SMART APPLICATION FOR VISUALLY IMPAIRED PEOPLE

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Abstract

In today's technologically computerized world, the need of self dependant is acknowledged in case of visually challenged people who are facing main problem of social antagonistic. With the help of recent technology, it is possible to provide the support given to people with visual impairment. The project is to help those people who are blind or visually impaired using Artificial Intelligence,Machine Learning,Image and Text Recog- nition. The idea is manifested through mobile application that clearly focuses on voice assistant, image recognition, navigation etc. The app is also able to assist the users using voice command 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 help of technology and employ the potentials of thetechnology.

Index Terms—*Machine Learning, Tensor Flow*

INTRODUCTION

VISUAL impairment is a major disability faced by the visually challenged people. A person who can not see can noway feel the emotion that a person feels who can see the world. This visibility problem is a dark fleck faced by billions of people around the entire world. Our focus is to exclude this dark fleck with the help moment's hi- tech advancement's Artificial Intelligence and Machine Learning. Sight- bloodied present severe consequences on particular capabilities related to optic function The diurnal conditioning that requires a vision at an average distance. discussion, reading, writing which requires a precise vision and average distance. Estimation of area and the relegation which bear a far vision. The tracking of an exertion includes an increased care of visual observation. The currently existing system uses speech synthesis to read books for the visually challenged using operations and converts the document/ soft dupe of the books to the speech using natural language and Text- to- Speech. Major problem with the being 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 or response. The proposed system uses Artificial Intelligence to help the visually disabled people which is all grounded on voice command. It also does image recognition of the photos clicked or uses camera to fete the objects and describes them in audio and

also a converse bot to have light and friendly discussion

LITERATURE SURVEY

According to " Yuta Hashimoto " in(1) the ' Development of Audio- Tactile Graphic System Aimed at Facilitating Access to Visual Information for Blind People ' conveys that the eyeless people frequently use tactile plates when penetrating visual information. Tactile plates are plates expressed by raised face so that the visually bloodied can feel them. Eyeless people use the sense of touch to understand visual information that are frequently handed as the tactile plates. But, tactile plates have some problems shown below. Blind people can pierce visual information through tactile plates. But, tactile plates have some problems so that eyeless people need rich partner experience to understand tactile plates. thus, systems that are enforced audio guidance capabilities to tactile plates have been studied. still, because of the limitations of the current audio- tactile visual systems, many of eyeless people use the audio- tactile visual systems. Some of the reasons are as follows(1) the systems need special bias which are frequently precious;(2) the systems bear druggies to produce specific tactile plates to the systems because being tactile plates aren't available to the current systems;(3) since the special bias are large, this degrades the portability of the systems. fastening on the below three problems, we're developing an audio- tactile graphic system executable on smartphones. According to " Sanchita Bilgaiyan, Sherin James, Sneha. S Bhonsle, Shruti Shahdeo and Keshavamurthy " in(2) ' Android Grounded Placard Discovery using Image and Voice Alert System ' veritably frequently we see that numerous road accidents take place numerous road accidents take place. This can be due to motorist's or rider's ignorance of business signals and road signs. numerous people die in these road accidents which is a great loss for the family. Android Based placard discovery is one similar approach where the motorist gets information about forthcoming chain in advance. Also, whenever it detects a rambler movement the vehicle stops and speed reduces in speed limited zones. This approach can help in avoiding mishaps to a lesser extent. At night it's delicate for motorist to keep track of billboards, answer of these issues and problem is the ' android grounded placard discovery system using image and voice alert system

According to " Xilin Chen, Jie Yang, Jing Zhang, and Alex Waibel " in(3) present an approach to ' Automatic Detection and Recognition of Signs from Natural Scenes ', and its operation to a sign restatement task. The proposed approach embeds multi resolution and multiscale edge discovery, adap- tive searching, color analysis, and affine rectification in a hier- archical frame for sign discovery, with different stresses at each phase to handle the textbook in different sizes, exposures, color distributions and backgrounds. We use affine rectification to recover distortion of the textbook regions caused by an inappropriate camera view angle. The procedure can significantly ameliorate textbook discovery rate and optic character recognition(OCR) delicacy. rather of using double information for OCR, we prize features from an intensity image directly. We propose a original intensity normalization system to effectively handle lighting variations, followed by a Gabor transfigure to gain original features, and eventually a direct discriminant analysis(LDA) system for point selection. We've applied the approach in developing a Chinese sign restatement system, which can automatically descry and fete Chinese signs as input from a camera, and restate the honored textbook into.

