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GENCHAT

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Abstract: Visually impaired people are not comfortable reading and writing. Hence, an application is being developed to enable blind individuals to read printed text with a camera by simply tapping on the screen using a speech engine. Additionally, a talking calculator has been designed so that visually impaired people can utilize it via voice commands. Alongside these features, several applications have been incorporated to assist blind individuals in their everyday lives. The application also displays the user's current location and provides weather information for any city or location. With the help of an object detection system, blind individuals can easily identify objects through the camera and listen to their names[1]. Furthermore, they can transfer money using a phone number or account number through a voice-based payment system implemented in the project. The application requires minimal effort from the user to be used effectively during daily activities. With the rapid growth of wireless communications, there is an increasing need for voice recognition techniques. Voice applications based on voice interfaces, recognition, and dialogue management can help users focus on their current tasks without requiring extra effort from their hands or eyes. The application listens to commands and responds with voice prompts.

Index Terms - OCR recognition, Calculator, location detector, Weather detector, text-to speech, Object detection, android

I. INTRODUCTION

This project was conceived with a paramount focus on addressing the day-to-day challenges faced by individuals who are blind or visually impaired. It encompasses a comprehensive array of functionalities, including reading assistance, location tracking, weather detection, phone battery monitoring, and time/date management. To ensure seamless accessibility, the integration of Google Speech Input technology was pivotal, enabling users to effortlessly initiate specific tasks through voice commands.

The application's user interface has been meticulously designed for intuitive interaction, allowing users to activate the voice assistant with a simple swipe gesture. This streamlined approach facilitates verbal communication, thereby enhancing user engagement and utility. Additionally, the implementation of a text-to-speech mechanism further enriches the user experience by providing clear and concise auditory feedback on the application's functionalities and operational procedures.

A notable aspect of this project is its focus on catering to the unique communication needs of the deaf-blind community. Through a combination of tactile feedback and auditory prompts, the application enables individuals to perform essential daily activities with ease. From reading text and utilizing a calculator to accessing real-time weather updates and monitoring phone battery status, every aspect of the user interface is meticulously crafted to promote inclusivity and accessibility. Furthermore, the integration of voice command functionality adds a layer of convenience, allowing users to initiate specific tasks effortlessly. By simply vocalizing predetermined commands, individuals can seamlessly navigate through the application's features, thereby enhancing their overall user experience.

II. LITERATURE SURVEY

Smartphones have become an unavoidable part of modern life. It has a number of features, including calling, messaging, and the ability to interact with others via social media. The number of smartphone users worldwide has risen to 7.26 billion, implying that 91.62 percent of the global population now possesses one [6]. This is to be expected, given that smartphones and tablets include mobile apps that provide several benefits and assist us in a variety of ways. We can, for example, use smartphone apps to make payments or even place food orders. We can also use a smartphone app to check our electricity bills and pay them directly. However, it is only useful for normal individuals, and the majority of its applications are restricted towards the visually impaired. Visually impaired people confront numerous challenges that are taken for granted by sighted people. We recognise items in our daily lives as sighted users. Without eyesight, finding an object in an unknown area is nearly impossible. In any case, visually impaired persons rely on their memories to locate their items, and they become irritated if the object is misplaced or taken. Visually impaired or blind persons are unable to visualise the item in front of them, making daily living difficult for them. They won't be able to see what the thing is even if they touch it because some objects are unfamiliar to them, and even if they can recognise the object after touching it, it will take time and the result will not always be right. People who are blind or visually challenged confront challenges that we are not aware of because we have eyes that can see. The majority of sighted people believe that blind persons can only see darkness. They believe that someone who is blind has the same experience as someone who is blind and walks around with their eyes closed. Nonetheless, it isn't. Somebody can be visually impaired and keep a specific degree of vision. For outwardly hindered individuals, their eyes should work at 20/200 vision or more regrettable This implies that their eyes are 10% as solid as those of an individual with practically no visual hindrance [7]. Outwardly debilitated individuals face troubles exploring outside the spaces they are normal to. Essentially, actual development is probably the greatest test for blind individuals. Voyaging or in any event, strolling down a jam-packed road can be trying for blind individuals. In addition, they should recollect the area of pretty much any snag or item in their home climate, for example, tables, seats and bed which ought not be moved suddenly and without notification ahead of time to keep away from mishaps [8]. Many outwardly disabled individuals simply need everybody to see them as ordinary individuals, not as individuals with inability [9]. They could feel as offended by overcompensating thoughtfulness. For example, when they request directions, assist them with going across the road and take them to their objective or counting cash for their benefit when they are purchasing something [10]. In any event, getting something, they dropped and proposing to convey their things is totally seen as overcompensating graciousness, which many visually impaired individuals believe is discourteous. Thus, we need to ask first assuming that they need assistance, and recognize it assuming they say no [11]. Other than that, outwardly weakened has limit profession choices as visual impairment influences their capacity to perform many work capacities and assignments. This definitely influences their abundance and confidence [12,13]. Visual impairment likewise may create some issues assuming they are participating in assignments outside like games. This in the long run will influence their capacity of to associate and meet new individuals, which will prompt enthusiastic and emotional well-being issues.

