PROJECT DOCUMENTATION

Project Title - Learning Assistant Using Generative Ai

Team ID : M129

Team Members - Arunraj v, Aravind R, Abhijith Ashokan, Muhammed Sajadh, Aravind Kumar V

Motivation

Our project involved us to get familiar with the Android Development environment and thus develop an application to solve the following problem.

In today's busy world, we often lose track of time. As students ourselves, we often struggle with wasting our time in learning things that do not produce any outcome. We wanted to do something about this by addressing the issue and providing an innovative solution. As a result, we came up with the idea of creating a mobile application that helps us keep track of time and also assist in learning by filtering key points using generative AI.

So what our app does is fairly simple, you enter the topic you want to learn and our Generative AI model gives the most filtered out key points for you which makes the learning process fast and simple.Insert the PDFs you want to summarize, our AI model summarize the content and results in the summary in 1-2 lines.

Theory

Android is a Linux-based operating system designed primarily for touchscreen mobile devices such as smartphones and tablet computers.Initially developed by Android, Inc., which Google backed financially and later bought in 2005. Android is open source and Google releases the code under the Apache License. This open source code and permissive licensing allows the software to be freely modified and distributed by device manufacturers, wireless carriers and enthusiast developers. Additionally, Android has a large community of developers writing applications ("apps") that extend the functionality of devices, written primarily in a customized version of the Java programming language.

Android software development is the process of creating applications for devices running the Android operating system. Applications are usually written in the Java programming language using the Android Software Development Kit (SDK), but can also be written in other languages such as Kotlin, C/C++, and Go.

The SDK includes a set of tools that developers can use to create, test, and debug their applications. It also includes a library of pre-built components that developers can use to add common features to their applications, such as user interfaces, networking, and storage.

To develop an Android application, you will need to install the Android SDK and the Android Studio IDE. Once you have installed these tools, you can start creating your application by creating a new project in Android Studio.

Android Studio provides a number of features that make it easy to develop Android applications, including a visual layout editor, a code editor with code completion and refactoring tools, and a built-in emulator that allows you to test your application on a variety of devices.

Once you have developed your application, you can publish it to the Google Play Store so that other users can download it.

Flutter is a new framework from Google that allows you to develop cross-platform applications using the Dart programming language. This means that you can use Flutter to develop applications that run on Android, iOS, and the web.

Flutter is a relatively new framework, but it has already gained a lot of popularity due to its ease of use and its ability to create beautiful, high-performance applications.

If you are looking for a framework to develop cross-platform applications, Flutter is a great option. It is easy to learn and use, and it can be used to create beautiful, high-performance applications.

Python is a general-purpose programming language that is becoming increasingly popular for data science, machine learning, and web development. It is relatively easy to learn and use, and it has a large community of developers who contribute to its development.

Visual Studio Code (VS Code) is a free and open-source code editor developed by Microsoft. It is a lightweight and extensible code editor that supports a wide variety of programming languages, including Python, JavaScript, TypeScript, C/C++, Go, and many more. VS Code is also popular for web development, with support for HTML, CSS, and JavaScript.

VS Code is available for Windows, macOS, and Linux. It is also available as a web-based editor.

