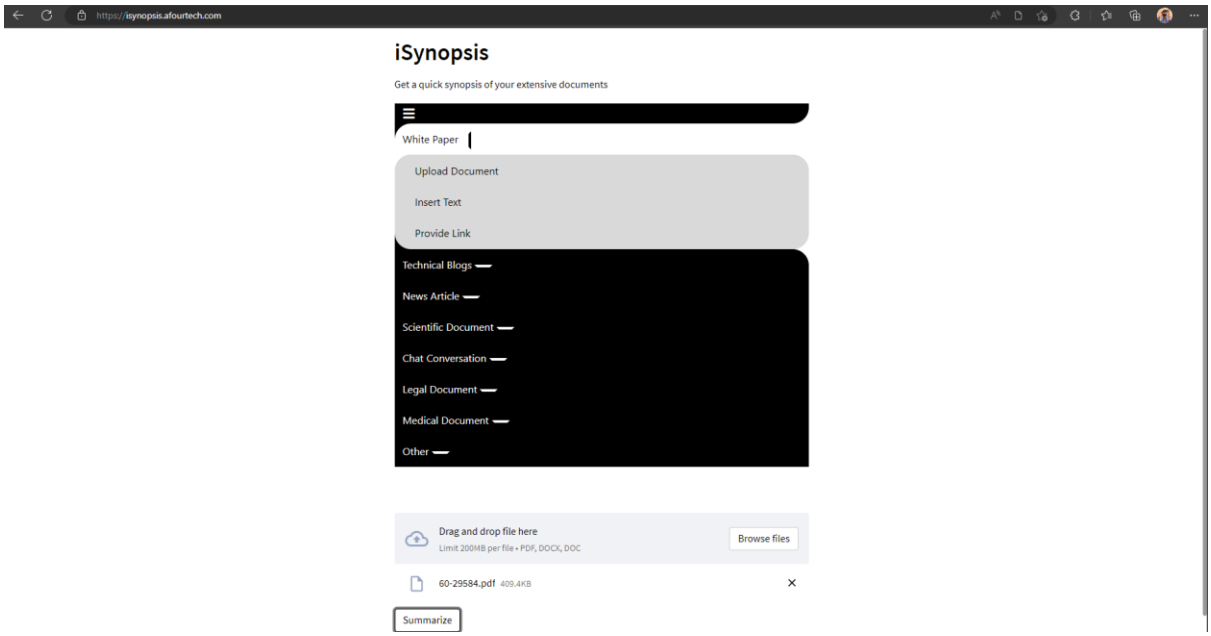
8. **BeautifulSoup** (BS4): BS4 was employed for web scraping and fetching information from URLs. This library enabled the extraction of relevant text content from web pages, expanding the scope of iSynopsis to include text summarization for online articles and resources.

9. **PyPDF2 and docx2txt**: PyPDF2 and docx2txt libraries were utilized for reading and extracting text from PDF and DOC/DOCX files, respectively. These libraries facilitated the processing of document files, allowing iSynopsis to handle a wide range of input formats.

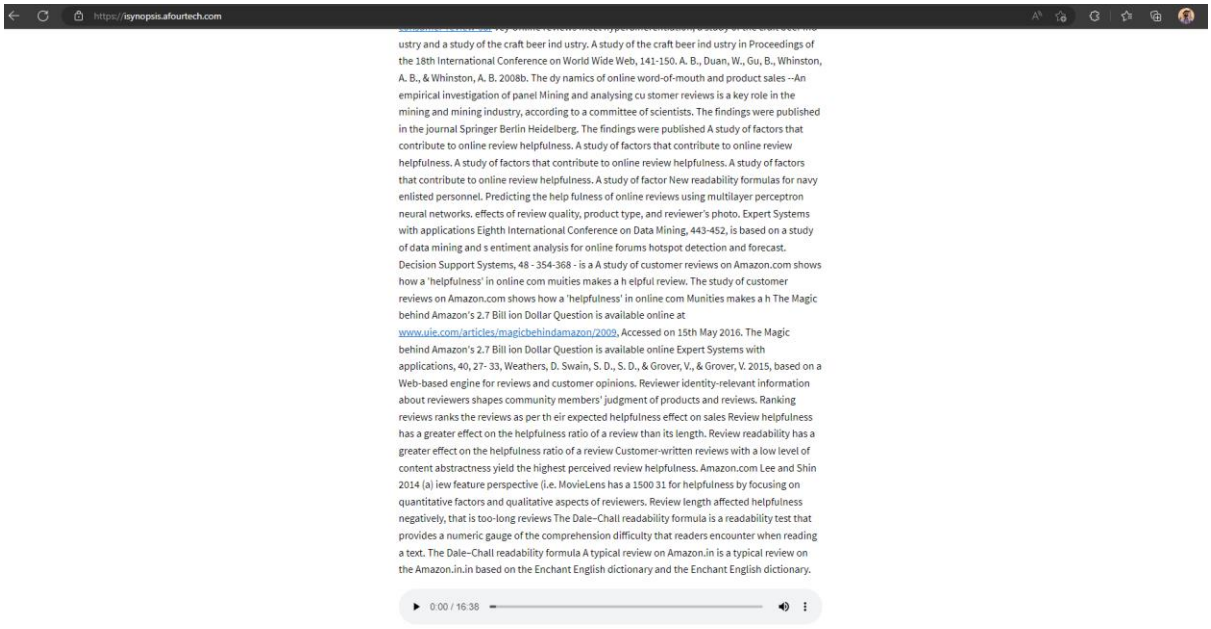
10. **GitLab**: GitLab was employed as the version control system for the iSynopsis project. It facilitated collaborative development, allowing me to track changes, manage code repositories, and work effectively with other team members. GitLab's version control capabilities ensured seamless coordination and efficient code management throughout the project

By leveraging these tools and technologies, I was able to develop a comprehensive and efficient text summarizer application that catered to diverse user needs, integrated seamlessly with the frontend, and deployed successfully on an AWS EC2 instance.

