

ANDROID APPLICATION FOR VISUALLY IMPAIRED PEOPLE BASED ON AI TECHNOLOGY

Abhishek More*¹, Tushar Gayakwad*², Mansi Suryawanshi*³,
Suraj Kshirsagar*⁴, Prof. Pragati Deole*⁵

*^{1,2,3,4}Computer Engineering, Smt Kashibai Navale Of Engineering Vadgaon Bk, Pune, India.

*⁵Guide, Computer Engineering Dept, Smt Kashibai Navale Of Engineering Vadgaon Bk, Pune, India.

ABSTRACT

In today's technologically computerized world, the need of self-dependent is acknowledged in case of visually challenged people who are facing main problem of social antagonistic. They suffer in strange surroundings without any manual help. Optical information is the basis for most tasks, so visually challenged people are at drawback because necessary information about the surrounding environment is not available. With the help of recent technology, it is possible to provide the support given to people with visual impairment. This project is to help those people who are blind or visually impaired using Artificial Intelligence, Machine Learning, Image and Text Recognition. The idea is manifested through mobile application that clearly focuses on voice assistant, image recognition, currency recognition etc. The app is also able to assist the users using voice command to recognize objects in the day-to-day life, do text analysis to recognize the text in the hard copy document. It will be an efficient way in which visually challenged people can also link with the world with the help of technology and employ the potentials of the technology.

Keywords: OCR Recognition, Calculator, Location Detector, Weather Detector, Text-To- Speech, Android.

I. INTRODUCTION

VISUAL impairment is a major disability faced by the visually challenged people. A person who cannot see can never feel the emotion that a person feels who can see the world. This visibility problem is a black dot faced by billions of people around the entire world. Our focus is to eliminate this black dot with the help today's hi-tech advancement's (Artificial Intelligence and Machine Learning). Sight-impaired present severe consequences on particular capabilities related to optical function:

- The daily activities (that requires a vision at an average distance).
- Conversation, reading, writing (which requires a precise vision and average distance).
- Estimation of area and the displacement (which require a far vision).
- The trailing of an activity includes an increased care of visual observation.

The currently existing system uses speech synthesis to read books for the visually challenged using applications and converts the document/soft copy of the books to the speech using natural language and Text-to-Speech. Major problem with the existing system is that it works only for single language (English), and not amicable with other languages. It does work online and always requires internet connection for the feedback/response. The proposed system uses Artificial Intelligence to assist the visually impaired people which is all based on voice command. It also does image recognition of the photographs clicked or uses camera to recognize the objects and describes them in audio and also a chat bot to have light and friendly discussion.

II. PROBLEM STATEMENT

Blind people can't tell the exact time. As we know an assistant or helper always needs for a blind person to go out. But, If they visit a place more than once, they can go there without any helper or assistant and if it is a new place, they need an assistant to visit there. Blind people face problems to recognize money. They cannot differentiate between departmental stores and restaurants. Only hearing voices or noise, they can differentiate among humans, vehicles and other animals. Mostly, Blind people cannot pass roads without any help. In communication, they can recognize only their known voices.

III. LITERATURE SURVEY

The References surveys tell us that our society has a notable number of disadvantaged people and large proportion of them are visually challenged. Vision challenged classifications:

- (1) Mild disability – presenting visual acuity worse than 6/12.
- (2) Moderate disability – presenting visual acuity worse than 6/18.
- (3) Severe disability – presenting visual acuity worse than 6/60.
- (4) Un sighted – presenting visual acuity worse than 3/60.

among all the senses, capability to see via the eyes is one of the maximum crucial senses in humans. And the loss of this potential significantly impacts all of the feasible moves an character is likely to do in his/her existence. considering that such people are not expected to develop of their profession as lots as an abled person, they frequently experience a violation of their rights and also discrimination on social structures & at the place of job.

Government and civil society play an important role in making the visually impaired life easier and safer by organizing campaigns and providing education with new tools and technologies. In, the method is proposed when the image is captured using a camera and the captured image is scanned from left to right to detect an obstacle and produce sound. Sound is produced by analysing an image in which the top image is converted into a high frequency and the lower part into a subtitle sound. And the height depends on the brightness of the image as well. Nowadays, blind people are very advanced than our imagination. They are able to operatemobile phone even laptop, computer by using different applications. We contacted some blind people and told them about our project. Most of them appreciated us and happily thanked us.

