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Vision Application for Visually Impaired People

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Abstract: ***The Vision Eye application is a novel solution that aims to assist visually impaired individuals in their daily lives. The application uses computer vision algorithms and artificial intelligence to detect the user's surroundings and provide them with real-time auditory feedback about the objects and people around them. The Vision application uses a smartphone camera to capture images, which are then analyzed by the app's algorithms to identify objects, people, and other environmental features. The app then converts this information into auditory feedback that is relayed to the user through headphones or earbuds. The application also includes voice recognition and GPS navigation to enhance the user's experience. The Vision application has the potential to significantly improve the quality of life of visually impaired individuals by providing them with greater independence and autonomy in their daily lives.***

Keywords: Application, Blind People, Impaired, Object recognition, Path detection, Vision, Voice.

I. INTRODUCTION

The Vision application is a promising technological solution to address the challenges visually impaired people face. Visually impaired individuals often face difficulty navigating and interacting with their surroundings, limiting their independence and leading to social isolation. The Vision application, based on computer vision and artificial intelligence, offers a novel way to enhance the sensory perception of visually impaired individuals by providing them with real-time auditory feedback about their surroundings.

This paper aims to present the Third Eye application as a solution to the challenges faced by visually impaired individuals. The paper will begin by providing an overview of the current state-of-the-art technologies used to assist visually impaired individuals. It will then introduce the Vision application and discuss its design, features, and technical specifications. The paper will also present the results of user studies conducted to evaluate the effectiveness of the Vision application. the Vision application has the power to dominantly improve the level of life of visually impaired people by envoking their independence, safety, and mobility. The paper will conclude by discussing the future directions for research and development of the Vision application and its potential impact on the field of assistive technology for visually impaired individuals.

The Vision application is a promising technological solution that can significantly enhance the sensory perception of visually impaired individuals by providing them with real-time auditory feedback about their surroundings. The application is based on computer vision and artificial intelligence, which allows it to detect and analyze the user's surroundings in real time. The app then converts this information into auditory feedback that is relayed to the user through headphones or earbuds.

The Vision application is designed to be highly user-friendly and customizable. Users can adjust the settings to suit their individual needs and preferences. The application includes features like voice recognition and GPS navigation, which further enhance the user's experience. In addition, the Vision application is highly scalable and can be easily integrated with other assistive technologies to provide a comprehensive solution for visually impaired individuals.

As technology continues to advance, there is a growing need for innovative solutions to address the challenges faced by visually impaired individuals. The Vision application is one such solution. It is a novel and innovative application that uses computer vision and artificial intelligence to provide real-time auditory feedback to visually impaired individuals about their surroundings. power to dominantly improve the level of life of visually impaired people by envoking their independence, safety, and mobility.

Visual impairment is a significant health issue that affects millions of people worldwide, with a profound impact on their daily lives. It is a condition that can limit the independence and mobility of visually impaired individuals and pose a significant challenge to their safety and quality of life. Over the years, researchers and technologists have been exploring various innovative solutions to address the challenges faced by visually impaired individuals.This paper aims to explore the current state-of-the-art research and technologies used to assist visually impaired individuals. It will present a comprehensive review of the existing solutions, including their design, features, and effectiveness. The paper will also examine the challenges and limitations of the current solutions and discuss the future directions for research and development of assistive technologies for visually impaired individuals.

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One of the most promising technological solutions for visually impaired individuals is the Vision application. It is an innovative application that uses computer vision and artificial intelligence to provide real-time auditory feedback about the user's surroundings. The Vision application has been evaluated in several studies and has shown promising results in enhancing the independence and mobility of visually impaired individuals.

The paper will also present several use cases of the Vision application and other assistive technologies, including their application in daily life, education, and employment. The use cases will demonstrate how these technologies can significantly enhance the lives of visually impaired individuals by improving their independence, safety, and overall quality of life. the paper will provide a comprehensive analysis of the current state-of-the-art research and technologies used to assist visually impaired individuals. It will also highlight the need for continued research and development of innovative solutions to address the challenges faced by visually impaired individuals and improve their lives.