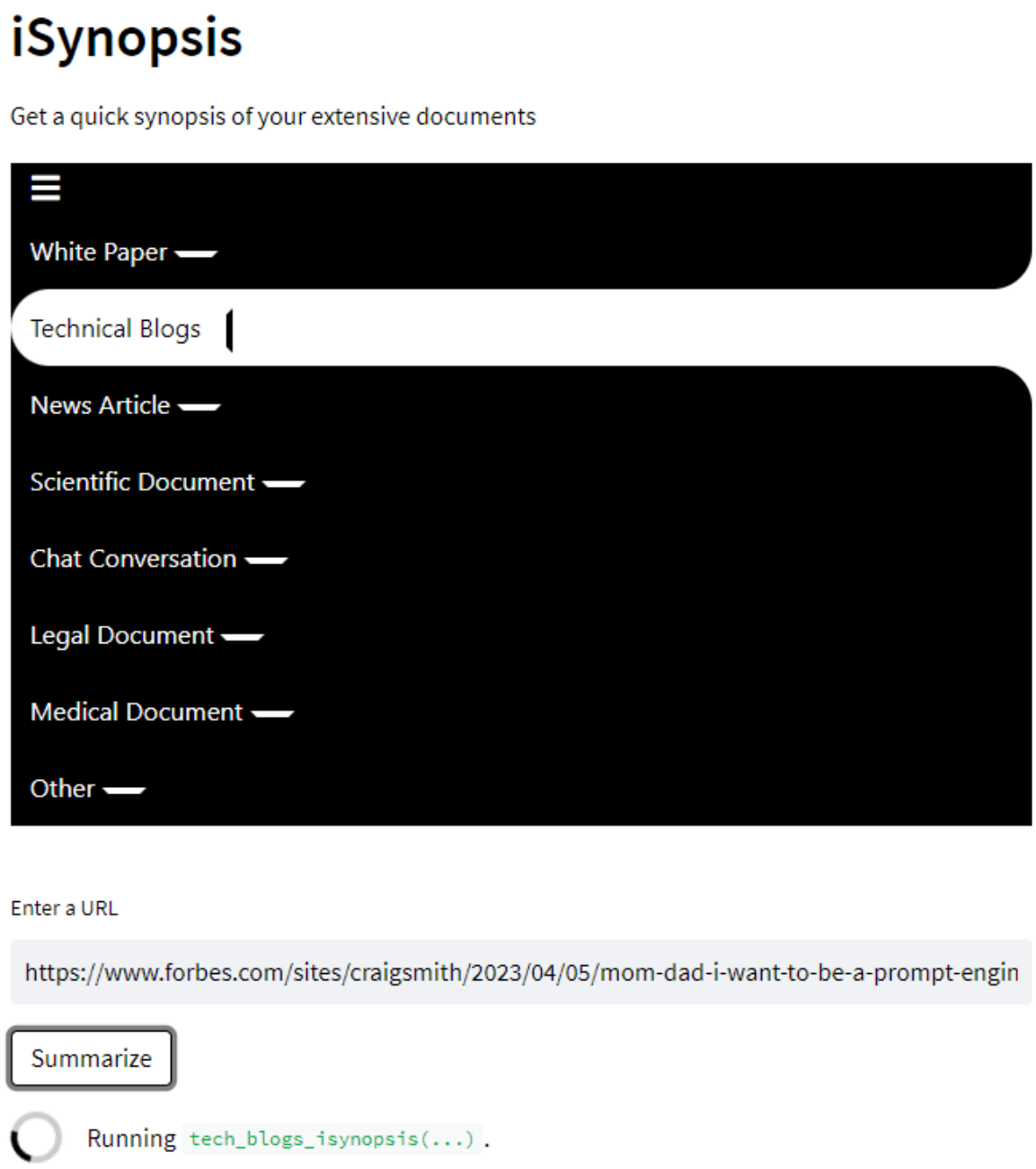
Screenshots



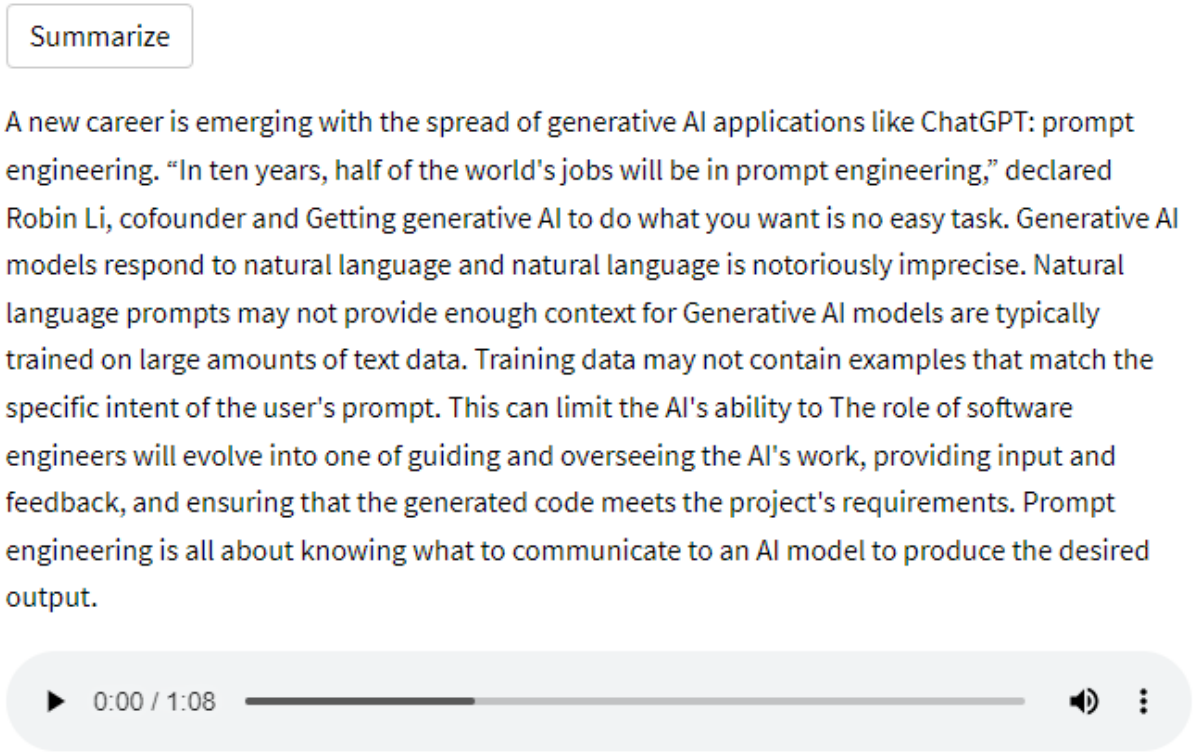
This Screenshot shows in section of white paper you can give input in all of the three methods but