An intelligent Assistant for Blind named VISION EYE is an Android application. It used Speech Synthesis and textual content reputation to understand the text from a pdf report and synthesize it to the consumer. A textual content report or a .ppt record is transformed right into a .pdf via spotting a set of words. as the application is constructed on android, it makes use of pre-defined APIs for text-to-speech conversion whichmakes the method even extra green. However, it doesn't recognize Text through image Google's Vision APIis used. Total percentage of blind people among all population is 3.44%, from that 53.1% people use the android mobile and remaining are not.

IV. SYSTEM ARCHITECHTURE

The system proposes following applications:

1. OCR reader:- After swiping right on the screenuser has to say “read” then it will ask you want to read say yes for continue and no to return the main menu.
2. Calculator:- User has to say “ calculator” afterthat user has to tap on the screen and say what to calculate then application will say the answer.
3. Location :- In this user has to say location afterthat 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 application will say the weather of that particularycity.
5. Battery :- To check the current phone batterystatus user has to say battery.
6. Time and date:- To check current time and dateuser has to say time and date.
7. Object ;- To check the object front of the blind person

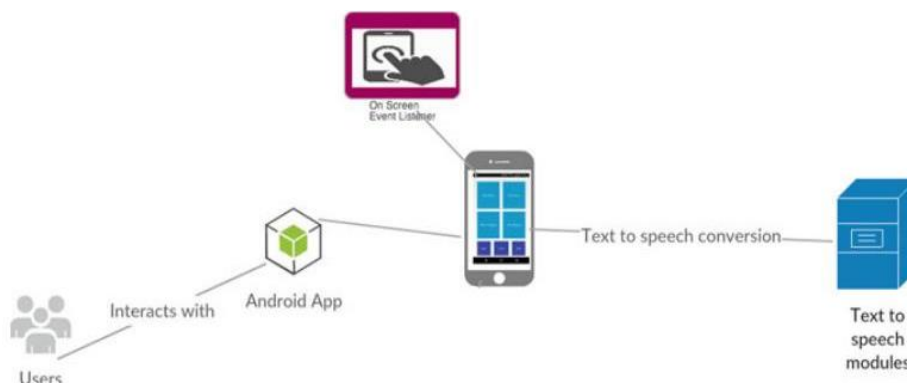


Fig 1: System Architecture

The requirements were arranged in two groups: user interface , functional requirements

► **(1) User interface**

- Easily accessible
- Flexibility of voice control (Set speed, pausespeech)

► **(2) Functional requirements**

- Switching among the different voices
- read the text (OCR Reader)
- Calculator
- Weather
- Location
- Battery
- time and date
- Object (object detection)
- Exit - close the app.

4.1 Image Pre-processing

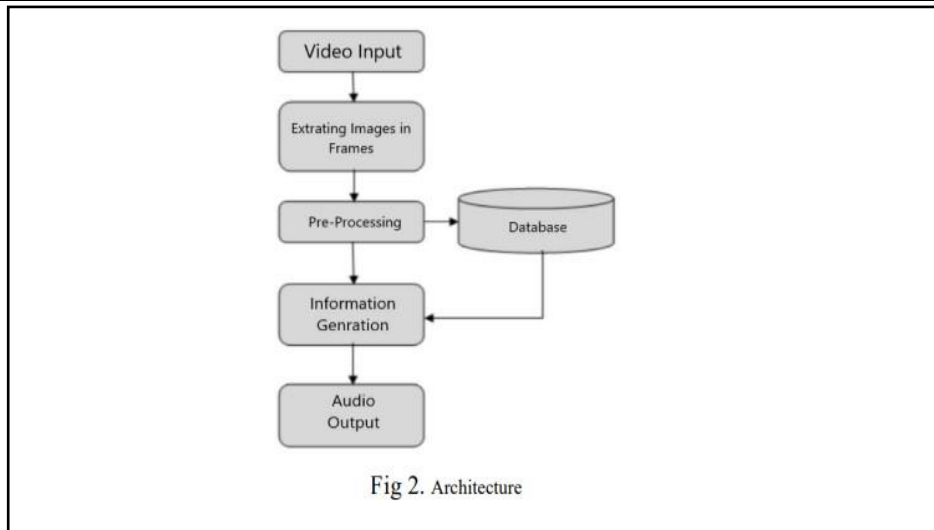
The inceptive task of image and video is to collect frames from the live environment data. Minimum of 20 to 30 frames per second can be recorded to videos from the modern camera. we can drop frames from the video to minimize the processing if the person is not moving at a high pace. The images/frames are converted to grayscale format which will further reduce the superfluous processing. An image consists of pixels and every pixel holds its RGB colour values. To minimize the processing by a large margin, reduce the number of values stored by the pixels. YOLO is an algorithm that uses neural networks to provide real-time object detection. This algorithm is popular because of its speed and accuracy. Object detection is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects of a certain class (such as humans, buildings, or cars) in digital images and videos.

