Object Detection on an Android Mobile Phone Which Gives Voice Description

Mr. Kiran Yesugade[1] Shradha Andure[2] Deepali Garde[3] Soniya Mane[4] Nikita Mohite[5]
[1]Assistant Professor [2,3,45]Student
[1,2,3,4,5]Department of Computer Engineering
[1,2,3,4,5]BVCOEW, Pune, India

Abstract— Keeping in mind the challenges faced by the visually impaired people we had come with an Android application. In this paper we present an Android application dedicated to the aid of visually impaired or blind users. The main aim of this application is to reduce object detection procedure and give more useful and reliable function in single application. The software modules are designed for Android operating system. The goal of this project is creating virtual guide application which provides services like Object detection, Scene detection, Motion detection in which result generated will be in voice format with the help of speech synthesizer enable in smart phones.

Key words: Visually Impaired, Speech Synthesizer, Object Detection, Android OS, Text to Voice Converter, Model Base, Visualization

I. INTRODUCTION

The visually impaired people face various kind of life challenges that normally sighted people take for granted casually. As far as all activities are concerns visually impaired people face difficulties in safe and independent walking in surrounding area in day to day life.

The issues dealing with communication, perception and access to information are important. Here we offer help by software application for touch screen mobile phones. For demonstrating this application we apply different image processing algorithm and ANN algorithm with back propagation method. With the help of very efficient and reliable high level computer language Java. All this code of application written will become a powerful tool for visually impaired people, child and for training purpose of ITians in IT industry for giving knowledge and increment accuracy of learning procedure.

When user takes a picture of an object, our application searches related information in a model base using image recognition. Since a user of an application can take a picture under different circumstances, hence case consideration is important. Object detection and localization can be done using comparison of an unknown image and known database images, a best match can be selected. After completion of process output generated in a text format and text to voice converter is used for voice output. Hence our application is useful for visually impaired and children as a virtual guide.

While using the application if Object detection field is choose it demand for image to be captured by user. After this step with the help of various algorithm comparison of features will take place with training database available of different images in model base. Some functions is applied to Scene detection field with comparison of training database available of different Scenes in model base. For Motion detection field operation perform is a run time procedure which detect motion and then it will guide user for further operations to perform.

II. EXISTING WORK

Various application focused on the same cause are available in the market already. They are used mostly for limited purpose or activity and do not offer an simple assistance to the visually impaired users.

1) Some applications scan barcodes of objects and recognize them so as to help users choose their purchases during shopping.
2) Some applications have a voice assistance which narrates instructions to users about how to use their phone effectively.
3) Some have a GPS function which assists in the form of a voice - directions to reach the destination selected by the user.
4) LookTel has designed similar software to identify objects present in the focus area of the camera of the application. The photos of the daily used objects are stored in memory.
5) EyeRing project is another application which acts as a virtual walking stick, has functions like calculate distance for the user etc.

All these applications are very expensive and hence it is difficult to reach an ordinary middle-class man. As a result, they become deprived of any assistance.

III. METHODOLOGY

In this, in the developed software tool for Android smart phone, we propose the three following modules:-
1) Object detection module
2) Scene detection module
3) Motion detection module

Further it also provide facility to convert an output gain by each module converted into voice format which helps to understand the instructions and descriptions related to surrounding by visually impaired people also.

It is the virtual guide for all those which are in need for learning things or for those who faces diverse kind of problems in day to day life. Hence it is useful for child also to learning procedure. In IT industry for ITians for training purpose while getting started with system newly.

IV. SYSTEM DESIGN

Figure shows the overall architecture of our proposed method which considers all the above requirements.

From above figure, first capture an Object with the help of smart phone using applications. Then feature extraction process will be done in that basic image processing algorithm are performed. In these extracted features are stored in data base. Up till now the training

process is done. After that if user capture picture of another object, application compare this image of Object with trained database image. Here comparison is done with the help of ANN algorithm. As per our proposed application user taking pictures of an Object or capturing the video. In case of video, application converts that video into the no of frames. Those frames or captured image get converted into RGB to Greyscale with the help of HSV.
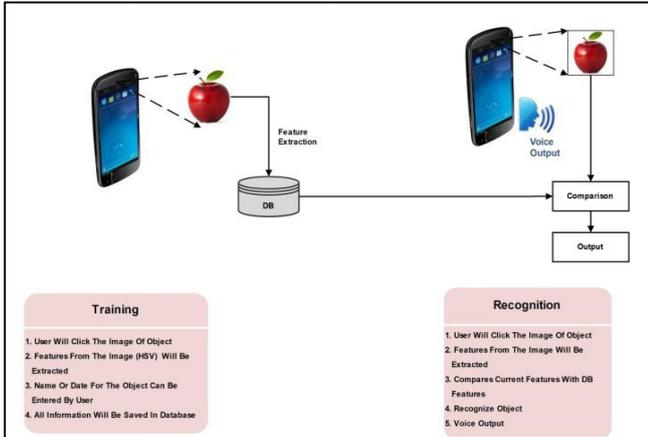

