A SMART NAVIGATION AND AUTOMATED SYSTEM FOR BLIND PEOPLE

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ABSTRACT

"A smart navigation and automated system for blind people" is a project that helps the visually impaired in the whole world to get better access to their surroundings. The project provides an alert system through vibration and speech systems. Nowadays, when it comes to traveling alone, the visually impaired always need a guide, whether it be the cane, the noise in their surroundings, a guide dog, assistive technology, or a relative. This project is an assistive technology that consists of an object detector, speech to text converter, and text to speech converter. With the help of the aforementioned technologies, it finds the direction of the object for the visually impaired.

Keywords: AWS, API, Voice recognize.

I.INTRODUCTION

In many developing places worldwide, the count of visually impaired people is nearly 285 million as calculated by the World Health Organization". Those people who have low visual capacity are a visually impaired person. Blind or partially sighted people are Visually impaired persons (VIP). In day to day life visually impaired people are unable to do some tasks. The aim is to develop an application for the blind and visually impaired people. On the other hand, an object detection system using vibration is added to this device to reduce navigation difficulties of the blind. The proposed system detects the position and angle of the nearest object to inform the visually impaired person of its location. Historically the technologies for orientation and mobilization have been in development since world war 2. Earlier attempts focused on systems that would replace a cane or a guide dogs but these days, the development of technologies have been mainly focused on support systems rather than out right replacement for canes and guide dogs. With the advancement of technology, a variety of electronic aids have been developed for the visually impaired, the most common of which use ultrasound. These devices use ultrasound to measure the

time taken for a wave of sound to be reflected back which as a result can be used to measure distance. This device uses the camera instead to detect objects.

II.LITERATURE REVIEW

Traditionally the assistive systems available for visually impaired were a long cane, white cane, short cane, kiddie cane, guide cane, identification cane, and support cane. None of these provide information about the obstacle until the user encounters them physically. Voice-Based Guidance and Location Indication System for the Blind Using GSM, GPS, and Optical Device Indicator. This method involves finding the location of the user and obstacles in the user's path. The main disadvantage is they developed a new model that was too heavy to hold and inconvenient to carry around Electronic Guide Cane with Ultrasonic eyes for Visually Impaired.

Voice-Based Navigation System for Blind People Using the camera. This model involves detecting obstacles and providing guidance through voice but the disadvantage is the use of complex text to speech and speech to text conversion through Google API, Pocket sphinx, Raspberry pi.

We developed an android application that guides the user through voice commands from his respective source to his particular destination. It is used to detect the obstacles along the path and pass the same information to the user. The application alerts the user and guides him/her to a safer path. When the blind reaches a decision point, for instance, a point at which the route takes a left turn, the user presses a key on the aid coded with a left turn instruction. This has two effects: - The distance traveled is stored in the memory of the; microcontroller, and the counter reset to zero. - The left turn instruction is stored. Afterward, the blind person walks to the next decision point and the above procedure is repeated. In the playback mode, the aid measures again the distance traveled by the user.

III. PROPOSED SYSTEM

The objective of this application is to guide unsighted people with a smart device using an Android Phone. This device is innovative and an effective guide system for Visually Impaired People (VIP). Blind people's major problem is to navigate the indoor region. The main scope of the project is it allows you to control your phone using your voice. This system is based on Android technology and designed for trying to solve the impossible situation that afflicts the blind people. Users can command a mobile device to do something via speech. These commands are then immediately interpreted by the Speech Recognition Engine (SRE) and APIs that convert speech into text for direct actions. Firstly, we will start our application and then will ask for help. After asking for help the app will recognize the voice of the user. If the voice recognized then we will ask for the object which we want to detect. Then the app will start detecting that particular object and as soon as the app will detect the object it will create vibrations and will show us the direction of the object.

Fig.1: Flow chart

IV. TECHNOLOGY USED

Android Studio: In May 2013, at Google, I/O announced a software, and in December 2014 released first stable build. Android Studio is available for many platforms like Windows, Mac, and Linux desktop platforms. For Android application development replaced Eclipse Android Development Tools (ADT) as the primary IDE. For Android application development, Android Studio is the official integrated development environment (IDE).

XML: XML stands for Extensible Mark-up Language. XML is a mark-up language much like HTML used to describe data. XML tags are not predefined in XML. We must define our Tags. XML as itself is well readable both by humans and machines. Also, it is scalable and simple to develop. In Android, we use XML for designing our layouts because XML is lightweight language so it doesn't make our layout heavy.