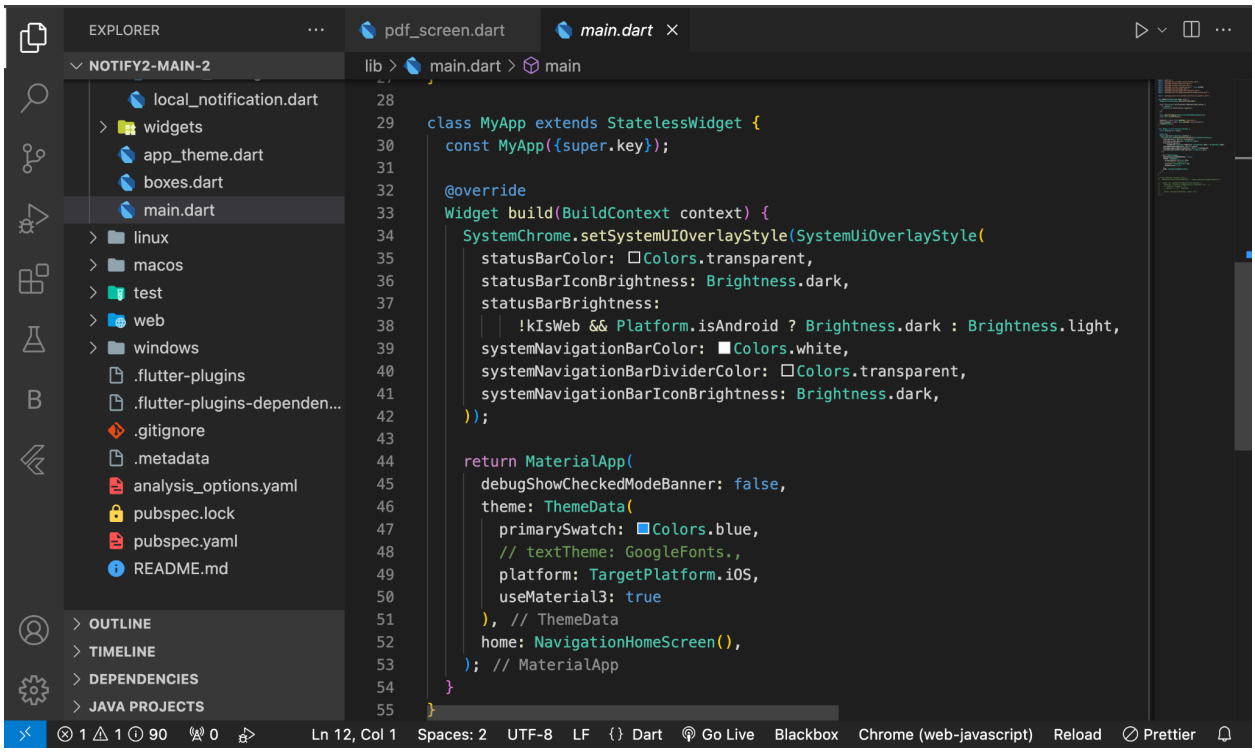
VS Code is a popular choice for developers because it is easy to use and has a wide range of features, including:

- Syntax highlighting and code completion: VS Code provides syntax highlighting and code completion for a wide variety of programming languages. This makes it easier to write and read code, and can help to prevent errors.

- Debugging: VS Code has a built-in debugger that can be used to debug code in a variety of programming languages. This makes it easy to find and fix bugs in your code.

- Version control: VS Code integrates with popular version control systems such as Git and Mercurial. This makes it easy to track changes to your code and collaborate with other developers.

- Extensions: VS Code has a large and active community of developers who create extensions that add new features and functionality to the editor. There are extensions available for a wide variety of programming languages, tools, and technologies.



Software Development Kit (SDK**)**, is a set of software development tools that allows developers to create applications for a particular platform. It may include a compiler, debugger, libraries, and other tools that are necessary to develop applications for that platform.

SDKs are typically provided by the platform vendor, such as Apple or Google. They can also be created by third-party companies.

SDKs can be very helpful for developers, as they provide them with the tools they need to create applications quickly and easily. They can also help developers to avoid common errors.

Here are some of the benefits of using an SDK:

- SDKs provide developers with the tools they need to create applications quickly and easily.

- SDKs can help developers to avoid common errors.
- SDKs can provide developers with access to platform-specific features and functionality.
- SDKs can help developers to create applications that are compatible with the platform.

Application Programming Interface(API), is a set of rules that allow two pieces of software to communicate with each other. APIs are used in a wide variety of applications, including websites, mobile apps, and desktop software.

APIs are also used in mobile apps. For example, when you use a mobile app like Uber, your mobile app is communicating with Uber's servers using an API. The API allows your mobile app to request information from Uber's servers, such as the location of nearby drivers or the estimated cost of a ride. Uber's servers then respond to your mobile app with the requested information.

One common example of an API is the Google Maps API. This API allows developers to embed Google Maps in their own websites and apps. When a user interacts with a Google Map on a website, the website is actually making a call to the Google Maps API to request data.

APIs can be public or private. Public APIs are available to anyone who wants to use them. Private APIs are only available to a select group of developers.

OpenAI API is a public API that allows developers to access OpenAI's AI models. These models can be used for a variety of tasks, such as generating text, translating languages, and writing different kinds of creative content.

Here are some examples of how the OpenAI API can be used:

- A developer could use the OpenAI API to create a chatbot that can generate realistic and engaging conversations.

- A developer could use the OpenAI API to create a tool that can translate text from one language to another.

- A developer could use the OpenAI API to create a tool that can generate creative content, such as poems, code, scripts, and musical pieces.

Machine learning is a type of artificial intelligence (AI) that allows computers to learn without being explicitly programmed. In other words, machine learning algorithms can learn from data and improve their performance over time.

Machine learning is used in a wide variety of applications, including spam filtering, web search, and fraud detection. It is also being used to develop new technologies, such as self-driving cars and virtual assistants.