Fig. 1: Architecture of Our Proposed Method

After the conversion of grayscale we are detecting the edges of an Object by using the Blob algorithm. Now the main Object matching technique is done by the use if Histogram given as input to the ANN algorithm with some additional functionalities. In case of Object and Scene detection, Object get match with the database using ANN algorithm. Whereas in case of Motion detection, Motion is detected by application using HSV algorithm and ANN algorithm with the help of foreground and background separation method.

After the confirmation the application gives the voice description related to the output using speech synthesizer.

V. Materials and methods

For creating software application of Object detection required materials are an Android Mobile Phone with minimum specification of camera of 5 megapixels and other requirements is Android version next to Ginger Bread. Object detection is a task which required Object localization and Object recognition procedure working for detecting Object, feature extraction done on Object, Scene or live video frame available is required. Hence following methods or algorithms used in complete system.

Algorithm used:-Blur, RGB to Greyscale conversion, RGB to HSV conversion, HSV Thresholding, Blob detection, Artificial Neural Network with back propagation.

VI. Implementation

When the user click on logo of application (see fig.1) after which system opens which gives option for selecting object training, detection and system reset button (see fig.2). Then if user select training option it gives checkbox for scene training and dropdown list for saving the image in database for object and scene (see fig.3). After capturing the image system gives user window for writing description about captured image which also stored along with image and its

features in system (see fig.4).For completing the training of system user have to select option train all object (see fig.5,6) for object training and select option train all scene (see fig.7,8) for scene training.

If user select detect option it gives three functions such as, object detection, scene detection, motion detection. After clicking on object detection if object is trained by system previously then it localize the object(see fig.9) and give output in voice format and text format which is description related to that object(see fig.10).If user select scene detection, it gives output same as object detection(see fig.11).As motion detection is runtime procedure which detect motion runtime video frames (see fig.12)by separating foreground and background hence it didn't need training and system gives output of motion detection in voice format. If user want to clear database system has reset function.
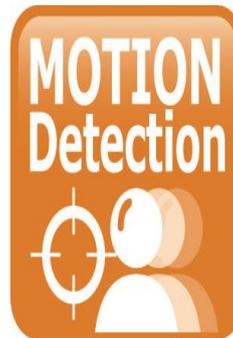

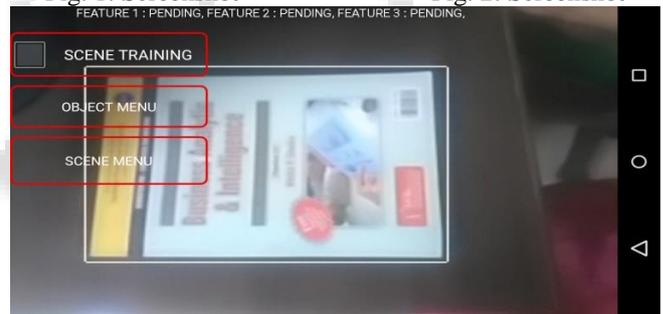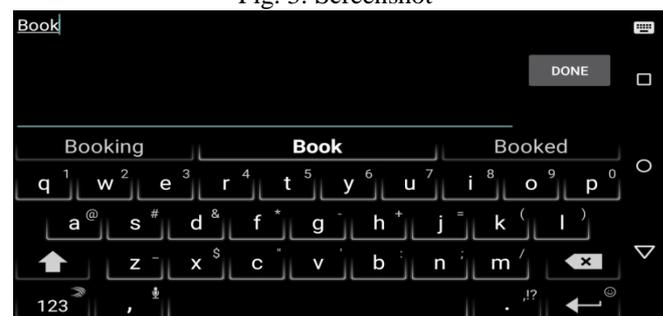Fig. 1: Screenshot

