

# Wearable Technology for Visually Impaired

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## ABSTRACT

Wearable technology is the smart devices that can be worn on the body as accessories. Wearable devices such as activity trackers are a good example of the Internet of Things. This technology is basically used for tracking daily activities with the help of some electronic device. Mainly this technology contains smart watches or activity tracker. This kind of technology can be used for many purpose like navigation, health tacker and many other purpose. Wearable technology with image processing will lead to a great futuristic way to solve real life problems and help in solving it way faster than it usually takes and saving the money too. Image processing is a set of computer algorithms which performs processing techniques such as gray scaling or compressing. Image processing can also be helpful in reducing the noise and distortion of an image. In this project, we are going to make a smart wearable glass for visually impaired people which will help them in reading the sign boards and newspaper headline which they feel hard in reading.

**Keywords:** Wearable, Internet of things, Image Processing, Noise, Algorithms, Data, Smart, Visually Impaired.

## I. INTRODUCTION

This system is a smart wearable device that can be used by the visually impaired people to read the text by changing the text into speech and then reading it to them. This system can be monitored using the smart-phone where we can see the current battery percentage and how much time left for the device before it needs the charging. This system will help out the visually impaired people while they are outdoors and trying to read the sign board and help them in navigating through the streets. This system provides information about the place they are currently at and help them to know the nearby places with the help of GPS, WIFI and artificial intelligence. This system is designed to improve the working of existing system and to improve accuracy in result. This system will have user-friendly interface.

## II. LITERATURE SURVEY

In this section we discuss the different Methodologies Review/ Literature Review and Motivation Outcomes from it. Kazunori Uruma, Ken Saito, Tomohiro Takahashi, Katsumi Konishi and

Toshihiro Furukawa on Representative Pixels Compression Algorithm Using Graph Signal Processing For Colorization-Based Image Coding[1] This paper describes the representation of the pixel compression using the signal processing for better image coding and image processing. Image is compressed using colorization and the decoded. Haomiao Jiang, Qiuyan Tian, Joyce Farrell, Brian Wandell paper on Learning the image processing pipeline[2] This paper describes about the various methods of image procesing and applications ranging from consumer photography to computer vision. It explains a method that combines machine learning and image systems simulation that automates the pipeline design. The approach is based on a new way of thinking of the image processing pipeline as a large collection of local linear lters. Lei Jing, Zeyang Dai, Yiming Zhou paper on Wearable Handwriting Recognition with an Inertial Sensor on a Finger Nail[3]This paper describes about a new handwriting recognition system is proposed with an inertial sensor attached on the ngertip to automatically digitalize the cursive handwriting characters. It focuses on the issues and methods about the reconstruction of writing trajectory. Yuanxing Pan, Hailong Liao, JunhuiLi ,Xiaohe Liu, and Wenhui Zhu paper on Improved Image Processing Algorithms for Microprobe Final Test[4]This paper describes about image processing which is carried out based on the rectangular frame of the chip surface, for which the rectangular box image-processing algorithm is designed to detect the chip is correctly oriented or not.SagarRane, Aman Dubey and TejismanParida paper on Design of IoT Based Intelligent Parking System Using Image Processing Algorithms[5]This paper describes about the parking managed by the help of image processing. It gathers information like the number plate of a car , empty spaces etc. This paper aims for a better automated parking system. Long Cheng, Yiyi Yu, Xinyang Liu, Jinyu Su, Yani Guan paper on Recognition of Human Activities Using Fast and Adaptive Sparse Representation Based on Wearable Sensors[6] This paper describes about a system which aims to trace human activity using wearable sensors. It track activities like running, walking, sleeping etc.

### III. SYSTEM OVERVIEW

The smart wearable device basically consists of 5 components:- Battery, Speaker, Touch pad, Main logic board and Assembly. Main Logic Device consists of GPR Engine, Bluetooth module, Core chips of 16GB flash and DRAM also Assembly consists of Microphone, Camera and Sensors.

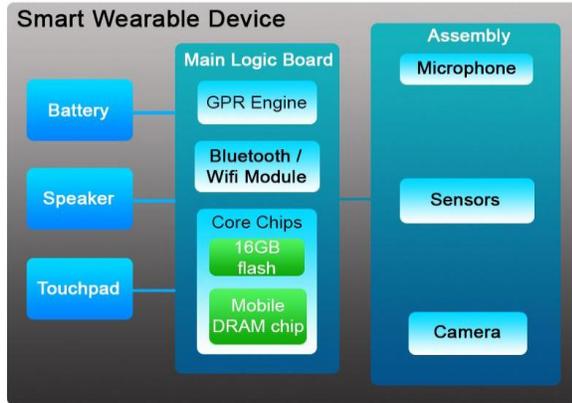


Fig. 1: System Overview

### IV. ANALYSIS

Image processing is used for manipulation of digital images through a computer. It is a field of signals but focus mainly on images. It focuses on developing a computer system for processing an image. The input of that system is a digital image and the system then process that image and gives an image as an output. For Example we take this colored image as an input. And gives this black and white image with just some simple lines of code-



Fig. 2: Colored Image



Fig. 3: Black and White

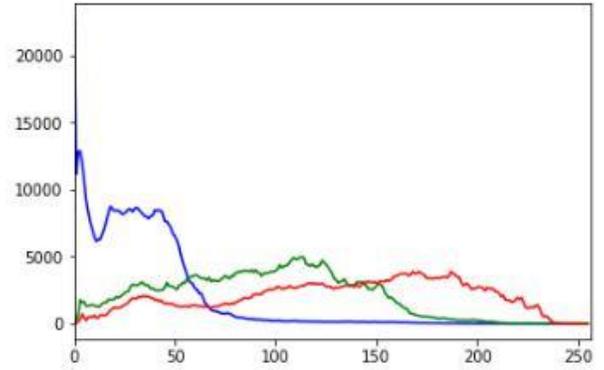


Fig. 4: Histogram

#### a. Histograms

An image histogram shows frequency of pixels intensity values. In the Fig 4. the x axis of the histogram shows the range of pixel values. Whereas on the y axis, is the count of these intensities. It shows the intensity of each color in the image of Fig1.

#### b. Roles of Modules of the System

- 1) Camera: Camera is the main module. It takes the image of the surrounding which is to be processed and is then send to the Logic board for processing.
- 2) Battery: Main issue with other similar systems are the battery backup so the main challenge is to bring good battery backup so that the user does not face any problem when in need.
- 3) Speaker: Speakers will help the users by telling what they looking at.
- 4) Bluetooth: Bluetooth is used for the user to connect the device with smartphone where they can check the status of the device like how much battery is left, and also for keeping a track of places they visit with an image attached to it, which will help them in recognizing the place.
- 5) Microphone: It is used for better communicating purpose.
- 6) DRAM: For better performance and faster processing we use the Dynamic Ram.
- 7) Sensors: Apart from all these , we have some basic sensors like GPS Sensor for navigating users and proximity sensor for low lighting condition it will enhance the performance of the camera for better low light image capture.

### V. OUTPUT

Our system would help the visually impaired person in reading the things they find difficult to read and also this system will have a better battery backup and good processing under low lighting condition.

### VI. CONCLUSION

Thus hereby we conclude that the proposed system removes all the drawback of the existing system and enhance with more image stabilization. The proposed system helps visually impaired people to read easily and help them in the real world problems. It provides the detailed solution to the existing system.

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