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Development of Wearable Image Recognition Device to Aid the Divyang (Blind) Folk

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Abstract: Action and identification problems are the challenges that visually impaired people often encounter in their lives. The high price of existing commercial intelligent auxiliary equipment has placed enormous economic pressure on most visually impaired people in developing countries. Visually impaired individuals are a growing segment of our population ,the inability to read has a substantive negative impact on their quality of life. Printed text(books, magazines, menus, labels, etc.) still represents a sizable portion of the information this group needs to have unrestricted access . Hence, developing method by which text can be retrieved and read out loud to the visually impaired is critical.

In order to solve this problem, this work proposes a smart wearable system that performs image recognition.The system adopts the method of storage and local cooperative processing. The storage mainly performs image processing, while the local unit only uploads images and feedback results. Therefore, the processor of the system does not need to use expensive high-performance hardware, and the cost to a great extend. The main aim of this system is to build an automatic face recognition assistant using existing hardware associated, software programs with innovative algorithms.

Keywords: Face recognition device, image recognition, algorithms.

1. INTRODUCTION:

The World Health Organization (WHO) Fact reported that there are 285 million visually-impaired people worldwide. Among these individuals, there are 39 million who are blind in the world . More than 1.3 million are completely blind. Over the past years, blindness that is caused by diseases has decreased due to the success of public health actions. However, the number of blind people that are over 60 years old is increasing by 2 million per decade. Unfortunately, all these numbers are estimated to be doubled by 2020. This issue stands alone as a great challenge for the scientific community to develop a system able to assist visually impaired people to obtain verbal descriptions of the surrounding environment and increase their independence.

Many innovative explanations usually known as electronic travel aids (ETA) have hence been proposed and executed ;yet none have been broadly effective in enhancing the flexibility and lives of the blinds due to the disadvantages like limited features, one way communication and bulkiness due to use of many sensors.

Reading is very essential in our daily lives. Out of 314 million visually impaired people all around the world ,45 Million are blind and new cases being added each year. Recent development s in computer vision, digital cameras, and portable computers make it feasible to assist these individuals by developing camera-based products that combine computer vision technology with other existing commercial products such optical character recognition (OCR) systems. Printed text is everywhere in the form of reports ,receipts, bank statements, restaurant menus, classroom hand outs ,product packages ,medicine bottles etc. There are many assistive systems available today but they have certain issues reducing the feasibility for the visually challenged persons. For example, portable bar code readers designed to help blind people identify different products, it enables the users who are blind to access Information about these products through speech and Braille. But a big limitation is that it is very hard for blind users to find the position of the bar code and to correctly point the bar code reader at the bar code. There are systems like K Reader Mobile it runs on a cell phone and allows the user to read mail, receipts, fliers, and many other documents.

However, the document to be read must be nearly flat, placed on a clear, dark surface(i.e., a no cluttered background), and contain mostly text. Furthermore, K Reader Mobile accurately reads black print on a white background but has problems recognizing colored text or text on a colored back ground. It can not read text with complex backgrounds. The main aim is to develop such a system that will read the texts from complex back ground successfully. In the years between 1990 and 2015 there been consider able improvement globally in the relative percentage of people with visual impairment (from 4.58% to 3.38%), considering a 38% increase in the overall world population and near doubling of the population of adults 50 years and older

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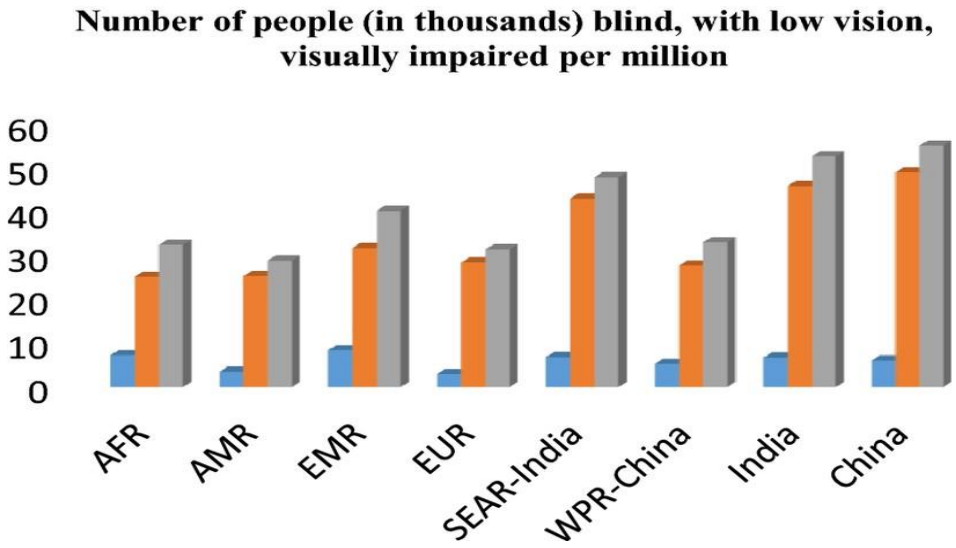