III. METHODOLOGY

Use The development process commenced by incorporating necessary dependencies within the Android project, facilitating the integration of external libraries, local JAR files, and other essential modules. These dependencies form the backbone of the application, enabling enhanced functionality and streamlined development. Moving forward, meticulous attention was devoted to crafting an intuitive and visually appealing user interface (UI) using XML. This stage involved structuring the layout of the application, ensuring optimal usability and aesthetic appeal. By leveraging XML, developers could delineate the placement and behaviour of various UI elements, fostering a cohesive and engaging user experience. Within the Main Activity Java file, an array of methods was meticulously crafted to empower users with the ability to interact with the application using simple voice commands. These methods serve as the backbone of the application's functionality, orchestrating seamless transitions and executing tasks in response to user input.

Fig.1 System Design

A notable feature of the application is the implementation of swiping touch events, which enhance user navigation and interaction. Left-swiping across the screen provides users with informative insights into the application's features and operations, enriching their understanding and fostering engagement. Conversely, right-swiping initiates voice input functionality, empowering users to interact with the application effortlessly. Upon receiving voice commands, the application seamlessly translates speech into actionable text through the utilization of Text-to-Speech (TTS) and Speech-to-Text (STT) functionalities. TTS functionality plays a pivotal role in providing users with voice feedback, enhancing accessibility and user engagement. In contrast, STT functionality enables users to input speech, which is then converted into text for processing. This text serves as a catalyst for executing specific actions within the application, further augmenting user interaction and functionality.

IV. SYSTEM ARCHITECTURE

The system proposes the following applications:

1. OCR reader:- After swiping right on the screen the user as to say “read” then it will ask you want to read say yes to continue and no to return to the main menu.
2. Calculator:- User has to say “ calculator” after that user has to tap on the screen and say what to calculate the application will say the answer.
3. Location :- In this user has to say location after that user will tap on the screen then it will say current location.
4. Weather :- In this user will say “weather” and then say the name of the city. After that the application will say the weather of that particular city.
5. Battery :- To check the current phone battery status the user has to say battery.
6. Time and date:- To check current time and date the user has to say time and date.
7. Object detection :- To detect the object and listen to the name of the object. Specially designed for blind.