II. LITERATURE REVIEW

Kasturi R Nivetha B et all. This research paper describes that This application lies on Android tech and is made to: tries to find solution for impossible situations that afflict the visually impaired Man. The app help users to open any app In addition to calling contacts using voice commands, the. User, You can command her mobile device to do something by voice [1].

Milios Awad Jad El Haddad et all. The paper is on the app the application assists It helps visually impaired people by providing many useful features. The application targets visually impaired people and provides them with a set of useful features such as light detection, color detection, object recognition, and banknote recognition [2].

Pamely Zantou Mikael A et all. This work presents an electronic cane that enables the visually impaired to move around without having to resort to caregivers or traditional solutions. Indeed, it helps its user to detect obstacles in height as well as on the ground within a radius of two meters (2m), which sends voice commands back to its user to enable him to avoid the obstacle that stands in his path and which has applications to follow him [3].

Krzysztof Dobosz. The paper mainly focuses on the rapid development of information technology has made access to mobile applications for visually impaired people became difficult. The techniques are screen readers, screen magnification, voice commands recognition, etc. are used to help visually impaired people in every application available [4].

Sumitra A. Jakhete Avanti Dorle et all. The research says that very much so Necessary for visually impaired people to understand their surroundings, and know what objects they are interacting with. integrate Various techniques for creating rich Android applications that can do just that in addition to detecting nearby objects for the visually impaired, not only in real-time but also provide audio output to support them as soon as possible [5]

Parminder Kaur Mayuri Ganore et all. This paper possesses the methods like Speech applications based on voice interfaces, speech recognition, and spoken dialog management to help users focus on the task at hand without extra strain on their hands and eyes. The application also the application listens to your commands and then responds with voice commands by talking. The application converts your voice into text. Keywords-Text-To-Speech, Visually Impaired Peoples, Mobile Devices, Voice-Based Interfaces, Speech-To-Text [6].

Ritik Singh. The research is on Third Eye for Blinds is an innovation that helps the blind. A person who recognizes and can navigate quickly and safely. Nearby obstacles and notify by buzzer or vibration. I only need you to Wear this device as a band or cloth. strength of Vibration and beep frequency increase as frequency decreases distance and this is a fully automated device [7].

Ayat Nada Ahmed Farag Seddik. This paper suggests a solution for visually impaired people presented on a smart stick with an infrared Stair detection sensor and 2 ultrasonic sensors for the detection of All other obstacles in front of the user within 4 m. In addition, another sensor is placed on the underside. The stick can detect all obstacles in the area of 39 ms with a range of 4 meters, emitting a proper Respect meld that Allows the blind to move twice as fast as her [8].

Piotr Kardys Adam Dąbrowski et all. This article describes a new Android application that Assists the visually impaired in using smartphones. make calls, send and receive text messages, "Phonebook" and additional options Location or battery monitoring by voice command. Software concepts and their respective structures. The application will be displayed in detail [9].

III. METHODOLOGY

Android is a software mound and mobile operating system that includes a mobile device operating system, middleware, stoner interface, standard operations(web cyber surfed, dispatch customer, SMS), and multimedia communicating service(MMS). We give the needed operations through the Android Software Development Kit(SDK) and develop colorful tools and APIs.

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Effective perpetration of the model depends on Python comity and library installation hurdles. This is one of the hardest stages I have set up erecting this design. Credit to Stack Overflow and Python Unofficial Binary Releases for uploading there-built lines, which can be fluently downloaded then, depending on system comity. I enforced it using the TensorFlow API.

The advantage of using the API is that it provides a set of common operations. So you do not have to write the law for your program from scrape. Both can be said to be veritably helpful and effective. APIs bring us convenience and save time. The TensorFlow Object Discovery API is a structural figure for creating deep literacy networks that break object discovery problems.