Machine learning is a powerful tool that can be used to solve a variety of problems. However, it is important to note that machine learning algorithms can be biased, and it is important to be aware of these biases when using machine learning models.

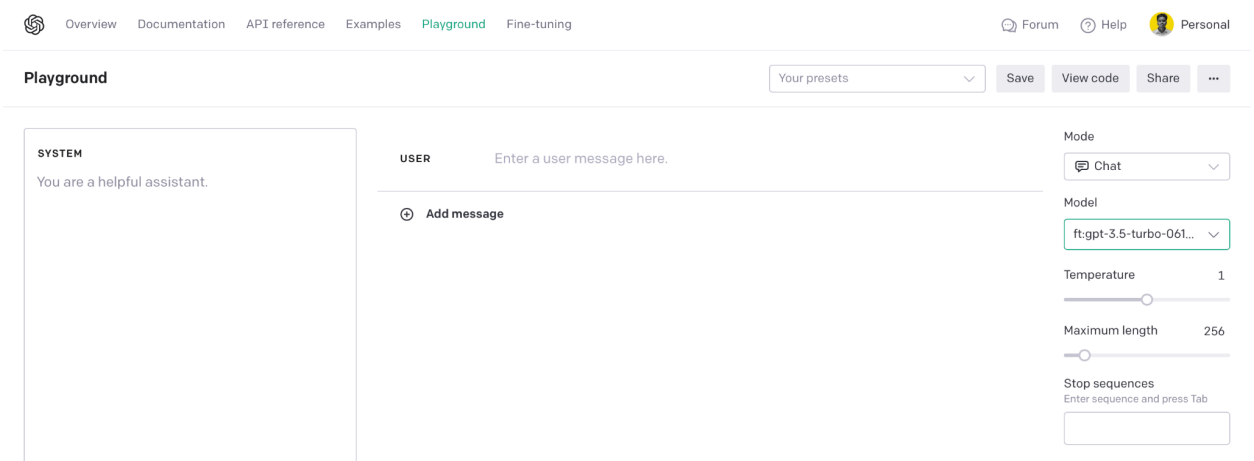
Fine-tuning is a machine learning technique that involves adjusting the parameters of a pre-trained model to improve its performance on a specific task. This can be done by providing the model with additional data that is relevant to the task, or by providing the model with feedback on its performance. Fine-tuning can be used to improve the performance of a model on a variety of tasks, including text classification, image classification, and natural language generation.

Fine-tuning is a powerful technique that can be used to improve the performance of a model on a specific task. However, it is important to note that fine-tuning can be computationally expensive, and it may not always be possible to find a dataset that is relevant to the task at hand.

Here are some of the advantages and disadvantages of fine-tuning:

Advantages of fine-tuning:

- Fine-tuning can be used to improve the performance of a model on a specific task.
- Fine-tuning is a relatively simple technique to implement.
- Fine-tuning can be used with a variety of machine learning models.



Our Approach

We approached this project to learn about the android development environment not merely to sneak the code from tutorials and copy-paste to build something.

With this in mind, first we developed a lot of apps which implements different aspects of android ability and which were,totally unrelated to our project. Among those were a primitive calculator, username-password authentication window, Splash screen music player,a primitive camera app and others

Now, after getting pretty much exposure in android development, we decided to go ahead with our project app. Ignoring the futile attempts to add many features in our app,which unfortunately could not be made possible, the work of our final app can be divided into the following phases:

- Smart learning through Generative AI
- PDF summarising using AI
- Customised Message Notifier

Smart learning through Generative AI :

The user can enter their queries in the textbox inside our app and the AI model generates summarised key points which makes the learning process very easier for people having difficulties understanding long paragraphs.

For implementing smart learning through Generative AI we used the Openai API to fine-tune the GPT 3.5 Turbo base AI model using the Python programming language to implement smart learning through Generative AI. This AI model takes the user's query as input and passes it to the fine-tuned model with the help of the OpenAI API, then outputs the summarized key points to the user in the UI of our app.

The fine-tuning process involves training the AI model on a large dataset of text and code. This allows the model to learn the patterns of human language and code, which it can then use to generate text, translate languages, write different kinds of creative content, and answer your questions in an informative way.

The AI model is able to summarize the key points of a text by identifying the most important sentences and phrases. It then uses these sentences and phrases to create a concise and accurate summary of the text.