Population of blind people in the world, with low vision, visually impaired per million

2. RELATED WORKS:

[1] Yang,YingliTianChucaiYiAriesArditi—Context-basedIndoorObjectDetectionas an Aid to Blind Persons Accessing Unfamiliar Environments‖ 2010computer vision based indoor way finding system is implemented for blind people to independently access unfamiliar buildings. A blind person can find different rooms and building exit or an elevator. This system includes text recognition. It detects doors based on general geometric shape, by combining edges and corners. To differentiate between an office doors from a bathroom door, it extract and recognize the text information.

[2] Xiaodong Yang, Shuai Yuan, and YingLi Tian —Recognizing Clothes Patterns for Blind People by Confidence Margin based Feature Combination‖ clothes pattern can be recognized using this system. There are many clothes patterns. This system is classifying clothes patterns into 4 categories: stripe, lattice, special, and pattern less. In this system texts is methods only focused on text users varying with distinctive pattern changes. Due to large intra class variations in each clothes pattern category. It cannot achieve level of accuracy for clothes pattern recognition. Extracting statistical and structural feature from image wavelet sub bands can be a solution of this problem.

[3] Epshtein Eyal, Ofek Yonatan Wexler —Text in Natural Scenes with Stroke Width Transform‖2010. A novel image operator used to find the value of stroke width for each image pixel. It is used in text detection in natural images. The suggested operator is data dependent and local, which makes it fast and it is strong enough to reduce the need for scanning windows or multi-scale computation. Extensive testing shows that the suggested scheme outperforms the latest published algorithms. Its simplicity allows the algorithm to detect texts in many fonts and languages.

[4] Asif Shahab, Faisal Shafait, Andreas Dengel —ICDAR 2011 Robust Reading Competition Challenge 2: Reading Text in Scene Images‖ 2011International Conference on Document Analysis and Recognition of Text in natural scene images is becoming a prominent research area because imaging devices like mobile phone s are available. The ICDAR 2011 Robust Reading

Competition was organized to evaluate the performance of recent algorithms in recognizing and detecting text from complex images.

3. BLOCK DIAGRAM:

The proposed system approach meets the requirement of visually impaired persons. The aim of proposed system is to restore self-reliance in visually impaired people. Several sensors, electronic module are mounted on the printed circuit board.The hardware architecture of the proposed system is shown in figure, the smart system design integrates different modules in one single system, and each module has different functions the modules .