Java: Oracle has two products that implement the Java Platform Standard Edition (Java SE) 8: Java SE Runtime Environment (JRE) 8 and Java SE Development Kit (JDK) 8. JDK 8 is a superset of JRE 8 and contains everything that is in JRE 8 plus tools such as the compilers and debuggers necessary for developing applets and applications.

Python: Python is a high-level, interpreted, general-purpose programming language. Structured programming and object-oriented programming are fully supported, and many of its features support aspect-oriented programming and functional programming (including by metaobjects and metaprogramming (magic methods)).

Machine Learning -Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of Computer Programs that can change when exposed to new data.

TensorFlow - For numerical computation using data-flow graphs TensorFlow is an open-source software library. It was originally developed by the Google Brain Team within Google's Machine Intelligence research organization

for machine learning and deep neural networks research, but the system is general enough to be applicable in a wide variety of other domains as well.

OpenCV - OpenCV (Open Source Computer Vision Library) is an open-source computer vision and machine learning software library. To provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products OpenCV was built.

Google speech recognition- Google Speech-to-Text enables developers to convert audio to text by applying powerful neural network models in an easy-to-use API. Recognizes more than 120 languages and variants to support your global user base this API is used.

V. IMPLEMENTATION

1. Home page

Fig.2: Home Page

This is the page that opens up when the user starts up the app. The only button that the user can click is the find me an object button.
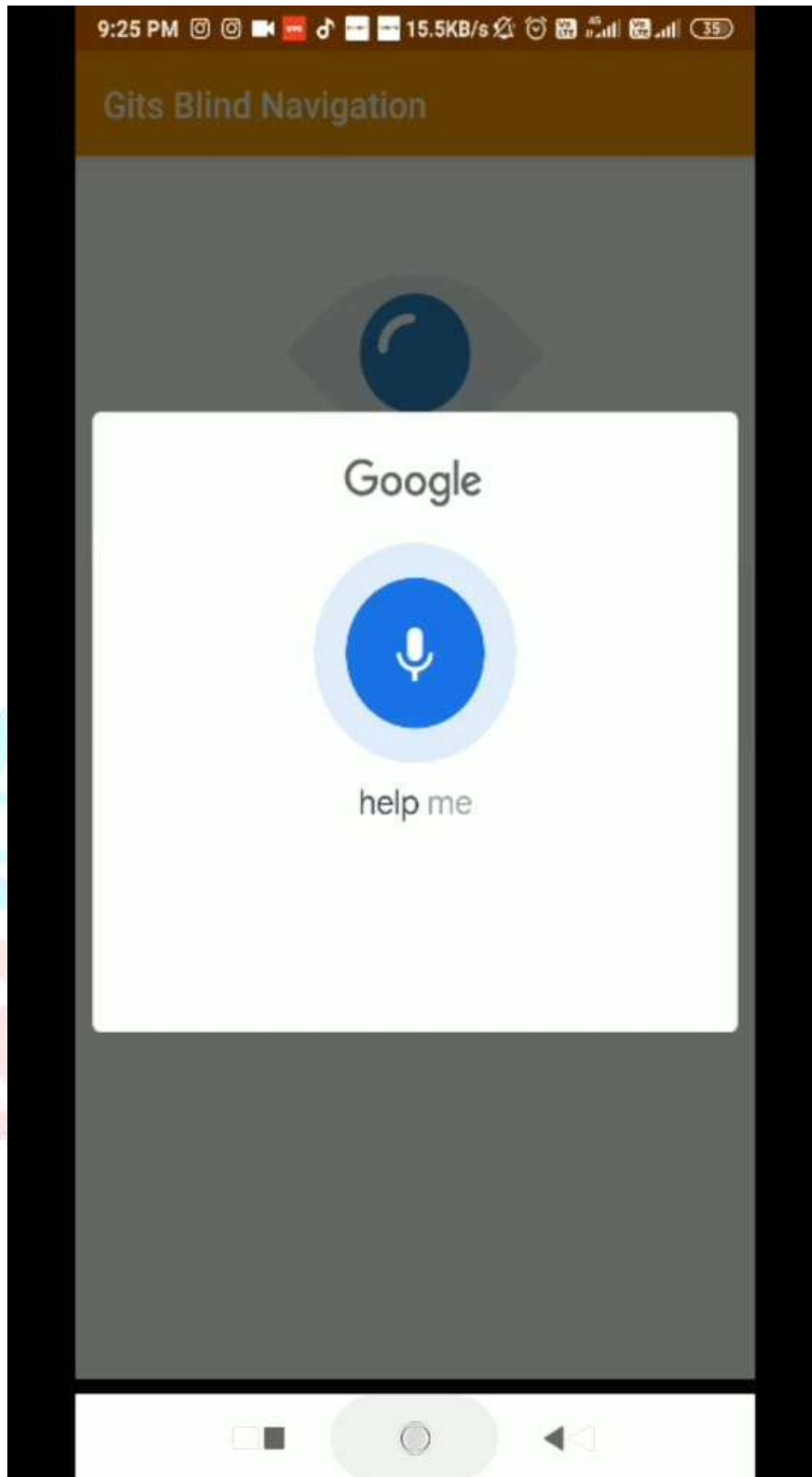
2. Voice recognizer
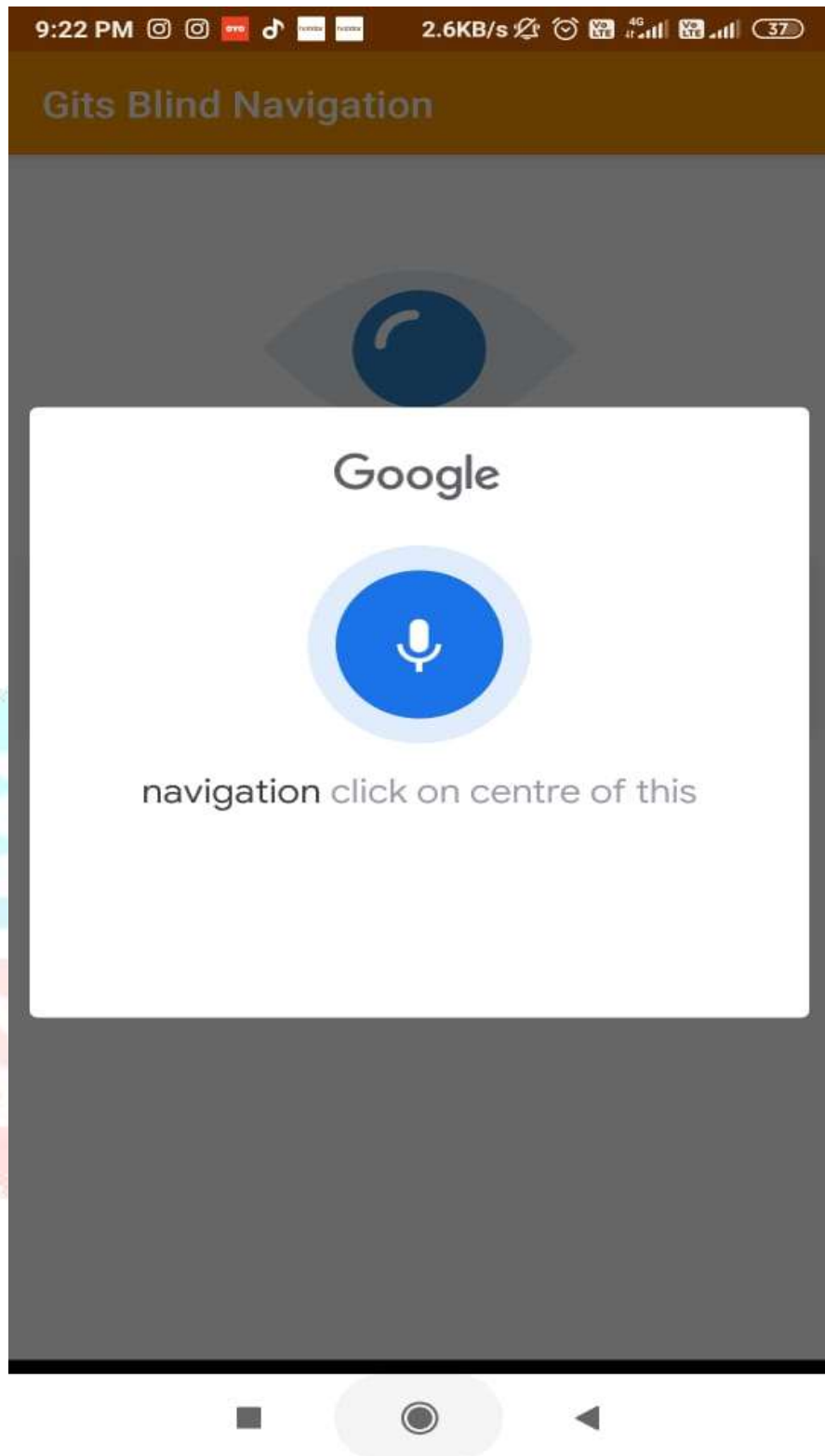
Fig.3: Recognizing the user's voice