According to " Shiladitya Chowdhury, Aniruddha Dey, Jamuna Kanta Sing, Dipak Kumar Basu and Mita Nasipuri " in(4) ' A Novel Elastic Window for Face Detection and Recognition from Video ' addresses that, face recognition from videotape has entered significant attention due to wide range of marketable and law enforcement operations, similar as surveillance systems, closed circuit television(CCTV) monitoring, etc. mortal face discovery is the first and important task in a dynamic terrain, similar as videotape, where noise conditions, illuminations, locales of subjects and disguise canvary significantly from one frame to another frame.

In this paper a new elastic window, which doesn't make any supposition about the disguise, expression or previous localization of a face in a videotape frame is presented for chancing boundary of face region. The window locates the possible face boundaries by elastically expanding its size using original image slants. Prior to this, a videotape- frame undergoes in several pre-processing tasks in order to remove noise, background, etc. and producing thin double image representing only possible face boundaries and scattered noises. After detecting faces from videotape frames, we prize discriminant facial features from these cropped face images. A multi-class SVM is used as a classifier for face recognition grounded on these facial features. The proposed system was evaluated on Honda/ UCSD videotape database and the experimental results show that the proposed system outperforms several being videotape- grounded face recognition styles in terms of face recognition.

According to " Devi A, Therese M.J, Ganesh R.S " in(5) lot of companies try to develop electric outfit and widgets

for visually challenged people in order to overcome their mobility problem without any kind of dependence. To overcome this challenge, a ' Smart Navigation Guidance System for Visually Challenged People ' is proposed to guide them in a smart manner. The proposed system performs contemporaneous object observation and discovery conduct. The girding environment can be captured and given as a voice command. The heart beat detector measures the heart rate of the people. However, also the communication will be shoot to the guardians of the people along with their position, If any obstacles are detected or heart rate is advanced. The proposed system effectively performs live shadowing of visually disabled people and allows the visually disabled people to move anywhere without any backing. The proposed system is tested on visually disabled people in real time at different locales to prove the system effectiveness.

According to " Nassih M, Cherradi I, Maghous Y, Ouriaghli B Salih- Alj Y " in(6) outlines an ' handicap recognition system for the eyeless people using the Radio frequence identification(RFID) '. In order to walk without being accompanied, people with visual impairment use touching suggestions similar as nightsticks. The main concern of eyeless people is to be suitable to descry any type of handicap within their surroundings. For that, several ways have been developed similar as Differential Global Positioning System(DGPS) or Radio- frequence identification(RFID) former gests of different inquiries have proven the limits of the DGPS in localizing the position of people and obstacles in different situations, while the RFID is being developed to more meet the requirements of the visually disabled people. This paper aims on developing a eyeless recognition system through nightsticks using RFID and covers a brief sapience of applicable work about the RFID system. The review of RFID system introduces the specialized features of this mileage and presents the conception of exploration being developed in smart nightsticks for eyeless people. The information similar as the costs of the factors of the suggested RFID- grounded system is handed.

According to "Michel Owayjan, Ali Hayek, Hassan Nass-rallah and Mohammad Eldor" in [7] The proposed system isa 'Smart Assistive Navigation System for Blind and Visually

Disabled individualities ' is designed and enforced to secure a safe and low- cost navigation. Eyeless navigation systems are numerous, but veritably many are those that are fully successful in addressing the conditions of eyeless individualities to navigate safely, comfortably, and singly. therefore, some systems of the state- of- the- art are bandied and anatomized. Eventually, the design and the perpetration of the system are shown. According to " Hanen Jabnoun, Faouzi Benzarti and Hamid Amiri " in(8), In this paper ' Visual negotiation system for eyeless people grounded on SIFT

description ' we propose a system of visual negotiation that restores a central function of the visual system which is the identification of girding objects. In- deed, we're interested in assessing fast and robust algorithms to fete and detect objects in images. The perspectives of this work is to consider a cover tool in the recognition of the terrain for eyeless or visual disabled people, counting on a robust system for feting objects in a videotape scene and an audile system to identify this information.