giving as document named 60-29584.pdf



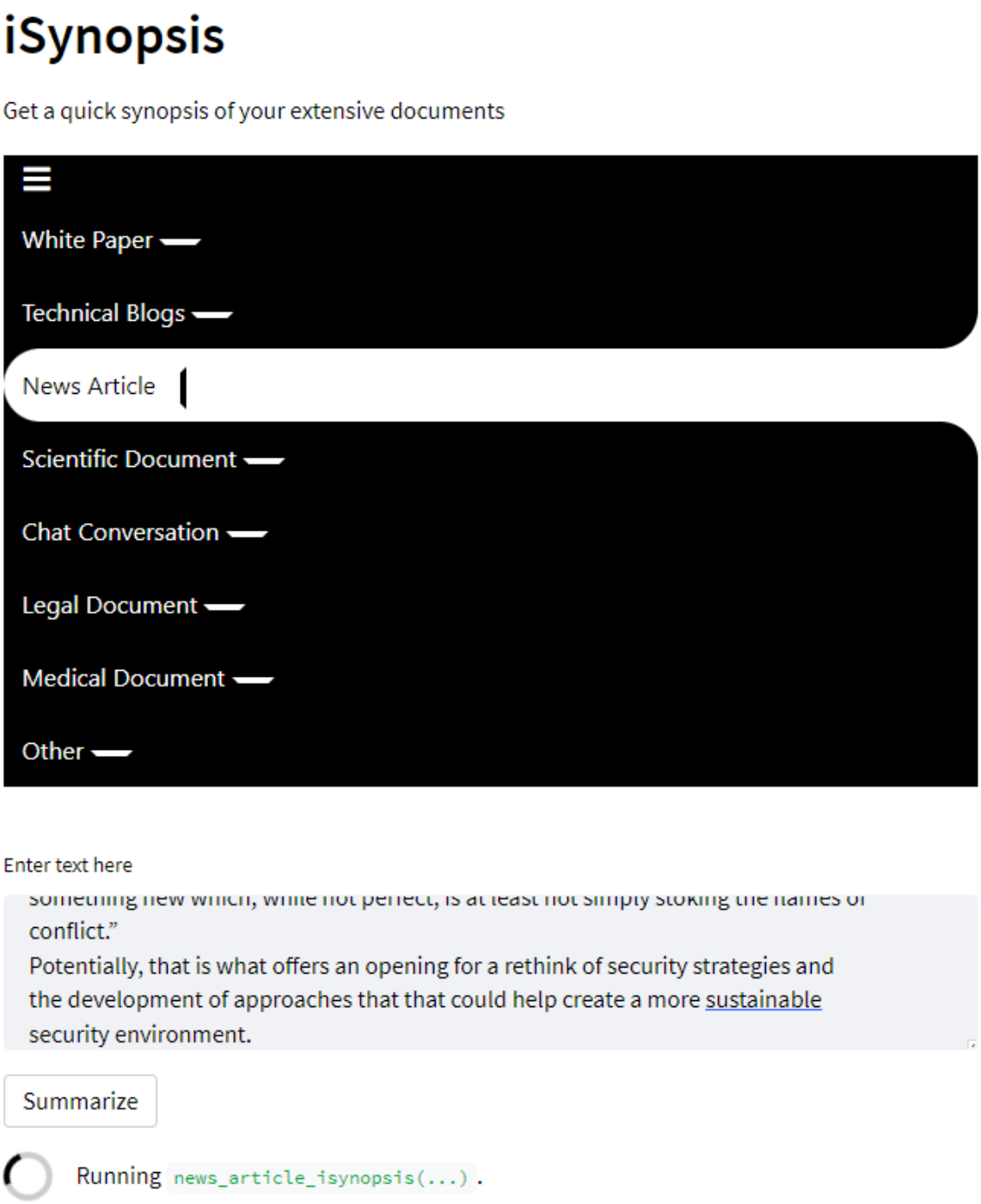
This Screenshot shows the summary of the same document which is only 20% of the information and also in audio format.



