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BLIND GUARD ANDROID APPLICATION FOR BLIND USERS USING ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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Abstract - *Abstract*— In this world, around 284 million people are visually challenged. But now-a-days advance technology making positive impact on visually challenged people. With help of these technology we can offer visually challenged people an independent life. The system we are introducing uses artificial intelligence and machine learning in real time to help the people with visually disabilities. Text analysis and object detection are the main task of our system performed using a smartphone application.

Key Words - machine learning, text analysis, speech recognition, voice output, location detection, currency recognition, objects detection.

1. INTRODUCTION

In our day to day life as like us blind people also need self-dependent life because they are not familiar with their surrounding environment that is social restrictiveness. Due to blindness they can't see anything so there is lack of necessary information for them. With the help of today's high technology, the visually impaired can be supported. The idea we have implemented through Android Mobile Application and our main focus on Text Analysis, Object Detection, Currency Recognition and Current Location Detection. Our application is able to assist with the help of voice input to detect objects in the surrounding environment. Also it is able to recognize the text on any kind of document by using text analysis. It can be efficient way that blind people will interact with their surrounding environment and can help to live the self-dependent life.

Visually impaired can be completely or partially blind. According to World Health Organization (WHO) 285 millions of people are visual impaired. The reasons for blindness are cataract, glaucoma, trachoma and deficiency like Vitamin A , leprosy and onchocerciasis.

These blind people suffers a lot and face challenges in their daily life from reading a book to walking on street. Sometimes they are also not able to recognize their current location. They can also misinterpretation of currency.

2. PROBLEM STATEMENT

Blind people faces many more challenges in their day to day life from reading book to walking on road. Wide ranges of tools are available to solve the challenges faced by visual impaired people but they are not that much enough. Vision is the most essential the human being can have and it play vital role in a person's life. A Blind person always needs an assistant to dictate its daily routine. So we have discussed this problem faced by visually impaired people and we have tried to bring a good enough solution for daily routine.

3. EXISTING SYSTEM

Walking Cane can assist the blind people. It detects the barriers while walking through the road .The cane uses the IR sensors and if any barrier gets detected it gives the beep sound as alert and it has limit of only 2-3 feet. But the major drawback of the cane is that if there is traffic sound on the roads the beep sound can be not heard by that blind person.

There is also another existing system called "Be My Eyes" can helpful to visually challenged people ,this system assign one sighted volunteer to blind person and connect them based on language and time zone. But still there is dependency of another person. And our focus is to offer self-dependent life to the visually impaired people. This application works by connecting the blind person with volunteer. It mainly focuses on particular language and timezone. At first the blind person gets connected to the volunteer via video call then that volunteer helps to the blind user to detect object as well as text recognition.

Fig 1: Be My Eyes

"Once Step Reader" is the quick and efficient text recognition app. It is use for converting the text to speech. It also converts text to the braille script. It makes text highlight which makes it valuable for low-sight, dyslexic and with other reading difference. It takes photo of anything or import any photo which contains text and will make it readable for you.

"TapTapSee" is a mobile camera application which is specially designed for blind and visually impaired people which is powered by CloudSight Image Recognition API.

This application uses mobile's camera and voiceOver functions to capture the photo as well as video of anything and identify it also it gives audio feedback. To capture the photo we need to double tap on right side of the screen and to capture video double tap on left side of the screen.

And also one another application is "Cash Reader : The Money Identifier Mobile App" This mobile app identifies the any world wide currencies from Europe to Australia. It provides an assistive technology which identifies the money and speak loudly the value of currency.

But if we observe the all the above mentioned existing systems, a single application has only one feature but in our system we have tried to combine all these features together so it would be user friendly for the blind people because he is getting all the essential features in one tap.

4. LITERATURE SURVEY

Android application has been used on very large scale because they provides millions of features and it also provides various services. It allows phone calls, message and it also has potential to let you connect with other people through social network.

In India there are around 748million people take benefit of smart phone. As android application gives lots of benefit in many way it is used widely by millions of people. Like weather forecasting, online shopping even we can make online transaction, we can also get food at our doorstep.

Though these benefits are only for us sighted people but many of these applications are restricted to blind people. As we have ability to see the objects, recognize the text as well as currency, detect location and many more.

As we have vision, searching for an object is an easy task for us but it is not same case with visually impaired people. As they don't have vision so all they use is their memory, so blind person first try to memorize the location of that object, if the object is misplaced then searching becomes an impossible task for them. Even if they recognize the object they will check by touching the object and it takes lot of time. But their predicted object can't be accurate all the time.

Visually impaired people find difficulties to navigate surrounding environment. One of the biggest challenge faced by visually impaired people is physical movement. Travelling or walking on street can be challenging as it is always crowded. Apart from, They must remember the locations of all the object or obstacles for their home environment just like chair, table, sofa etc. which can't be misplace.