According to " JackM. Loomis " in(9), ' Navigation System for the Blind Auditory Display Modes and Guidance ', the exploration we're reporting then's part of our trouble to develop a navigation system for the eyeless. Our long-term thing is to produce a movable , tone- contained system that will allow visually bloodied individualities to travel through familiar and strange surroundings without the backing of attendants. The system, as it exists now, consists of the following functional factors (1) a module for determining the rubberneck's position and exposure in space,(2) a Geographic Information System comprising a detailed database of our test point and software for route planning and for carrying information from the database, and(3) the stoner interface. The trial reported then's concerned with one function of the navigation system guiding the rubberneck along a predefined route. We estimate guidance performance as a function of four different display. modes one involving spatialized sound from a virtual aural display, and three involving verbal commands issued by a synthetic speech display. The virtual display mode fared stylish in terms of both guidance performance and stoner preferences.

According to " Hanen J abnoun, Faouzi Benzarti, Hamid Amiri " in(10), Vision is one of the veritably essential mortal senses and it plays the most important part in mortal perception about girding terrain. Hence, over thousands of papers have been published on these subjects that propose a variety of computer vision products and services by developing new electronic aids for the eyeless. This paper Object Discovery and Identification for Blind People in Video Scene aims to introduce a proposed system that restores a central function of the visual system which is the identification of girding objects. This system is grounded on the original features extraction conception. The simulation results using SFIT algorithm and keypoints matching showed good delicacy for detecting objects. therefore, our donation is to present the idea of a visual negotiation system grounded on features lines and matching to fete and detect objects in images.

I. PROPOSED SYSTEM

The proposed system is an android operation which helps the eyeless people to lead a comfortable and normal life like others. We named our operation as " BLINDIFY '. Blindify is an operation which easily focuses on voice adjunct, image recognition, currency recognition etc. The app is also suitable to help the druggies using voice command to fete objects in the day- to- day life, do textbook analysis to fete the textbook in the hard dupe document. Blind people can't tell the exact time. They always need an adjunct or coadjutor to go out. But, If they visit a place further than formerly, they can go there without any coadjutor or adjunct and if it's a new place, they need an adjunct to visit there. Eyeless people face problems to fete plutocrat. They can not separate between departmental stores and caffs. Only hearing voices or noise, they can separate among humans, vehicles and other creatures. substantially, Eyeless people can not pass roads without any help. In communication, they can fete only their known voices. In, the system is proposed when the image is captured using a camera and the captured image is scrutinized from left to right to descry an handicap and produce sound. Sound is produced by analysing an image in which the top image is converted into a high frequence and the lower part into a cutline sound. And the height depends on the brilliance of the image as well. currently, eyeless people are veritably advanced than our imagination. They're suitable to operate mobile phone indeed laptop, computer by using different operations. The operation generating information according to the bracket of the objects in the frame. These instructions will be transferred to the textbook to speech system and also communicated to the stoner using audio.

A. Object Detection

Object detection is done using TensorFlow which is a popular technique in computer vision applications. TensorFlow is an open-source deep learning framework that provides a comprehensive set of tools and libraries for building and deploying machine learning models. Object detection involves identifying and localizing objects within an image or video. TensorFlow offers several models and methods that can be used for object detection tasks. It contain a wide range of pre- trained models and architectures for different tasks, such as image classification, object detection, semantic segmentation, and more. These pre-trained models are often benchmarkedon popular datasets and have achieved high accuracy levels in their respective domains. TensorFlow is a powerful and popular choice for object detection tasks, providing the necessary tools, flexibility, and performance for developing accurate and efficient object detection systems.

B. Blind Assistance

The blind assistance consist of the communication of the blind user through call, SMS Email. It also provide navigation function and informs about the battery level. The visually im- paired user can call/SMS/E-mail by using the voice assistance to anyone in the contact. It helps to make their daily life more easier. The navigation feature help them to navigate freely by forwarding it to Google maps. These features are accessed by voice commands and it also provide audio output to the userby means of pre-recorded messages.