This Screenshot shows input in the technical blog section and giving input as URL.



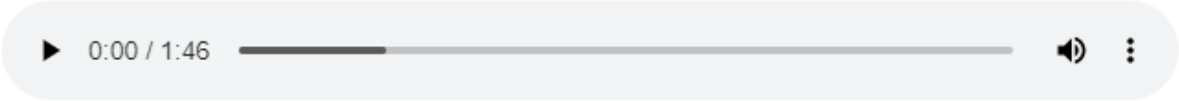
This Screenshot shows the summary of the same URL.



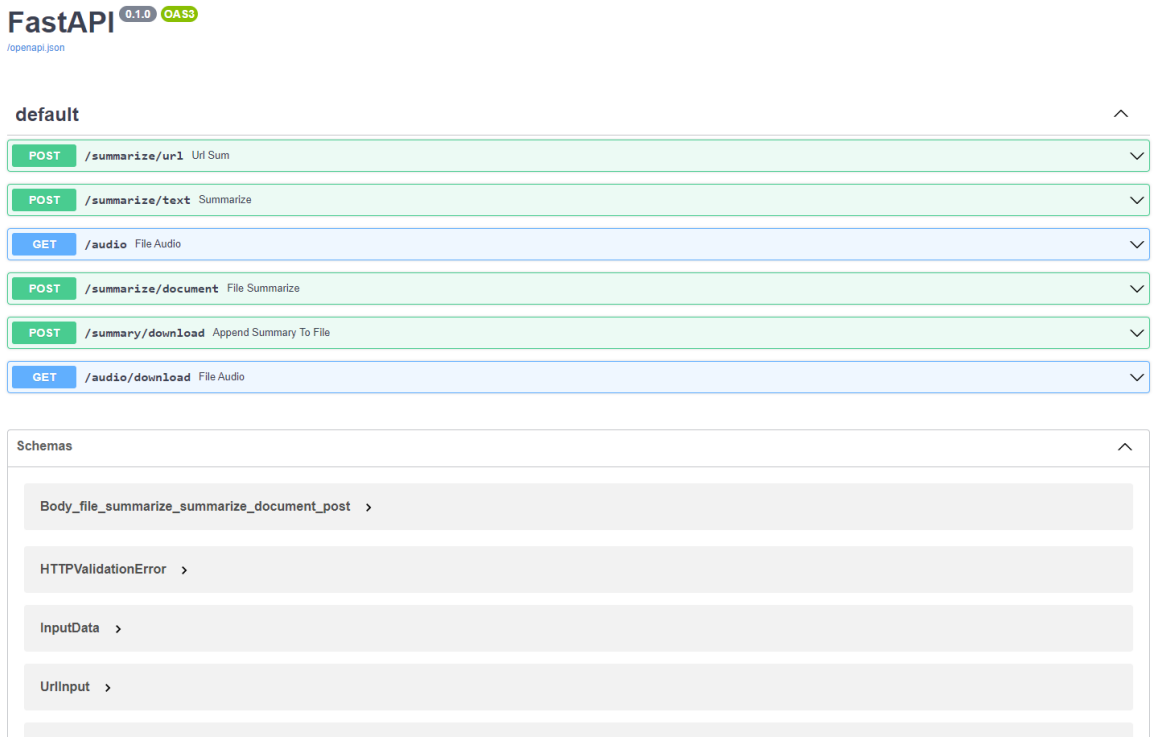
This Screenshot shows input in the News section and giving input as text.

Summarize

Saudi Arabia and the UAE have been at odds with each other in recent years. The UAE has been at risk of losing control of the world's most populous countries. The Saudis have been in the forefront of their efforts to The UAE has long been trying to keep out of the public eye, says a new study. It says the UAE's support for non-state actors in Yemen and Libya is a problem. The study says it is Emirati support for secessionist groups in Yemen could complicate efforts to end its war. The UAE is trying to be the dominant power in defining what uablyconstitutes moderate Islam. It has threatened to renew fighting if the country The UAE withdrew the bulk of its troops from Yemen in 2019 but continues to support the Southern Transitional Council (STC) that demands independence for South Yemen. The Council controls southern Yemen's strategic ports and waterways The UAE downgraded its diplomatic representation in Iran in 2016, but did not break off relations in the wake of the ransacking of Saudi diplomatic posts. The UAE sent Emirati coast guard commanders in 2019 to Tehran for The Chinese-mediated Saudi-Iranian rapprochement offers an opportunity to reduce regional tensions more structurally by positioning rogate warfare as a threat to long-term stability and security rather than a partisan issue Dialling down tension between Saudi Arabia and Iran is in the interests of all parties.