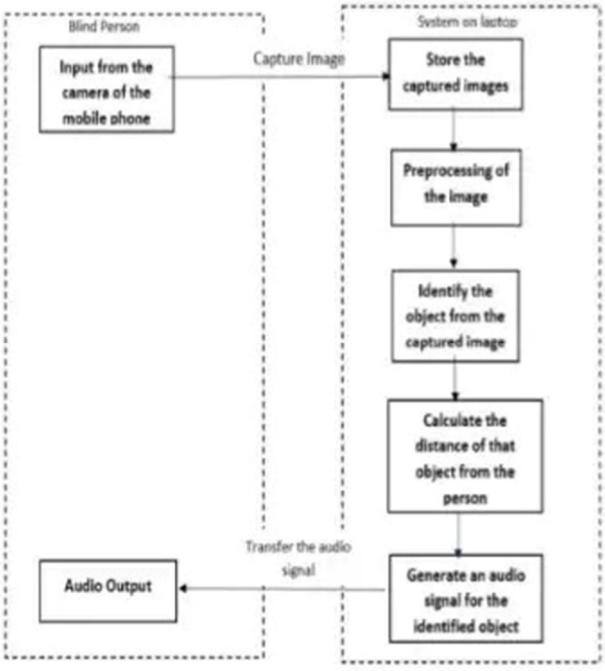


Fig.1 Flowchart for third eye application for visually impaired people

The proposed system will enable an eyeless person to operate her Android phone effectively. An eyeless person wanted to be suitable to use his phone for services like making phone calls, reporting battery situations, playing music, and getting the rearmost updates on his Android phone. In the system proposed in Figure 1, all services can be attained by voice command. Selendroid enables the communication between smartphones and colorful web waitersIt has the ability to recognise spoken languages and translate them into a machine-readable format. This process here is done by her SRE. Each speaker's input is read and separated into vocabularies. The system can performs conduct that normal people typically do. A personality who needs to use an Android phone should use a microphone or headset to speak to her SRE. SRE converts speech to the textbook. The textbook is passed as input to the command's recognizer. Commands are honored and linked using a morphological analyzer.

The SRE affair controls dialers, music players, Selendroid armature(SA), and Google Charts. Dialer Manager has options to telephone, hold and hang up. Music director includes play, stop, break, presto forward, and rewind music tracks. When the battery is low, a battery communication will appear to indicate that the range has been reached. H. The 20 system uses Google Charts to identify the longitude and latitude of superstars and partake them with stakeholders. The data subject is a given person of personality. equals allow subjects to fluently pinpoint the stoner's exact position. therefore slightly prostrating the missing situation script. Once the position is known, the stakeholder calls the stoner to check the status of the missing script.

The Android app is that the model is erected into the Android app. This app uses your smartphone's hinder-view camera for real-time processing.

IV. RESULTS AND DISCUSSIONS

In this section, we showcase some findings that demonstrate the effectiveness of the Vision mobile app in detecting objects and identifying banknotes. Numerous algorithms and models have been developed in the field of Object Detection and Recognition through extensive research and experimentation in Computer Vision to achieve near-perfect results. Additionally, smart tools can see objects, sound, and motion, and can lead users from sound or vibration.

As a result, using smart devices for guidance can be highly beneficial for people who are blind or visually impaired. Consequently, to promote the future market for this group of people. Big data and smart devices could be used to make assistive technologies and goods like road situation signal acquisition modules and data acquisition process control modules.



Fig. 2 Output results for third eye application for visually impaired people

Fig 2 is showing the output results of Vision application for visually impaired people. This system gives recognized image output with the help of some libraries and an esp32 camera module. It detects the objects present in the frame at the instance of time. this feature also labels the objects as mentioned by their names.