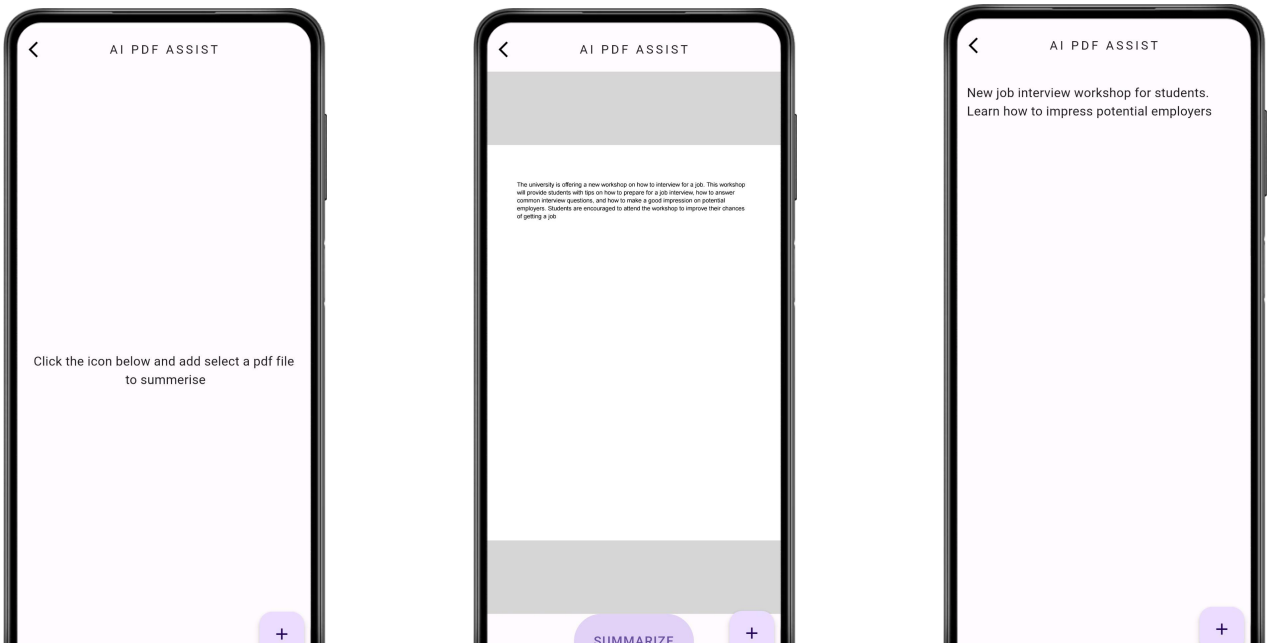
PDF summarising using AI :

Our AI model can summarize any PDF you upload in just a few words. It is trained on a massive dataset of text and code, so it can identify the key points of any document and generate a concise and informative summary. This can be a huge time-saver for anyone who needs to quickly understand a PDF, such as students, businesspeople, journalists, and anyone else who wants to stay informed.

To implement this, we fine-tuned the base AI model “GPT 3.5 Turbo” and trained it to summarize PDF content. The user can upload their PDFs using the upload button in the app user interface. The uploaded PDF is processed and the text data are extracted from it and passed to the fine-tuned model using the OpenAI API. The summarized output is then displayed on the app screen. This feature is very useful for people who don't have time to waste reading long PDF files.

Here are some of the benefits of using our AI model to summarize PDFs:

- Save time: Our AI model can summarize a PDF in just a few seconds, which can save you a lot of time if you need to quickly understand the contents of a document.
- Improve comprehension: Our AI model is trained on a massive dataset of text and code, so it can identify the key points of any document and generate a concise and informative summary. This can help you to better understand the contents of a PDF, even if it is long or complex.



Customised Message Notifier :

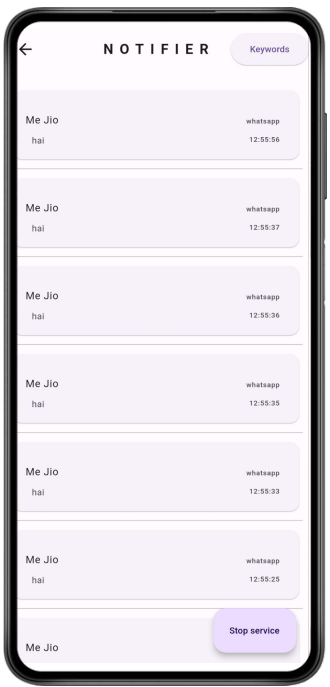
Our app provides customised message notification to the users according to their topic of interest by analysing the whatsapp messages using a package called notification listener

To implement this feature, we first added a way for users to add keywords related to their interests. The app then captures WhatsApp messages from the notification bar and checks if they match any of the keywords. If a message matches a keyword, the user is alerted with a notification. This feature uses the Flutter packages notification_listener and background_services.