This is the page that the user sees after clicking on the find me an object button. The app will recognize the command given by the user with the use of their voice.
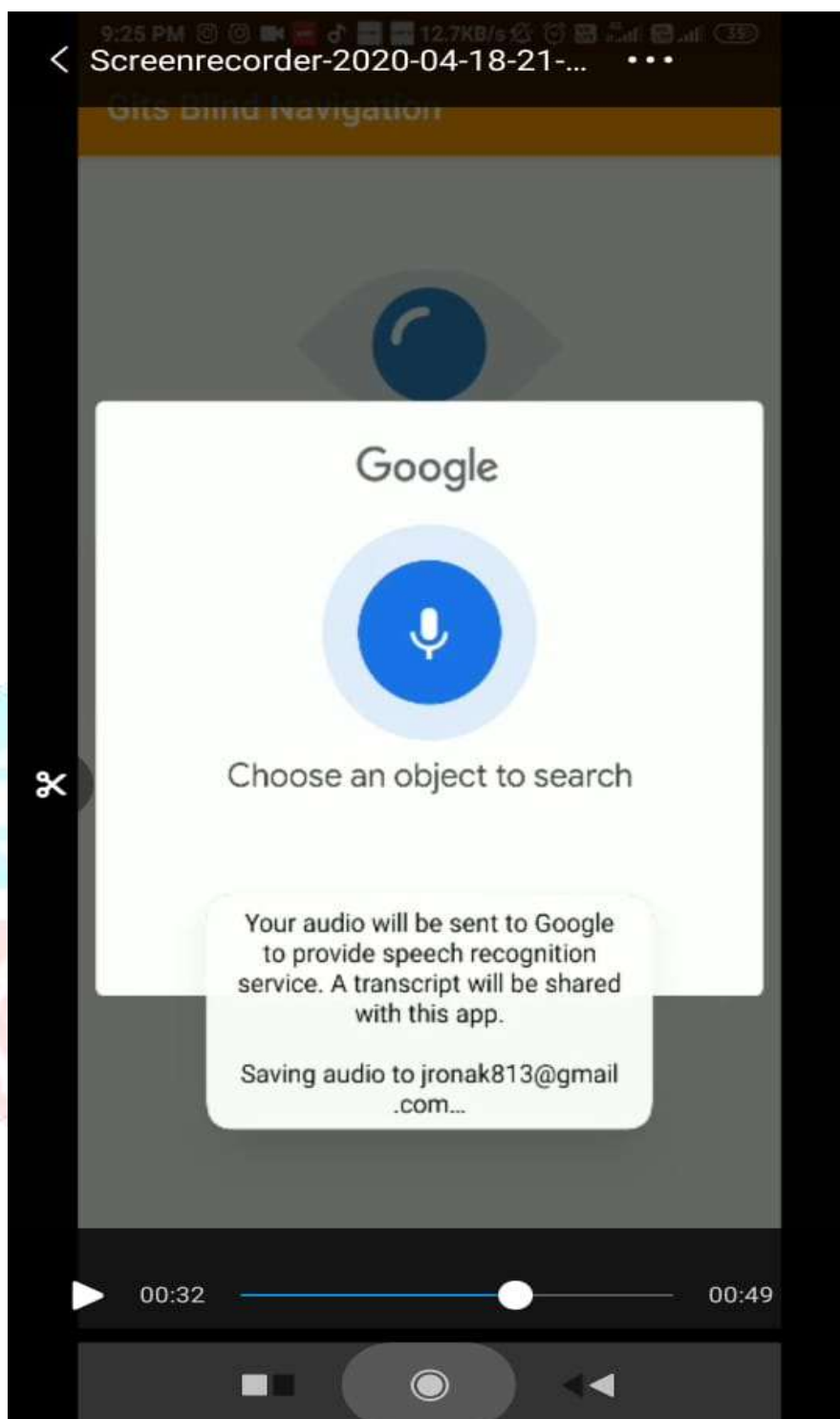
3. Ask for help