Fig. 2: Screenshot

Fig. 3: Screenshot

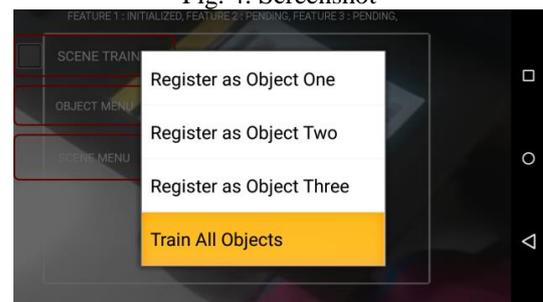

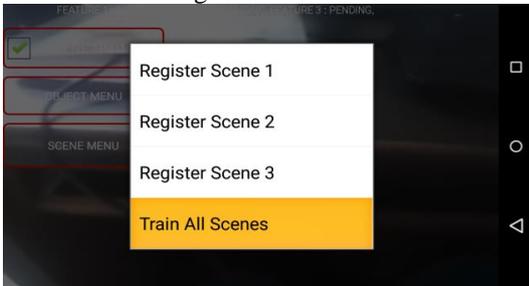Fig. 4: Screenshot

Fig. 5: Screenshot

Fig. 6: Screenshot

Fig. 7: Screenshot
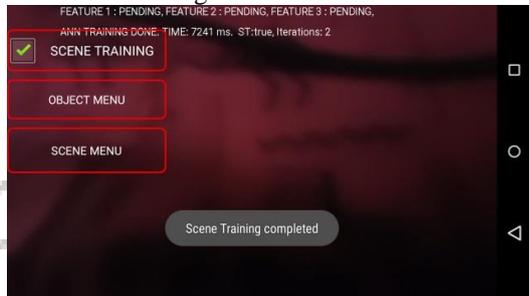

Fig. 8: Screenshot

Fig. 9: Screenshot
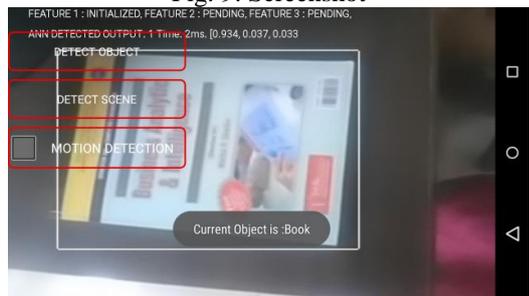
Fig. 10: Screenshot

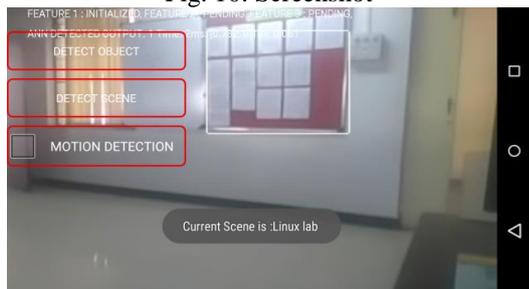Fig. 11: Screenshot

Fig. 12: Screenshot

VII. CONCLUSION

With over millions of visually impaired people worldwide, the need for an application that allows visually impaired user get knowledge of surrounding is crucial. Hence this virtual guide application will be very useful for visually impaired people, child as well as for training new ITians in IT industries.

REFERENCES

[1] Object detection using fast corner detector base on smart phone platforms, Kanghun Jeong, Seoul, Korea.

[2] J. A. K. Suykens and J. Vandewalle, "Least Squares Support VectorMachine Classifiers," Neural Processing Letters, vol. 9, no. 3, pp. 293-300, 1999.

[3] Y. Hirose, K. Yamashita and S. Hijiya, "Back-Propagation AlgorithmWhich Varies the Number of Hidden Units," Neural Networks, vol. 4,pp. 61-66, 1991.

[4] D. G. Lowe, "Distinctive Image Features from Scale-InvariantKeypoints," International journal of Computer Vision,60(2), pp. 91-110,2004.

[5] H. Bay, T. Tuytelaars, L. V. Gool, "SURF: Speeded Up RobustFeatures," in Proceedings of the European Conference on ComputerVision, 2006.

[6] E. Rosten and T. Drummond, "Machine learning for high-speed cornerdetection," European Conference on Computer Vision, vol.1, pp. 430-443. 2006

[7] E. Rosten and T. Drummond, "Fusing points and lines for highperformance tracking," Tenth IEEE International Conference on Computer Vision (ICCV'05), vol. 2, pp.1508-1515, 2005.

[8] www.wikipedia.com

[9] www.google.com