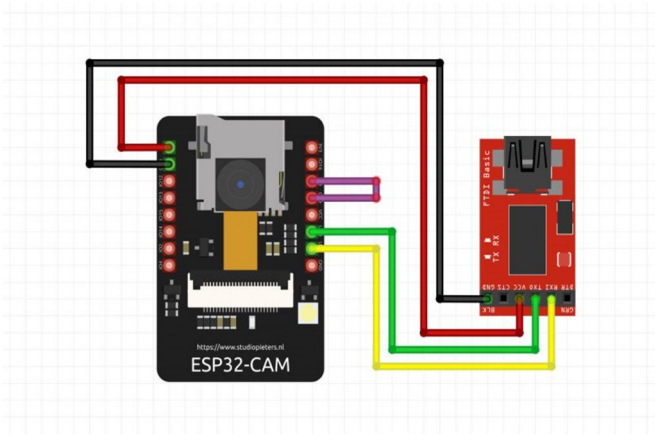


Fig. 3 Circuit diagram of hardware connections of third eye application for visually impaired people

A. ESPcamera Module

1) GND (ground) connects to the GND pin of FTDI
2) EN (enable) connects to the 3.3V pin of FTDI through a 10K resistor
3) IO0 (input/output) connects to the GND pin of FTDI through a push button
4) TXD (transmit) connects to RXD (receive) pin of FTDI
5) RXD (receive) connects to TXD (transmit) pin of FTDI

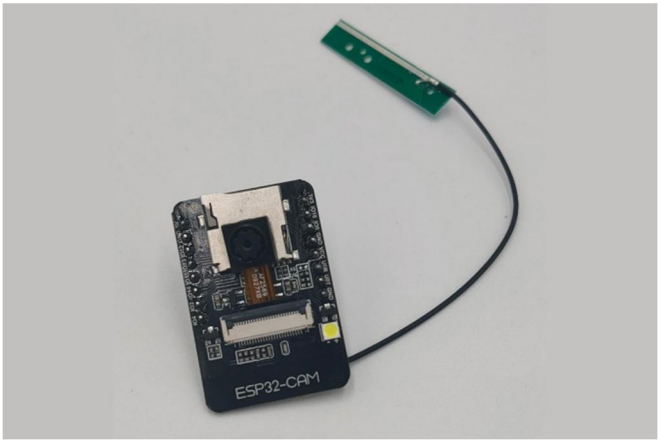


Fig 4 ESP32 cam module for third eye application for visually impaired people

V. LIMITATIONS

The effectiveness of the "Vision" application can be affected by environmental factors such as lighting conditions and obstacles in the user's path. For example, if the camera is facing the sun or other bright light sources, it may cause discomfort to the user or even make it impossible for the camera to capture useful information. The "third eye" application may not be able to provide detailed information about objects such as their color or size, which can limit the user's ability to navigate their environment effectively. The cost of the "Vision" application can be a significant barrier for many visually impaired people.

VI. FUTURE SCOPE

The addition of new functions including barcode scanning and reading, a personal card reader, a GPS reader, a pedestrian guide, and a traffic signal detector are just a few examples of future improvements. These include the integration of the app with wearable devices like smartwatches, improved algorithms for object recognition and path detection, integration with other assistive technologies like Braille displays, and the addition of features like face recognition and text-to-speech conversion. Also, the system will conduct further studies and user testing to improve the overall performance and usability of the app and to expand its availability to visually impaired individuals in other regions of the world. Additionally exploring the use of machine learning and artificial intelligence techniques to further improve the app's accuracy and functionality.

VII. CONCLUSION

This system presents an affordable, dependable, portable, power-efficient, and sturdy solution for navigation with a fast response time. Approximately 5% of the global population consists of visually impaired individuals, with over 26 million residing in Africa. Similar to able-bodied individuals, they require social integration. However, they can better manage objects or situations, such as cars or bikes approaching them, if they can recognize them more easily. To address this issue, we developed the Third Eye mobile application for Android. The application is designed for visually impaired individuals and includes features such as object recognition, path detection, and banknote recognition. The application has a user-friendly interface tailored for individuals with visual impairments. Detection outcomes are read aloud so that the user can hear them. The results demonstrate that the application accurately detects objects, paths, and banknotes.