5. PROPOSED METHODOLOGY

System Architecture:

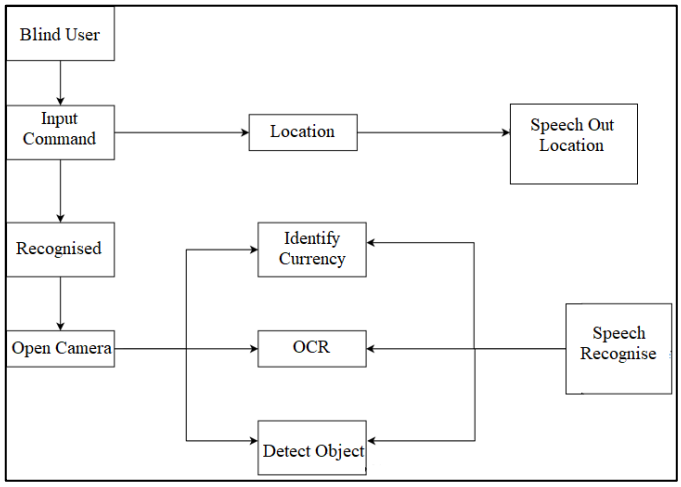

Fig 2: System Architecture

This is the system architecture of our system which includes six modules which are explained as follows:

1. Camera:

Our system uses mobile's inbuilt rare camera to detect the object/obstacles, also it is used to recognize the text and currency as well. User will not need to capture the image as we are providing voice command and volume button to recognize the text or any kind of object.

2. OCR Module:

OCR stands for Optical Character Recognition. It processes the image and convert it into the machine readable text format. It processes the image and detect the characters in the text. OCR consist of hardware as well as software. Hardware is consist of optical scanner that is use to copy or read the text. With the help of Artificial Intelligence it identifies the language and style of handwriting also. Pre-processing text recognition, post-processing are the widely used methods in OCR module.

Once the command is given to the app "Open OCR" then OCR module will start its work. It will process the image which come across the camera. It will start processing with textual regions in the image. The characters which are identified get converted into text that is machine encoded and will display on the screen. The main functionality of the OCR is to recognize the text from image. The regions where the text has detected would be act as input for the OCR.

For example, following image contains the text “Turn off the lights before leaving ON OFF” and OCR has recognized the same text. And reads out the text in audio format.

Fig 3: OCR

3. Detect Object:

Object Detection is like a computer vision for locating objects in real world environment. This technology is mainly uses for blind people to help them.

Whenever the command is given to the app as like “detect object” then the object detection module will start its working. The object detection will get start when the object came in front of the camera . The rare camera of the mobile phone will scan the object then with the help implemented algorithms the object get detected then result will given with the help of voice input. Such as “The detected object is …..” The object detection allows us to classify the located things.

For example, This image contains the laptop.

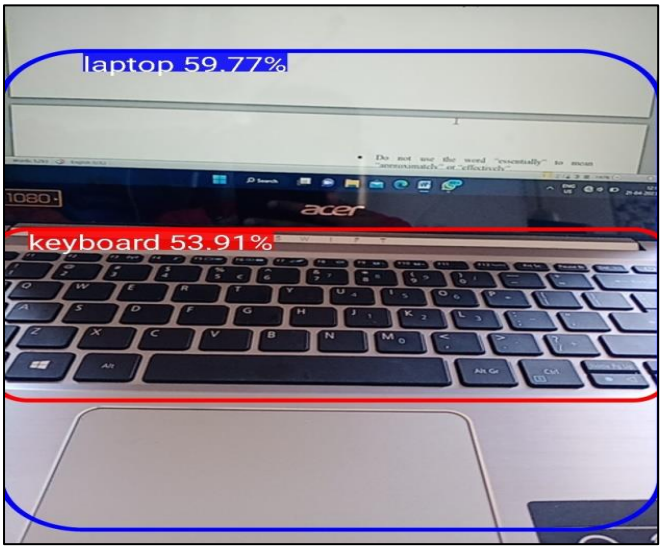

Fig 3: Object Detection

By using the large amount of the data ,various algorithms and faster graphical user interfaces the system can be trained so it can be able to classify and detect the multiple types of objects with the high accuracy.

4. Identify Currency:

The currency recognition is the significant area of pattern recognition .The main objective of this model is to identify the Indian banknotes with the help of the android mobile app. Accepting the fact, blind person faces lot of trouble to identify various types of banking notes. This issue prompted us to create a currency recognition device that can be converting into voice based system.

The main goal is to help blind people by providing them a simple mobile application. With the help of image processing the task of identification of the currency gets easier.

The processing of this module get start by taking the input of given currencies the system pre-processed the given currencies after words the RGB (Red, Green, Blue)image convert into gray scale image. After pre-processing some algorithms get applies the to extract the inner and outer edge of the image.

5. Speech Recognize:

Now-a-days visually impaired people and people with low vision are suffering from many difficulties. The common problems they are facing in their daily life are identifying the objects, reading the text and many more. Recently everyone is using hardware devices such as smartphones, laptops, tablets and many more in their daily life. So there should be an application in those hardware devices which helps blind people to detect the text, obstacle and the other thing and give the audio feedback which will be helpful for them and make there life easy.

6. Location:

As per our observation most of time the blind people are unable to recognize the current location nobody helps them it can cause them panic attack or anxiety. So here they can get helped by our system.

So we design a system to help visually impaired people to understand their current location so that without asking any one they can head to there destination.

6. CONCLUSION

Blindness restricts a person from acquiring knowledge of the surrounding environment and makes task difficult like object detection, text analysis, currency recognition. So to solve these issues we have came upon a solution and we have made use of some technology such as Artificial Intelligence, Machine Learning and also Deep Learning. We have developed an android application that assist blind people so they can live their life independently. In this paper as we

mentioned above, the application will open the camera after the command given and will provide the output to the blind user in the form of audio.

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