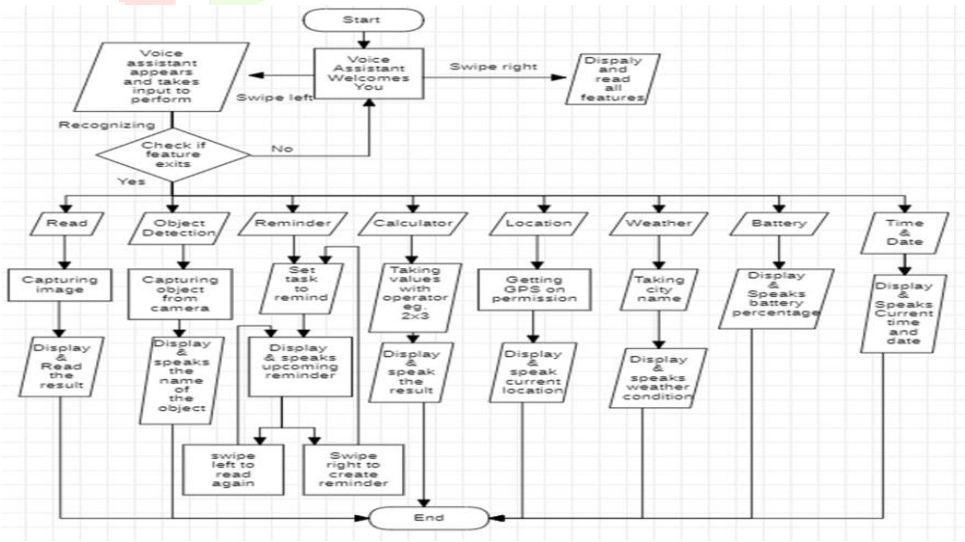

Fig.2 Flowchart

V. RESULTS

The application likely uses external libraries or modules to handle functionalities like Speech to Text and Text To Speech. These would be included as dependencies in the project.The specific output displayed or actions taken will depend on the functionalities programmed into the "read" activity or other activities within the application.

In fig.3 it is displayed that the front screen of the application when the app is opened.

In fig.4 By right swiping on the screen voice input will start. After the user gives the voice command it will automatically be redirected to that particular activity. Let's say If the user says “read” then it will automatically open the read activity. So that user will just tap on the screen and take the picture and read aloud text in it.

In Fig.5 it detects the Object infront of it using Object detection feature,it is used to detect the object and listen to the name of the object. Specially designed for blind.

In fig.6 By left swiping on the screen the user will read the feature or operations of the app.