VIII. ACKNOWLEDGMENT

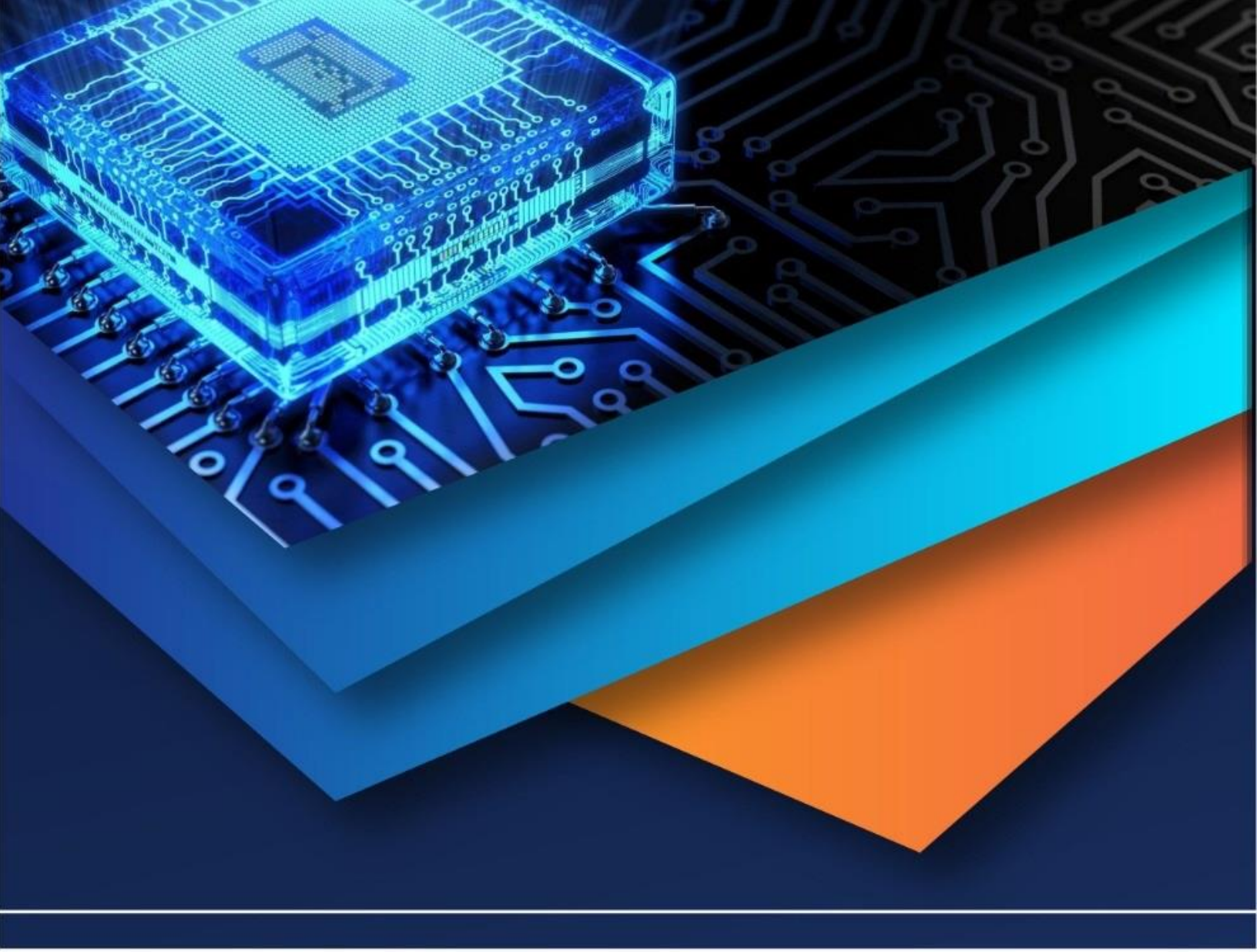
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