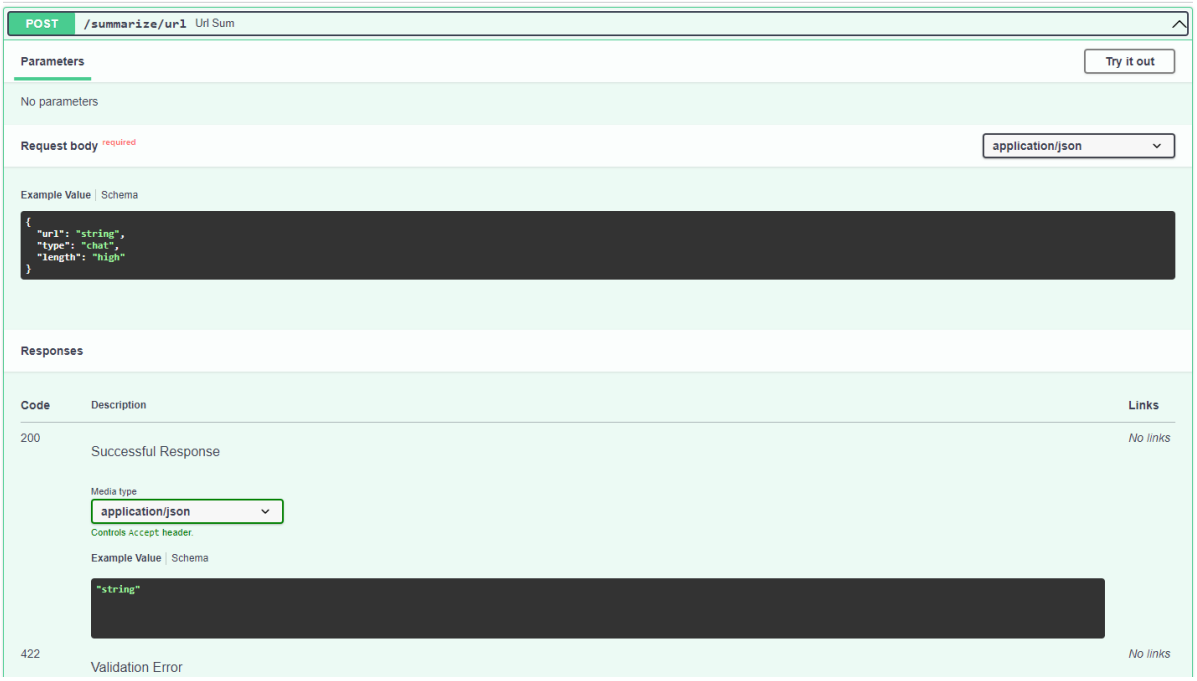
Screenshot shows summary of the same input.