4.2 Object-based Classification

Object-based or object-oriented classification uses both spectral and spatial information for classification. The process involves categorization of pixels based on their spectral characteristics, shape, texture and spatial relationship with the surrounding pixels. Object-based classification methods were developed relatively recently compared to traditional pixel-based classification techniques. While pixel-based classification is based solely on the spectral information in each pixel, object-based classification is based on information from a set of similar pixels called objects or image objects. Image objects or features are groups of pixels that are similar to one another based on the spectral properties (i.e., colour), size, shape, and texture, as well as context from a neighbourhood surrounding the pixels. Object-based classification is a two-step process, first the image is segmented or broken into discrete objects or features with and then each object is classified. This type of classification attempts to mimic the type of analysis done by humans duringvisual interpretation.

4.3 Information Generation

We will be generating info accordig to the classification of the objects in the frame. These instructions willbe sent to the text to speech system and then communicated to the user using audio.



V. RESULTS

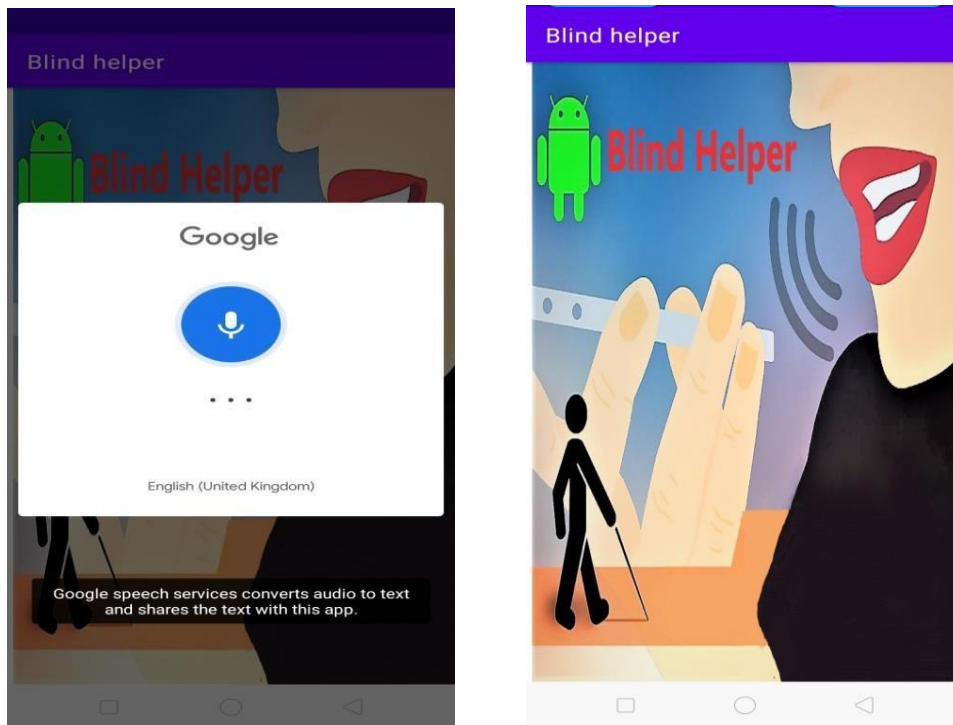


Fig 3. Output Image.

VI. FUTURE SCOPE

Instead of using an Android Application, an IOT device can be implemented for the sole purpose of assisting the visually impaired. This will further reduce the cost and open more possibilities such as adding of other sensors to provide additional data such as distance and provide more precision and accuracy. It will also make the device more energy efficient as it won't be required to run heavy services in the background that are used in android to overcome restriction such as running of background service, energy usage etc.

VII. CONCLUSION

“VISION EYE” is an android application for blind people. Our main goal is to build an application that helps blind people to lead a better life. We already have made the object detection method that helps a lot to know objects that are around with the user. Some other helpful features are added to this project. These are face recognition, money recognition, online news etc. Face recognition helps to recognize relatives of the user when they are near to use. Money recognition feature helps blind people to recognize Indian money. Also we have added some

additional features in this project. We have installed several android phones for testing. Hopefully this application helps blind people.

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