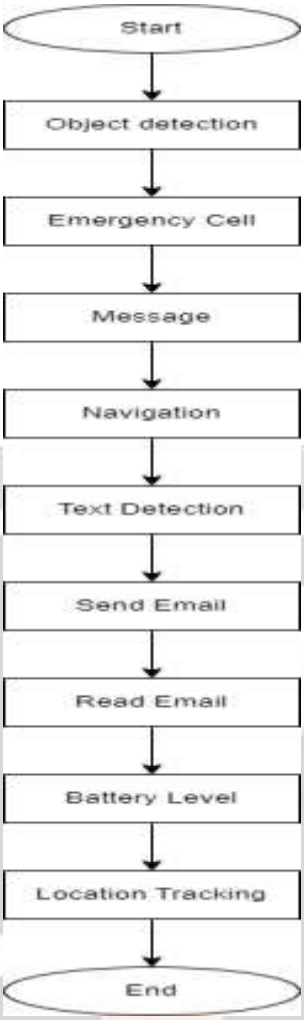

Fig. 1. Flowchart

C. Alert System

Alert system consist of providing a notification to the relative of the user with current location of the person incase of emergencies. The alert system is activated by the accelerometer measures. An accelerometer is a sensor that measures acceleration forces in the device's three-dimensionalspace. It detects changes in velocity and orientation, allowing the device to detect its movement, tilt, and rotation. It can also be used for fall detection in mobile phones. By analyzingsudden changes in acceleration and orientation, the devicecan detect when it has been dropped or is in free fall. This information can trigger protective measures like activating the phone's protective cover or initiating emergency calls. The measure of accelerometer sends notification to the relative showing emergency and the current location of the user.

D. Voice Command

Through a voice device, the user asks the voice assistant app to turn on the features. This feature helps the user to access the application efficiently. The voice over assistance is a necessary feature for the effective communication of the user. Voice- over assistance in the application involves providing audio feedback and spoken instructions to help users navigate and interact with the app. Most mobile platforms provide built- in accessibility APIs that allow developers to integrate voice- over functionality. These accessibility APIs provide a way to programmatically describe the user interface elements, such as buttons, labels, and controls, and enable spoken feedback for blind users. Text-to-speech technology converts textual content into spoken words. When implementing voice-over assistance, TTS engines can be used to vocalize various UI elements, including text labels, instructions, notifications, and error messages. Voice-over assistance relies on giving focus to UI elements, allowing users to navigate through

them and receiveaudio feedback.

IMPLEMENTATION

E. Front End

Simply put, the frontal end of the mobile app is what the stoner gests . You may be familiar with the term " stoner experience " or " UX "; the frontal end is where the stoner gests and interacts with these effects. A frontal end inventor will be concentrated on what happens with the app, rather than what goes on behind the scenes, which is generally described as the backend. The mobile app development process involves cooperation between frontal end and backend inventors in order to finish as a complete mobile operation. There are generally two types of frontal end developments Native and cold-blooded. Native frontal end developments are generally designed either for the iOS or Android platforms, whereas mongrels use both and can be compatible with all types of operating

systems. Android Studio is the official integrated development environment (IDE) for Android app development. It provides a comprehensive set of tools and features to design, develop, debug, and deploy Android applications. an open-source UI software development kit created by Google. Android Studio offers a visual editor where you can create and modify the user interface of your app using a drag-and-drop interface. It provides a palette of UI elements and resources to design yourapp's layout, themes, styles, and animations.

F. Back End

Java has been the traditional language for Android app development for many years. It is a general-purpose pro- gramming language that offers a robust set of libraries and tools. Java is known for its readability, scalability, and wide community support. It follows an object-oriented program- ming (OOP) paradigm and provides features like inheritance, polymorphism, and exception handling. Many Android API's and frameworks are built using Java.

RESULT AND DISCUSSION

..This application "BLINDIFY" is an android app used to provide assistance to visually impaired people. A blind assis- tance application aims to provide support and enhance the daily lives of individuals with visual impairments. The appli- cation can convert written text into spoken words, allowing blind users to listen to various types of content such as documents, emails, webpages, or messages. TTS functionalityensures accessibility to textual information. It support voice commands to perform various actions and navigate throughthe app's interface. This enables users to interact with the application hands-free and execute tasks efficiently. In our project we are utilizing computer vision and image pro- cessing algorithms, the application can identify and describe objects in the user's surroundings. By using the device's camera, the app can provide audio feedback about objects, such as identifying currency notes, reading product labels, or recognizing landmarks. This application include GPS and mapping functionalities to assist blind users in navigating their surroundings. It can provide audio directions, turn-by-turn instructions, and real-time location updates to help users reach their desired destinations safely. Accelerometer sensor that measures acceleration forces in the device's three-dimensional space. It detects changes in velocity and orientation, allowing the device to detect its movement, tilt, and rotation. This feature in mobile phone is used to ensure the safety of the user. A notification with current location is send to the relative by checking the accelerometer measures. The features of the app can be accessed through voice commands which makesthe application more user friendly.