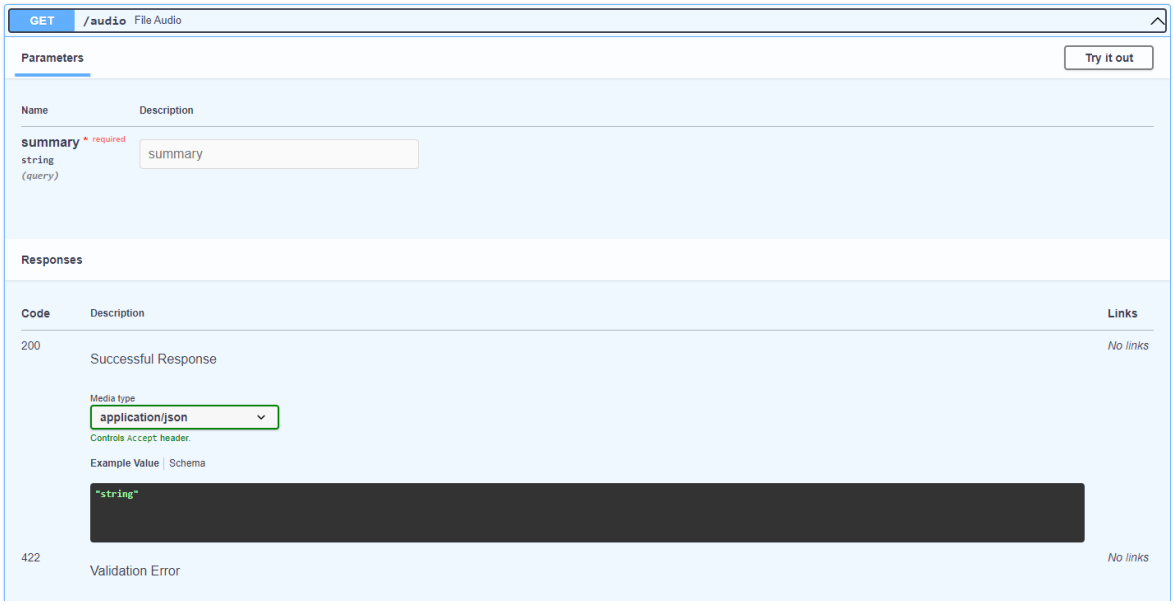


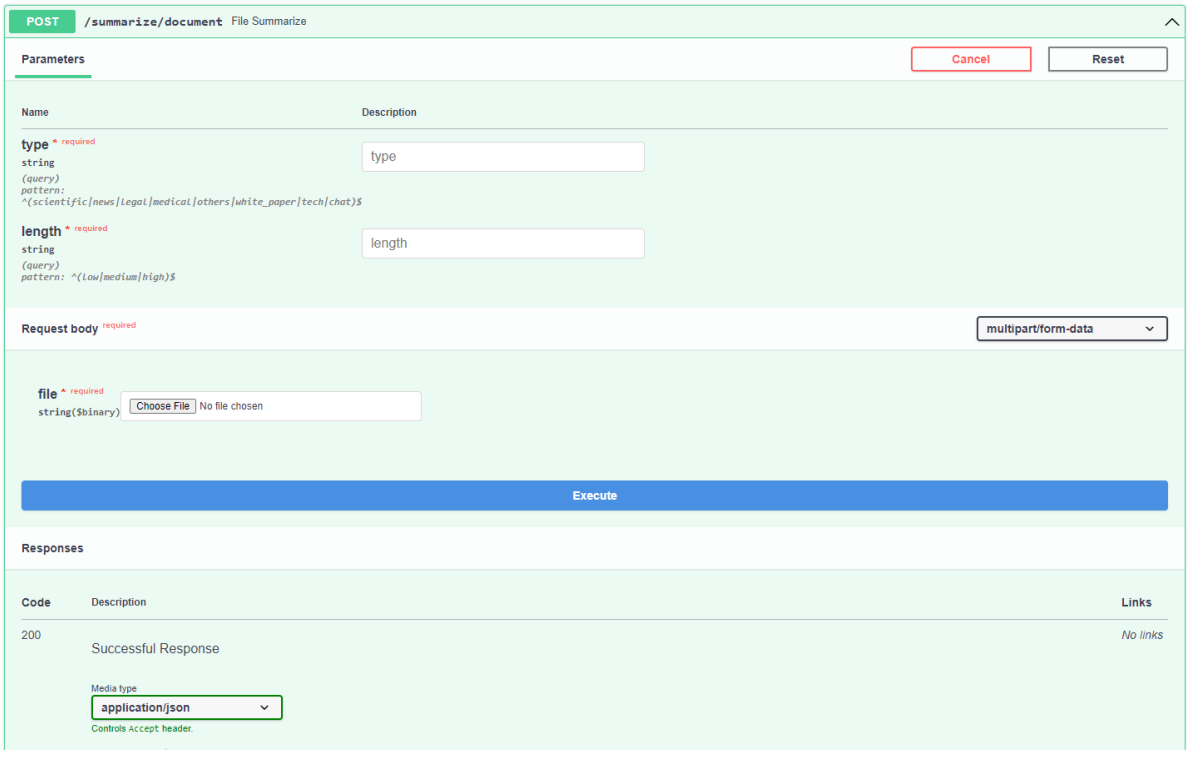
This is the FastAPI docs screenshot there are 6 API endpoints

1. POST /summarize/URL: Takes input in the format of json/application.
2. POST /summarize/text: Takes input in the format of json/application
3. GET /audio: Takes input in json format and returns a media .mp3 file.
4. POST /summarize/document: Takes input in form-data.
5. POST /summary/download: Takes input in json format and returns .txt file
6. GET /audio/download: Takes input in json format and returns the .mp3 file

The below Screenshots indicates the same.




GET /audio File Audio
Parameters
Try it out
Name
Description
summary * required
string
(query)
summary
Responses
Code
Description
Links
200
Successful Response
No links
Media type
application/json
Controls Accept header.
Example Value | Schema
"string"
422
Validation Error
No links


POST /summarize/document File Summarize
Parameters
Cancel
Reset
Name
Description
type * required
string
(query)
pattern:
^(scientific|news|legal|medical|others|white_paper|tech|chat)$
type
length * required
string
(query)
pattern: ^(low|medium|high)$
length
Request body required
multipart/form-data
file * required
string($binary)
Choose File
No file chosen
Execute
Responses
Code
Description
Links
200
Successful Response
No links
Media type
application/json
Controls Accept header.

Other Additional Tasks

In addition to my primary responsibilities, I actively contributed to several other projects and tasks, showcasing my versatility and willingness to explore new areas. The following are the additional tasks I undertook during my internship:

1. **Candidate Recommendation System (CRS)**: Within the CRS project, I helped my teammates by solving minor logic issues and offering additional ideas to enhance the system's performance and results. I also participated in testing the portal to ensure its smooth functionality with the required inputs.

2. **Generative AI**: To broaden my understanding of AI technologies, I delved into Generative AI, gaining insights into how this particular field operates. This endeavor allowed me to grasp the fundamental principles underlying Generative AI and its applications.

3. **ONNX** (Open Neural Network Exchange): I developed an application that facilitated the conversion of TensorFlow models into ONNX files. By leveraging the ONNX framework, the resulting models could be run on any platform, enabling compatibility and flexibility across different environments.

4. **Virtual Mouse**: I explored Computer Vision techniques to create a virtual mouse control system. This involved using finger gestures and hand movements to manipulate the mouse cursor on the screen without physical contact with the system. The implementation of this project showcased my ability to leverage Computer Vision technology for practical applications.

5. **Speech Classification**: Created a small project for classification of audio data in which there is the voice of a bird to get how many times the bird made sound.

6. **OpenCV and Augmented Reality**: In a project that involved face tracking and augmentation, I utilized OpenCV and Augmented Reality techniques. I successfully tracked facial movements and superimposed virtual glasses on the detected faces. Additionally, I incorporated object

detection to play videos based on the recognized objects within the same Augmented Reality framework.

7. **Figma UI**: I ventured into UI design by creating reference UI designs using Figma. These designs served as a guide for the frontend development team, ensuring a consistent and visually appealing user interface for the applications being developed.

8. **Prompt Engineering**: I explored the concept of prompt engineering using ChatGPT. This involved creating a Python program that accepted API information in JSON format and generated corresponding responses using prompt-based testing. This endeavor showcased my ability to integrate AI models into practical applications.

These additional tasks exemplify my curiosity, adaptability, and willingness to take on diverse challenges during my internship. Through active involvement in these projects, I further expanded my skill set and contributed to the overall growth and success of the organization.

Knowledge Gained

My internship at Afour Technologies Pvt Ltd provided me with valuable insights and knowledge across various aspects of software development, AI/ML technologies, and project management. Throughout the internship, I acquired the following key knowledge:

1. **Problem Understanding and Research**: I developed a comprehensive understanding of the problem statement related to text summarization across multiple categories. Through extensive research and discussions with my teammates, I gained insights into the challenges and existing methodologies in the field.