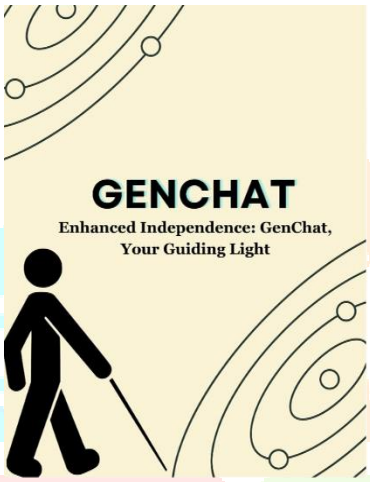

Fig.3 Front Screen

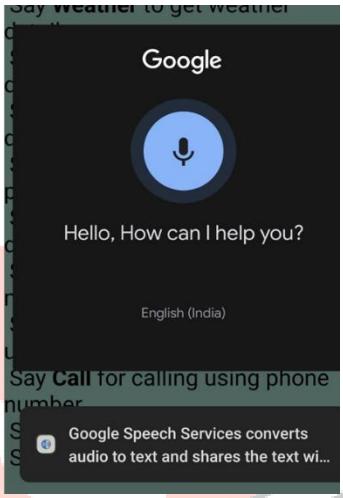

Fig.4 Voice Assistant

Fig.6 Features List

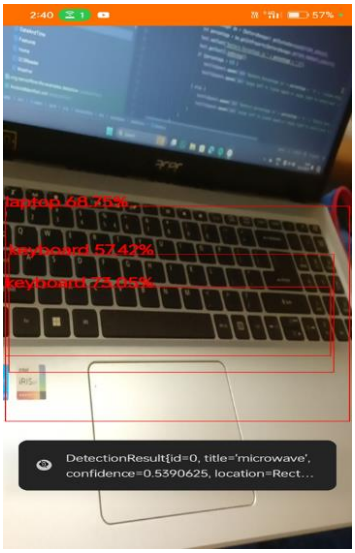

Fig.7 Object Detection

VI. CONCLUSION AND FUTURE SCOPE

Conclusion: Mobile applications have become indispensable tools in our daily lives, serving as conduits for various tasks and activities. However, individuals with vision impairments often face barriers when accessing and utilizing these applications on handheld devices such as smartphones and tablets. To address this challenge, Google and Android applications have been at the forefront of developing solutions tailored to the needs of visually impaired individuals. Despite these efforts, there remains a significant opportunity to enhance accessibility by leveraging Artificial Intelligence (AI) techniques.

This report underscores the importance of further refining existing mobile applications to better serve the visually impaired community. By integrating AI technologies, these applications can offer more effective and intuitive features, thereby improving accessibility and user experience. The report introduces two environmentally-friendly designs specifically tailored for individuals with visual impairments, highlighting the potential for innovation in this space.

Central to this initiative is the development of a specialized mobile application designed explicitly for blind individuals. This application is envisioned to provide enhanced accessibility features, catering to the unique needs and challenges faced by visually impaired users. By leveraging AI-driven solutions, such as voice commands, natural language processing, and image recognition, the application aims to streamline interactions and empower users to navigate their digital environment more efficiently.

Importantly, while the primary focus of the application is to cater to the needs of blind individuals, its utility extends beyond this demographic. The inclusive design ensures that individuals of all abilities can benefit from its features and functionalities. By fostering inclusivity, the application not only serves as a valuable tool for visually impaired users but also contributes to a more accessible and equitable digital landscape for all.[10]

In conclusion, the development of an AI-enhanced mobile application for visually impaired individuals represents a critical step towards improving accessibility and inclusion in the digital realm. By embracing innovative design principles and leveraging AI technologies, such applications have the potential to revolutionize the way individuals with disabilities interact with mobile technology, ultimately enhancing their quality of life and fostering greater independence.

Future Scope: Multi-Language Support: Implementing multi-language support for both text recognition and voice commands would significantly enhance the accessibility and usability of the application on a global scale. By accommodating multiple languages, the app can cater to a diverse user base, allowing individuals from different linguistic backgrounds to utilize its features effectively. This inclusivity promotes accessibility and ensures that users worldwide can benefit from the app's functionalities without language barriers.

Offline Mode: Introducing an offline mode for text recognition addresses the challenge of limited connectivity, particularly in areas with unreliable or unavailable internet access. By enabling users to perform Optical Character Recognition (OCR) tasks without relying on an internet connection, the app's functionality becomes more robust and dependable. This offline capability enhances user experience and ensures uninterrupted access to essential features, even in remote or offline environments.

Custom Object Detection: Custom object detection empowers users to personalize the app according to their specific needs and preferences. By allowing users to train custom object detection models, the app becomes more versatile and adaptable to diverse use cases. Users can define and teach the app to recognize specialized objects or items relevant to their daily lives, such as medical equipment, personal belongings, or unique items specific to their profession or hobbies. This customization enhances the app's utility and relevance to individual users, fostering a more personalized and tailored experience.

Integration with IoT Devices: Integration with IoT devices expands the app's capabilities beyond its standalone functionality, enabling seamless interaction with connected devices and smart systems. By integrating with IoT platforms, users can leverage recognized objects to trigger actions or control smart home devices, enhancing convenience and efficiency. For example, users could use the app to identify groceries and automatically add them to a shopping list, control lighting or temperature settings based on recognized environmental cues, or access additional information about recognized objects from connected databases or

services. This integration with IoT devices extends the app's utility and creates new opportunities for interaction and automation, enhancing user experience and functionality.

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