

# Motion Detection Security Technique in a Smartphone for Visually Impaired Users

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## Abstract

*This paper provides various important features of software modules constructed for android platform for visually impaired users. Due to the motion detection module visually impaired user will get to know whether someone is there in his/her surrounding environment. An approach is done in this implementation to the moving objects from a sequence of image frames especially traffic which will inform the blind users. Motion detection is performed by using threshold methods in conventional video surveillance system. Captured frames are converted into binary images using threshold technique for background and foreground separation, then the difference between matches of set of frames will get to know the visually impaired that anyone is there in his/her surroundings.*

## Keywords

*Android OS, Image Processing, Speech Generation, Motion Detection, Serialized Database, Visually Impairments.*

## I. Introduction

In day-to-day ongoing life everything is getting dependent on computer based technology. Hence due to which many of the dare is been evolved in these technologies. Computing environment is getting more closer towards Human Computer Interaction designs. so a significant help is provided by the android application for computer system or smart phones with speech output to the visually impaired user[1].

Presently, the most enhanced choice of smart phones among visually impaired users is either an iPhone with a very worthy tool called VoiceOver or an inexpensive selection of one of the Android-based smart phones[2]. Using a modern smart phone has an advantage that they provide a wide range of services such as digital camera, speech recognizer, etc. By Gartner's analysis the Android platform has gained 70% share of total smart phone market[4][5]. Recently, the most popular smart phones being used are iPhone and android phones, as iOS would be a costly approach for this system, so the essential implementations are made on Android platform[6].

We have delivered an Android based smart phone as a system for image processing and motion detection module which work on images captured by a visually impaired user using a built-in camera.

## II. Literature Survey

In the fields of Image Processing and Motion Detection a lot of exploration is being performed. Researchers have tried to develop more and more flexible, compact and reliable Motion Detection system for visually impaired people in the respective fields. However, all of them used various methods to make these motion Detection systems successful and trustworthy for daily use.

The value and attractiveness of motion analysis has led to several previous surveys:

Wang and Zhao[3] proposed a motion detection by using background subtraction technique. In this video sequence is composed of a series of video images which contains the features of geometry information of the target, extract relevant information to analyze the motion of targets then get detection results. The compression ratio was greatly improved[8].

This solution, however, is expensive for the visually impaired people. As, this project is equipped with many of the instruments, makes this project complex to carry for a visually impaired person[7].

## III. Motion Detection Module for Android Smartphone

Practical processing of the smart phone takes a Camera input and processes it through various image processing algorithms. Voice output module is used for generating output and motion detection module performs the processing as required project is planned for.

The objective of the system is to develop an application which will act as a security purpose for the visually impaired people, due to this module the visually impaired user will get to know whether someone is there in his/her surrounding environment. This will be done through the continuous images recorded by the camera as input through the android smart phone.

The motion detection algorithm should be robust to image registration parameters, i.e. stability, angle variation and clarity conditions. In this, module the camera or the smart phone is kept still through a supporter or a stand i.e. the camera input frame is still and if some object passes through that frame a beep sound through the voice output module is made. Due to this the visually impaired user will get to know that there is something or someone in his/her surrounding.

The first module of our application is Motion detection module. Fig1 showcases the operational flow in this module. In this a video stream is taken using camera of smart phone and is then processed to gauge motion. Motion detection aims to absolute the moving objects from a sequence of image frames especially traffic which will inform the blind users. Motion detection is performed by using threshold methods in conventional video surveillance system.

The essential and required steps of the module that we will be using in the application are shown in the flow diagram in Figure 1. Primarily, a video image is captured by the smart phone. Then, the image is transformed into blur I for reducing the noise from the image. Then, the image is transformed into grayscale. After the grayscale image obtained, the image registration is done for storing the image for the essential processing when needed. Image threshold, is done for foreground and background separation, and for converting the image into pure black and white or binary image. After the resulting image obtained, the motion estimation is done and due to which the essential speech output i.e. a beep sound is generated through the voice output module.