2. **Application Development**: I gained hands-on experience in developing web applications using the Streamlit framework. Leveraging my Python programming skills, I successfully created the initial version of the iSynopsis text summarizer application, incorporating pre-trained BART models from the Hugging Face LLM library.

3. **Backend and Frontend Development**: I acquired proficiency in developing the backend infrastructure of the iSynopsis application using Python and FastAPI. Additionally, I gained experience in creating a simple frontend interface using Streamlit, ensuring a smooth user experience.

4. **Deployment and Infrastructure Setup**: Through deploying the iSynopsis application on an AWS EC2 instance, I obtained practical knowledge of deploying web applications and managing the necessary infrastructure. I learned to save and retrieve fine-tuned models using AWS S3 buckets and securely accessed the deployed system using SSH certificates.

5. **Version Control and Collaboration**: I gained expertise in using GitLab as a version control system, allowing for efficient collaboration and code management within the development team. Working alongside my colleagues, I learned effective teamwork and coordination skills.

6. **AI/ML Techniques**: I expanded my knowledge of AI/ML techniques, particularly in the field of text summarization. I utilized Hugging Face LLM

models, such as BART, and applied fine-tuning techniques to improve their performance on specific tasks.

7. **Integration of Text-to-Speech**: I learned how to integrate the gtts (Google Text-to-Speech) library into the iSynopsis application, enabling the generation of audio summaries. This integration enhanced the application's usability and accessibility.

8. **Additional Project Contributions**: In addition to the iSynopsis application, I had the opportunity to contribute to other projects. I gained insights into Candidate Recommendation Systems, Generative AI, ONNX, Computer Vision applications (such as the virtual mouse and OpenCV augmented reality),Speech Classification, AWS sagemaker, Figma UI design, and prompt engineering using ChatGPT.

Overall, my internship at Afour Technologies Pvt Ltd provided me with practical experience in AI/ML development, web application deployment, version control, collaboration, and various additional areas of interest. The knowledge and skills acquired during this internship will undoubtedly contribute to my future endeavors in the field of AI/ML and software development.

Summary

My internship experience at Afour Technologies Pvt Ltd has been enriching and transformative, providing me with valuable insights into the world of AI/ML development and web application deployment. Throughout the internship, I actively contributed to the development and implementation of the iSynopsis text summarizer application, showcasing my skills and passion for innovative solutions.

I began by thoroughly understanding the problem statement and conducting extensive research to explore various text summarization techniques. With the support and guidance of my teammates, I created a basic version of the iSynopsis application, incorporating Streamlit and pretrained BART models. This initial version received approval from my mentor, paving the way for further development.

As the project progressed, I took on the responsibility of developing the backend infrastructure and a simple frontend interface using Python and FastAPI. I successfully demonstrated the application to the entire company, receiving positive feedback and validation from the Managing Director and Director of Afour Technologies Pvt Ltd.

To ensure seamless deployment, I leveraged AWS services, saving the fine-tuned models to an S3 bucket and deploying the application on an EC2 instance. I also implemented secure remote access to the EC2 instance by installing SSH certificates.

Throughout the internship, I gained hands-on experience with a range of tools and technologies, including Python, Streamlit, PyTorch, Transformers, FastAPI, AWS EC2, AWS S3, GitLab, and various libraries for text processing and integration such as gtts, BeautifulSoup4 (BS4), PyPDF2, and python-docx. These experiences enhanced my technical proficiency and broadened my understanding of software development best practices.

Moreover, I had the opportunity to contribute to additional projects, including the Candidate Recommendation System, Generative AI, ONNX, Computer Vision applications, Figma UI design, and prompt engineering. This exposure allowed me to explore diverse domains and expand my knowledge beyond text summarization.

In conclusion, my internship at Afour Technologies Pvt Ltd provided me with valuable practical experience, sharpened my technical skills, and deepened my understanding of AI/ML development and web application deployment. I am grateful for the guidance and support of my mentors and teammates throughout this journey. The knowledge gained and the lessons learned will undoubtedly shape my future endeavors in the field of AI/ML and software development. I am excited to apply these skills and insights in my academic and professional pursuits, aiming to contribute to the ever-evolving world of technology.

Internship Timeline

- January 2023 - February 2023: Learning material provided by Afour tech Stage 1 consist of basic knowledge and Stage 2 on your intrest.

- March:
  - Week 1 : OnBoarding Process and selected in Afour AI/ML team.
  - Week 2: Understand problem statement for iSynopsis. and research the method to go about.
  - Week 3: Created some models using extractive methods as well as using BART(Transformer model).
  - Week 4: Search for more specific models and created a Streamlit UI for the application.
  - Week 5: Added more models to iSynopsis and presented in game day demo and explored generative AI.

- April:
  - Week 1: Solved some problem which was occurring on EC2 instance and fixed those bugs, explored AWS sagemaker for deployment.
  - Week 2: Created a Python script using OpenAI api using prompt engineering to get result can be understand by 5 years old. and started creating FastAPI endpoints for the same iSynopsis
  - Week 3: FastAPI for some endpoints has been created and saved and downloaded the fine tuned models to S3 bucket and mounted to EC2 instance. explored ONNX
  - Week 4: Changes some things in UI Deployment of iSynopsis is done, Worked on Speech data for the classification problem and explored computer vision.

❖ May:

➢ Week 1: Created Virtual mouse and added some functionality. Using Opencv Created two AR applications.

➢ Week 2: Added SSH certificate to iSynopsis, created web App for Virtual mouse.