The notification_listener package allows our app to listen for notifications from other apps, such as WhatsApp. The background_services package allows our app to run in the background, even when the user is not using it. This is necessary because we need to be able to capture WhatsApp messages from the notification bar even when the user is not actively using our app.

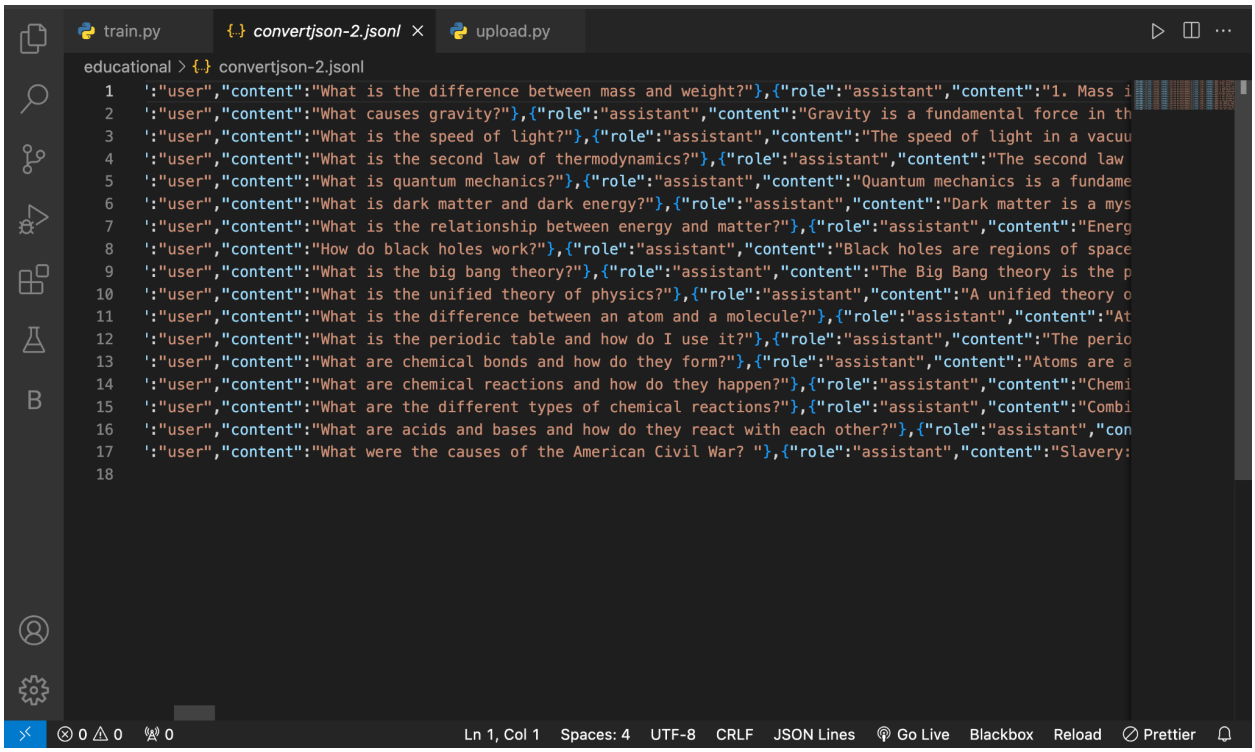
When a user adds a keyword to our app, we store that keyword in a database. Our app then periodically checks the database for new keywords. When a new keyword is added, our app starts listening for notifications from WhatsApp that contain that keyword. If a notification is received that contains the keyword, our app alerts the user with a notification.

This feature is useful for users who want to be alerted about specific messages in WhatsApp. For example, a user could add the keyword "meeting" to our app and be alerted when they receive a message about a meeting.



Accuracy Analyisis

Our application uses two fine-tuned AI models which performs two specific functions. We were able to achieve an overall accuracy of 70% . Within the time constraint we were able to achieve this level of accuracy , in future time we will improve the models accuracy by training it with more data and testing.



Sl No	No. of Queries	Successful Outcomes	Failed Outcomes
1	**10**	**6**	**4**
2	**10**	**8**	**2**
3	**10**	**7**	**3**

A Word of Thanks

- Github
- Pub.dev
- Openai
- The Flutter Way

Github Repo Link : https://github.com/aravindr001/notify2