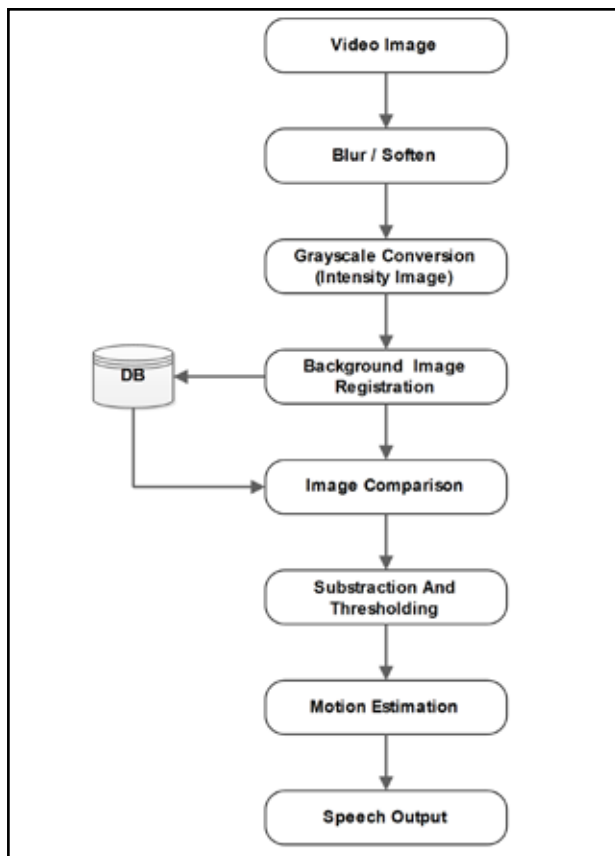


Fig.1 : Flow of Android Based Motion Detection Module.

A video stream is string of images taken continuously, these images are used to detect motion and on successful detection we inform the users about same. Further in images small dark spots are reduced by blurring. Thus, converted to greyscale, intensity information of the image is contained in the pixel. Taking the average of the R, G and B values for each pixel forming gray shade of image.

- A. Background Image Registration
- B. Image compression:  
It deals with redundancy of the image data in an efficient form. It also deals with compressing an image will ensure fast performance of desired or proposed system.
- C. Subtraction and threshold:  
In order to estimate motion foreground and background are separated. Therefore threshold value performs this separation and determine arbitrarily.
- D. Motion estimation:  
Drastic change implies when there is change in pixel value of previous loaded image and the pixel value of recent images.
- E. Speech Output:  
To inform users about the motion in front of them and to convey the result of blind users , so this model is added.

#### IV. Conclusion

The application that we are trying to develop will advance the way of people that are going to use the computing environment. The application being developed would lead to a better solution for communication and daily living for visually impaired people. It would be a fresh approach in the computing environment, and will lead to a successful and reliable approach. As, we are using all Android based integrations, which is totally an open source, due

to which, the product we are developing will be an open source and can be used by every visually impaired person. The application that we are trying to construct is currently under development and after final completion of the application it can be used for further enhancement for visually impaired people. It can be further used for its use in computing environment and developing systems in digital world on many aspects like for understanding human behaviour based on their way of interaction and for further explores.

#### References

- [1]. Strumillo P. (2012) *Electronic navigation systems for the blind and the visually impaired*, Lodz University of Technology Publishing House (in Polish).
- [2]. Apple, "Accessibility", <http://www.apple.com/accessibility/iphone/vision.html>. Accessed 25 February 2013.
- [3]. Zhengjie Wang, Yuan Zhao, Jifen Zhang, Yinjing Guo, *Research on Motion Detection of Video Surveillance System*, 3rd International Congress on Image and Signal Processing, vol.1, pp. 193-197, October 2010
- [4]. John Canny. *A computational approach to edge detection*. *Pattern Analysis and Machine Intelligence*, IEEE Transactions on, Nov. 1986.
- [5]. Joseph Schlecht, Björn Ommer "Contour-based Object Detection" *Interdisciplinary Center for Scientific Computing University of Heidelberg*, Germany, 2011.
- [6]. Ostu N.A. *Threshold Selection Method from Gray - Level Histograms*[J]. *IEEE Trans on Systems. Man and Cybernetics*, SMC - 9, 1979, 9(1):62-66.
- [7]. Fan-Chieh Cheng and Shanq-Jang Ruan, *Accurate Motion Detection Using A Self adaptive Background Matching*.
- [8]. *Motion Detection Based on Frame Difference method*, ISSN 0974-2239 Volume 4, Number 15 (2014), pp. 1559-1565. [http://www.ripublication.com/irph/ijict\\_spl/ijictv4n15spl\\_10.pdf](http://www.ripublication.com/irph/ijict_spl/ijictv4n15spl_10.pdf)