➢ Week 3: Created Desktop application for Virtual mouse and did some other functionality, Created Figma for iSynopsis, and read how we can automate API testing using Prompt engineering.

➢ Week 4: Explored around prompt engineering and created some useful prompts in ChatGPT, Created an Application which takes some user input and generates some prompts which can be used to get the pytest code.

My Experiences of Internship

My internship at Afour Technologies Pvt Ltd has been an incredibly rewarding and transformative experience. Throughout the internship, I had the opportunity to work on challenging projects, collaborate with talented professionals, and gain valuable insights into the field of AI/ML development. Here are some reflections and experiences from my internship journey:

1. **Learning and Growth**: The internship provided me with a steep learning curve, allowing me to expand my knowledge and skills in AI/ML, web application development, and cloud deployment. The exposure to cutting-edge technologies and real-world projects enabled me to enhance my technical proficiency and broaden my understanding of industry practices.

2. **Collaborative Environment**: One of the highlights of my internship was the collaborative work environment at Afour Technologies. I had the privilege of working alongside a team of experienced professionals who were always willing to share their knowledge and provide guidance. Collaborating with my teammates on the iSynopsis text summarizer application and other projects fostered a sense of camaraderie and collective growth.

3. **Problem-Solving Challenges**: The internship presented me with various problem-solving challenges, from understanding the nuances of text summarization across different categories to optimizing model performance and deploying the application seamlessly. These challenges pushed me to think critically, research extensively, and come up with innovative solutions. Overcoming these challenges has boosted my confidence and problem-solving skills.

4. **Industry Exposure**: Working on real-world projects at Afour Technologies exposed me to the practical aspects of AI/ML development in a professional setting. I gained insights into industry standards, best practices, and the importance of delivering high-quality solutions that meet clients' requirements. This exposure has been invaluable in shaping my career aspirations and giving me a glimpse into the industry's expectations.

5. **Effective Communication and Presentation Skills**: Throughout the internship, I had the opportunity to present my work, ideas, and progress to various stakeholders, including my mentor, the company's management, and the entire team. This experience honed my communication and presentation skills, allowing me to effectively convey complex technical concepts to different audiences.

6. **Continuous Learning**: The internship at Afour Technologies emphasized the value of continuous learning and staying updated with the latest advancements in the field. Engaging in research, exploring new libraries and frameworks, and seeking feedback from mentors and teammates became integral parts of my internship experience.

7. **Teamwork and Collaboration**: Working as part of a dynamic team at Afour Technologies taught me the importance of teamwork and effective collaboration. I appreciated the open and supportive culture where ideas were encouraged, and constructive feedback was provided. Collaborating with frontend developers, researchers, and other interns enhanced my ability to work in diverse teams and fostered a sense of shared success.

8. **Professional Development:** The internship provided me with a platform to develop my professional skills, including time management, organization, and adaptability. Juggling multiple projects, meeting deadlines, and adapting to changing requirements helped me refine these skills, which will be valuable in my future endeavors.

Overall, my internship at Afour Technologies Pvt Ltd has been a transformative experience, providing me with the opportunity to apply my knowledge, collaborate with professionals, and gain practical insights into the field of AI/ML development. It has reinforced my passion for technology and motivated me to pursue further learning and growth in this dynamic industry. I am grateful for the support, guidance, and experiences that have shaped my internship journey at Afour Technologies.

References

Afour Technologies Pvt Ltd. Retrieved from https://afourtech.com/

Hugging Face Transformers Library. Retrieved from https://huggingface.co/

Streamlit: The fastest way to build data apps. Retrieved from https://streamlit.io/

PyTorch: An open-source machine learning framework. Retrieved from https://pytorch.org/

FastAPI: A modern, fast (high-performance) web framework for building APIs with Python. Retrieved from https://fastapi.tiangolo.com/lo/

AWS EC2: Amazon Elastic Compute Cloud. Retrieved from https://aws.amazon.com/ec2/

AWS S3: Amazon Simple Storage Service. Retrieved from https://aws.amazon.com/S3/

GitLab: A complete DevOps platform. Retrieved from https://geeklab.afourtech.com/

gtts: Google Text-to-Speech. Retrieved from https://gtts.readthedocs.io/en/latest/module.html

BeautifulSoup4 (BS4): A Python library for web scraping and parsing HTML and XML documents. Retrieved from https://pypi.org/project/beautifulsoup4/

PyPDF2: A library for extracting text and metadata from PDF files. Retrieved from https://pypi.org/project/py2pdf/

python-docx: A Python library for creating and updating Microsoft Word (.docx) files. Retrieved from https://pypi.org/project/python-docx/

ONNX: Open Neural Network Exchange. Retrieved from https://onnx.ai/

OpenCV: Open Source Computer Vision Library. Retrieved from https://opencv.org/

ARUCO: Augmented Reality Marker Library. Retrieved from https://docs.opencv.org/4.x/d5/dae/tutorial_aruco_detection.html

Speech Processing: https://towardsdatascience.com/speech-classification-using-neural-networks-the-basics-e5b08d6928b7

AWS SageMaker: Amazon SageMaker. Retrieved from https://aws.amazon.com/sagemaker/

Prompt Engineering:
https://renaissancerachel.com/prompting/
https://maximebeauchemin.medium.com/mastering-ai-powered-product-development-introducing-promptimize-for-test-driven-prompt-bffbbca91535

OpenAI GPT-3.5 (ChatGPT): A powerful language model developed by OpenAI. Retrieved from https://openai.com/blog/chatgpt