Fig.4: Asking for help

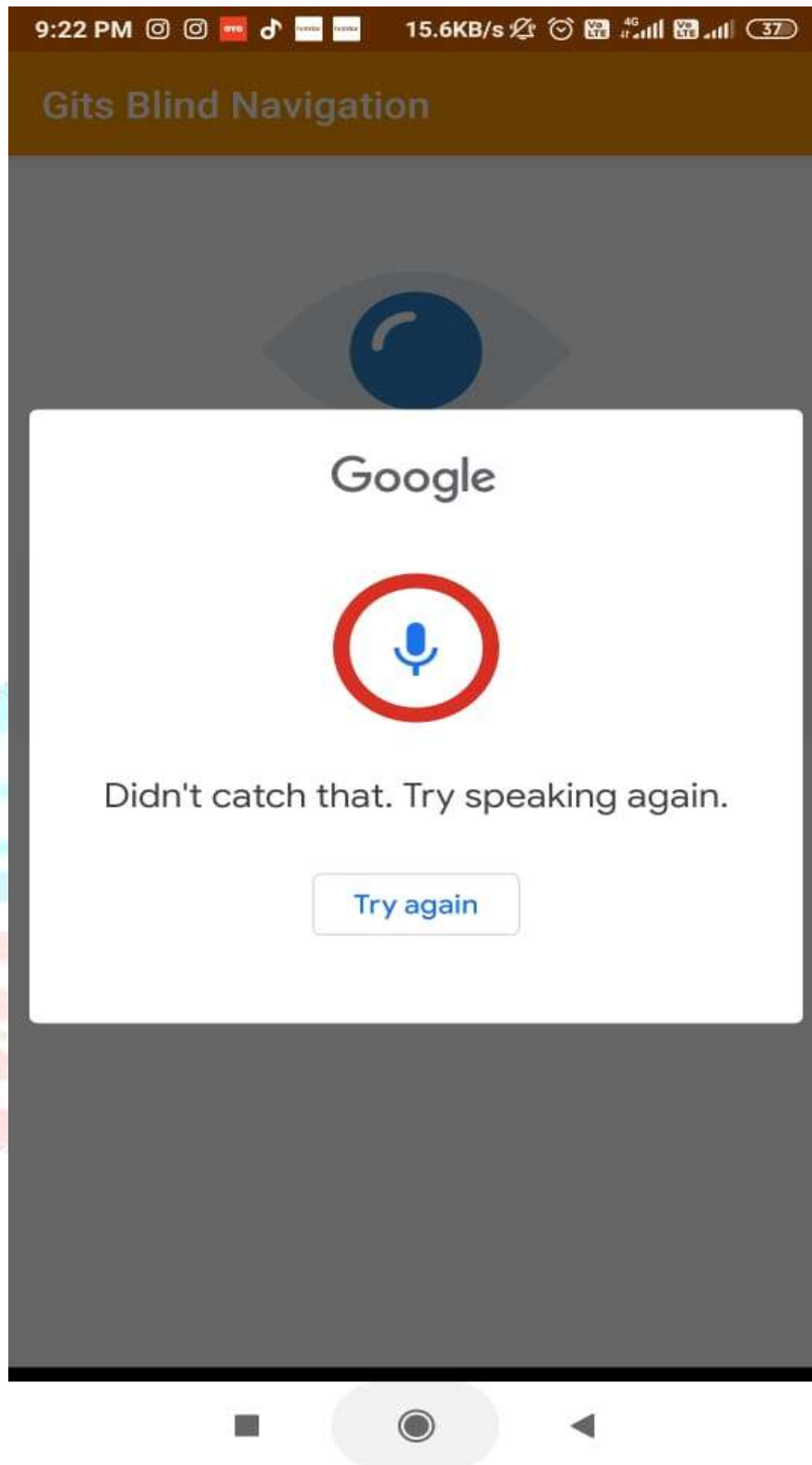The user needs to ask for help from the app to find the object they are looking for.

4. Search object

Fig.5: Search object

Here the user will speak the name of the object that they are looking for.

5. Show error

Fig.6: Voice recognize an error

If the situation comes up that the app is unable to recognize the command then the device will vibrate and the above prompt will come up. The user will need to tap the screen to give the command again.

6. Test result page

Fig.7: Test result

This is the page that will find the object for the user. The device will vibrate and say object found when the object is indeed found.

V.CONCLUSION & FUTURE ENHANCEMENT

The proposed system helps the visually impaired to move independently and safely. It can be used in any indoor place. As it is a voice-based system, the user can provide the object easily. This system is designed in less time with low cost and low power consumption. The application requires less space and it is dynamic. Compared to other existing systems, this system is more efficient. The future scope for this project is to develop an application for outdoor navigation and it will also detect the distance of the object from the user.

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