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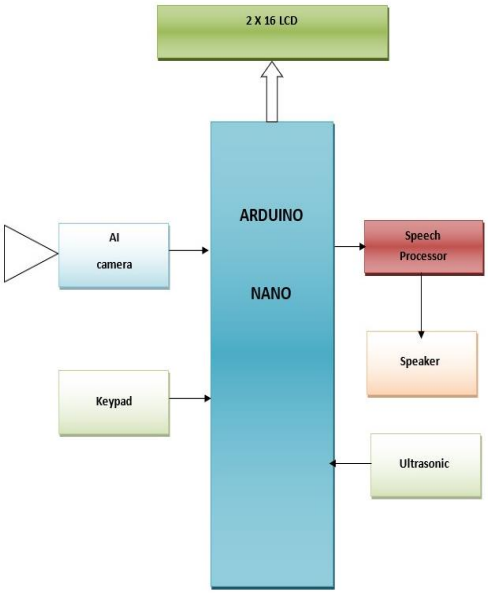
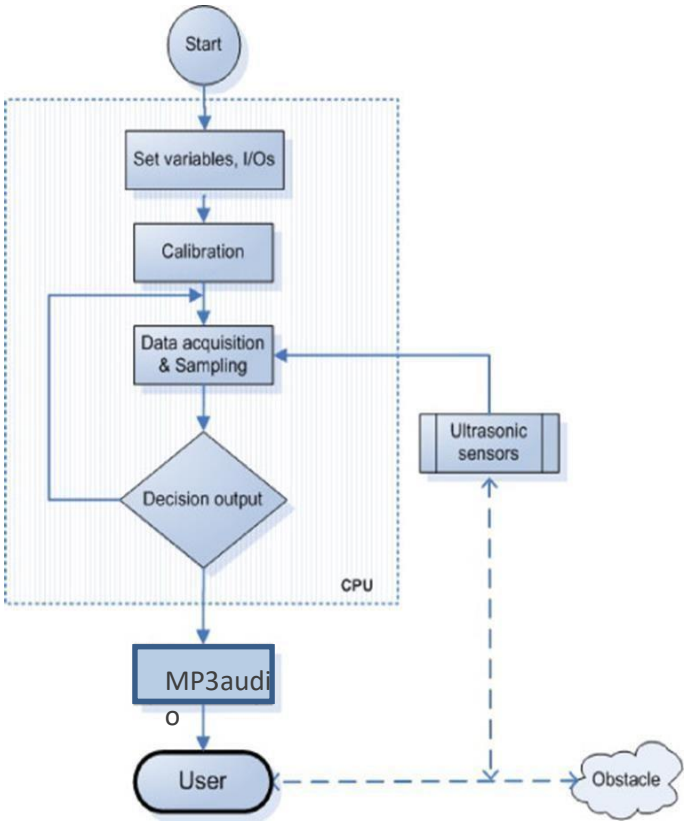
BLOCK DIAGRAM



Flow chart:



5.EXPERIMENTAL RESULTS:

We targeted light weight modules such as AI camera ,speech processor and ultrasonic sensor for object detection to ensure higher interface rates. This allowed us to run multiple objects and image detections simultaneously on the processor.

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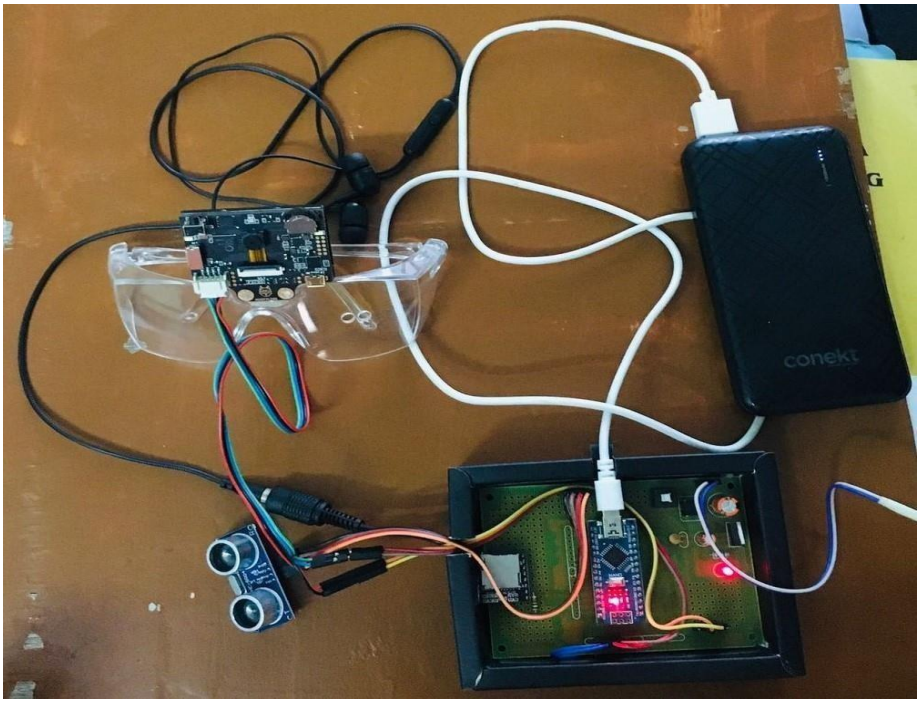