CONCLUSION

The proposed system has been implemented to provide a smart assistance to blind people using machine learning technique. The BLINDIFY application is for visually impaired people which will help them to do the tasks such as reading,

Fig. 2. Sample Image for cell phone

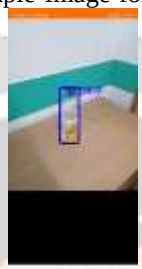

Fig. 3. Sample Image for Bottle

Fig. 4. Sample Image for a Laptop

Fig. 5. sample image for person

recognizing the person. To help visually impaired people and make their day-to-day activities easier is the main motivation behind this project. Blind people need to be provided with special facilities so that they can live comfortably. We wanted to give them a helping hand that they use as their assistant.

REFERENCES

[1] Chen X, Yang J, Zhang J, Waibel A (2004) Automatic detection and recognition of signs from natural scenes.

IEEE Transactions on image processing, Vol. 13, No. 1, pp 87-99. .

[2] Bilgaiyan S, James S, Bhonsle SS, Shahdeo S, Keshavamurthy (2016) Android Based . Signboard Detection using Image and Voice Alert Sys-tem, IEEE International Conference . on Recent Trends in Electronics, Information Communication Technology

[3] Chowdhury S, Dey A, Sing JK, Basu DK, Nasipuri M (2014) A Novel Elastic Window for . Face Detection and Recognition from Video. International Conference on Computational . Intelligence and Communication Networks

[4] Basavaraju R, Chetana H (2015) Traffic Signal Time Analysis and Voice

- Based App for Visually Impaired Pedestrians,IEEE International Con- ference on Recent Trendsin . Electronics, Information Communication Technology.

[5] Basavaraju R, Chetana H (2015) Traffic Signal Time Analysis and Voice

- Based App for Visually Impaired Pedestrians,IEEE International Con- ference on Recent Trendsin . Electronics, Information Communication Technology.

[6] Baskaran S and Lakshmi D, (2016) , 'Text to Audio Conversion using Portable Camera', . International Conference on Engineering and Technology (ICET).

[7] Hanen Jabnoun, Faouzi Benzarti, Hamid Amiri, 'Object detection and identification for . blind people in video scene', (2015) 15th International Conference on Intelligent Systems . Design and Applications (ISDA).

[8] Abboud, S., Hanassy, S., Levy-Tzedek, S., Maidenbaum, S., and Amedi, A., (2014). . . EyeMusic: Introducing a "visual" colorful experience for the blind using auditory sensory . substitution, Restorative neurology and neuroscience.

[9]] Jabnoun, H., Benzarti, F., and Amiri, H., (2014). Visualsubstitution system for blind people. . based on SIFT description, International Conference of Soft Computing and Pattern . . Recognition. Tunsia, pp. 300–305

[10] Jafri, R., Ali, SA., Arabnia, HR., and Fatima, S.,(2013). Computer vision based object . . recognition for the visually impaired in an indoors environment: a survey,The Visual . Computer, Springer Berlin Heidelberg, pp. 1–26.

[11] Auvray, M., Hanneton, S., and O'Regan, J. K., (2007). Learning to perceive with a visuo . . auditory substitution system: Localisation and object recognition with 'The vOICe'. . . Perception, pp. 416–430.

[12] Daniyal Rajput, Faheem Ahmed, Habib Ahmed, Engr Zakir Ahmed Shaikh, Aamir . . Shamshad, (2014), "Smart Obstacle Detector for BlindPerson," Journal of Biomedical . . Engineering and Medical Imaging.

[13] Khushboo Khurana, Reetu Awasthi, (2013), "Techniques for Object Recognition in . . Images and Multi-Object Detection," Internation-alJournal of Advanced Research in . . . Computer Engineering Tech- nology.

[14] Prof. Seema Udgirkar, Shivaji Sarokar, Sujit Gore, Dinesh Kakuste, Suraj Chaskar, . . (2006), "Object Detection System for Blind People," International Journal of Innovative . Research in Computer and Com-munication Engineering.