Fig: Over view of the project

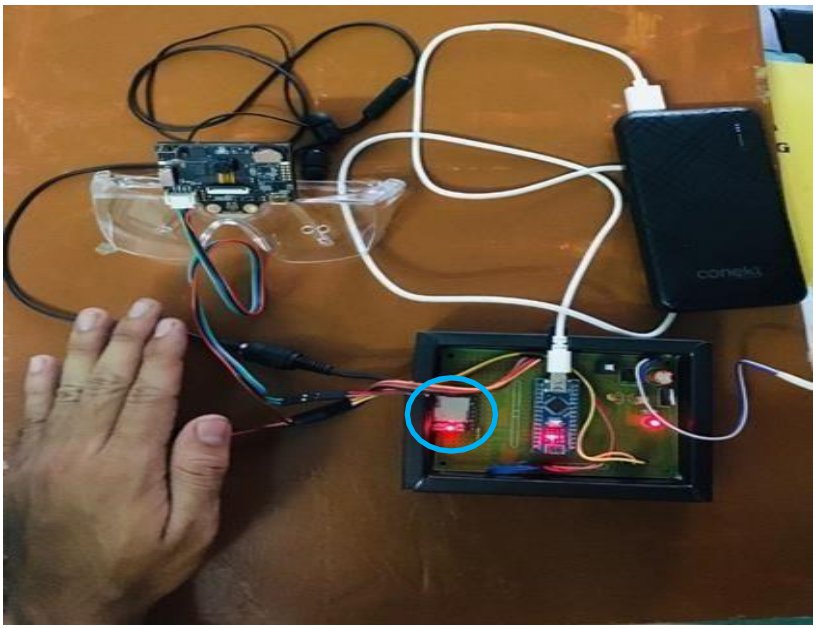

Fig: Obstacle detected

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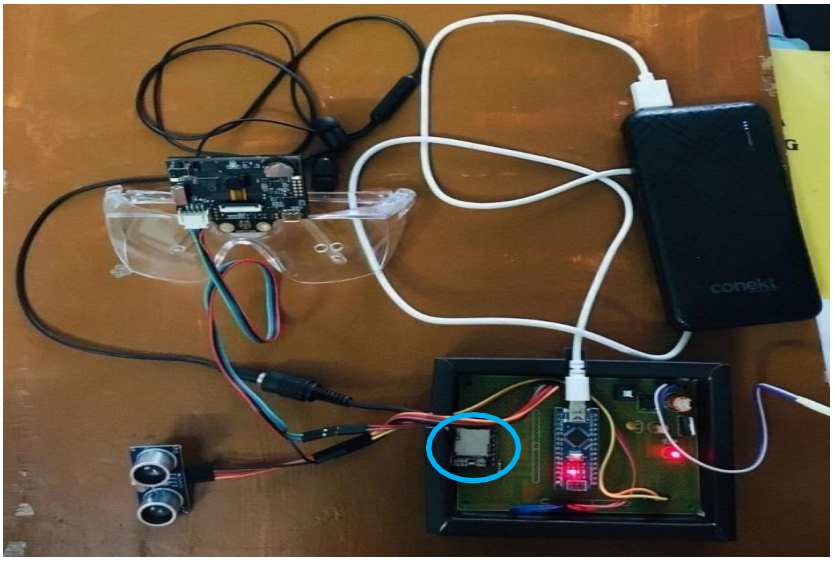

Fig: Obstacle Not- detected

Fig: Front view and side view with device

6. CONCLUSION:

In this project work we have developed a novel, comprehensive vision system for the visually impaired for indoor and outdoor navigation, coupled with scene understanding. The system is simple fashionable and compact device. Common challenges like detecting image, moving obstacles are addressed using artificial intelligence technology with low power consumption device This work describes a wearable system that performs image processing based on the Husky lens camera. The system uses ultrasonic sensors and micro-camera for specific identification. The recognition of faces, objects and texts/audio implemented successfully

FUTURE WORK

Our aim to explore actions to run multiple schematic image segmentation modules simultaneously at A higher interference rate . we even plane to evaluate system performance with high ended multiple sensors along with traditional point cloud methods to detect elevation changes.

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