SMART ASSISTANT FOR VISUALLY CHALLENGED PERSON

P.Abima[1], R.Aslin Sushmitha[2], P.Sivagami[3], Dr.A.Radhakrishnan[4]

[1, 2, 3]UG student, Department of IT, University College of Engineering, Nagercoil
[4]Professor, Department of IT, University College of Engineering, Nagercoil

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Abstract — *Independence is the important methodology in achieving objectives, dreams and goals in life. Visually impaired/blind persons find themselves challenged the dangerous paths to go out independently. There are millions of visually impaired or blind people in this world who always need the help of others. For many years the normal walking stick became a well-known attribute to blind person's navigation and later efforts have been made to improve the walking stick by adding remote sensor. Many electronic aids are developed for visually challenged persons. Most of the devices make use of smart stick and guide dogs. Hence we propose an Electronic Travelling Aid (ETA) which helps the visually challenged persons to help in navigation. This ETA is fixed to the shoe. When the obstacle is near to the shoe it will detect it by using ultrasonic sensor then the camera will capture the image and processing it using Matlab, finally it provides the exact path..*

Key Words : Blind People, ETA Shoe, ArduinoUNO, Ultrasonic Sensor, Camera, Voice Kit.

1. INTRODUCTION

Vision is considered as the most important sense, there are millions of visually impaired or blind people in this world who always need the help of others. Technology helps the blind people to communicate with the environment, the communication process and the dissemination of information has become very fast and on a wider scale to include all parts of the world, which greatly affected the human life, this increasing the ways of entertainment and comfort and reduced suffering and hardship in many things. Blind people are part of this world, technology leaves a significant impact on their lives today. The assistance provided earlier for blind people was at a particular hardware were expensive and limited capabilities. This paper presents an ETA to provide an embedded based smart electronic aid for blind people.

Advances of technology and better knowledge in human psycho-physiological 3D world perception permit the design and development of new powerful and fast interfaces assisting humans with disabilities. For the blind, research on supportive systems has traditionally focused on two main areas: information transmission and mobility assistance. More recently, computer access has been added to the list [3]. Problems related to information transmission concern reading, character recognition and rendering graphic information about 2D and 3D scenes. The most successful reading tool is the Braille dot code. Introduced by Louis Braille in the 19th century, it has now become a standard worldwide. Inventions addressing the problems of character recognition and pictorial representation mostly consist of tactile displays. They permit character and graphic recognition by feeling a tactile version of them. Problems related to mobility assistance are more challenging. They involve spatial information of the immediate environment, orientation and obstacle avoidance. Many electronic travel aids (ETAs) for safe and independent mobility of the blind have been proposed over the last decades. They all share the same operation principle: they all scan the environment (using different technologies) and display the information gathered to other sense (mainly hearing and touch).

The challenges faced by impaired/blind people in their daily lives, are not understood by people. In this paper, we try to present an electronic aid, in order to solve some of their problems, it's a way to give a hand with the aid of technology. This electronic aid detects the obstacle and it is sent to the blind people, thereby making him to navigate from one place to another without hindrance.
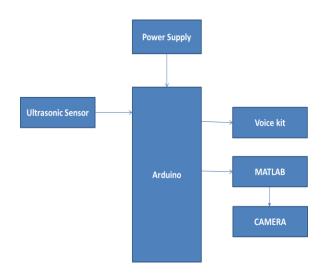
Fig-1 BLOCK DIAGRAM OF PROPOSED METHOD

2.METHODOLOGIES

Portability of visually impaired people is confined by within their surroundings. Moving safely and confidently in a metropolitan area without any human assistance is a tedious work for vision loss people. This paper proposes theoretical model and a system concept to provide an electronic aid for visually impaired people Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough. If the obstacle is close the microcontroller sends a signal to voice board. It also detects and alert give to the blind. Microprocessors are manufactured as components of embedded systems with general-purpose counterparts are low power consumption. Image processing technique is used to identify the object and give alert the correct path to the person.

2.1 . ARDUINO CONTROLLER

The Arduino Uno is one of the most common and widely used Arduino processor boards. There are a wide variety of shields (plug in boards adding functionality). It is relatively inexpensive (about \$25 - \$35). The latest version as of this writing (3/2014) is Revision 3 (r3): · Revision 2 added a pull-down resistor to the 8U2 HWB line, making it easier to put into DFU (Device Firmware Update) mode · Revision 3 added o SDA and SCL pins are now brought out to the header near the AREF pin (upper left on picture). SDA and SCL are for the I2C interface o IOREF pin (middle lower on picture that allows shields to adapt to the voltage provided o Another pin not

connected reserved for future use The board can be powered from the USB connector (usually up to 500ma for all electronics including shield), or from the2.1mm barrel jack using a separate power supply when you cannot connect the board to the PC's USB port.

2.2 . POWERSUPPLY

The power supply is very important section of all electronic devices as all the electronic devices works only in DC. One important aspect of the project is that the power supply should be compact. Most electronic devices need a source of DC power.

Power supply unit consists of following units:

1. Step down transformer.

2. Rectifier unit.

3. Input filter.

4. Regulator unit.

5. Output filter.

2.3 . ULTRASONIC SENSOR

Ultrasonic detection is most commonly used in industrial applications to detect hidden tracks, discontinuities in metals, composites, plastics, ceramics, and for water level detection. For this purpose the laws of physics which are indicating the propagation of sound waves through solid materials have been used since ultrasonic sensors using sound instead of light for detection. Sound is a mechanical wave travelling through the mediums, which may be a solid, or liquid or gas. Sound waves can travel through the mediums with specific velocity depends on the medium of propagation. The sound waves which are having high frequency reflect from boundaries and produces distinctive echo patterns. Sound waves are having specific frequencies or number of oscillations per second. Humans can detect sounds in a frequency range from about 20Hz to 20 KHz. However the frequency range normally employed in ultrasonic detection is 100 KHz to 50MHz. The velocity of ultrasound at a particular time and temperature is constant in a medium.

2.4 .Voice kit

There are several types of voice recorder and playback systems available in the market but most of them are expensive and their circuits are also very complex to assemble. Here is a simple voice recorder and playback system for recording and playback of voice messages. You can leave a voice message for your family or friends whenever you go out, which they can hear by pressing the 'play' button.

This voice recorder and playback system is built around a recording and playback chip that supports voice recording for 16 to 30 seconds and reproduces it clearly. It can be used in different types of applications such as door bells, railway announcement systems and automatic telephone answering devices
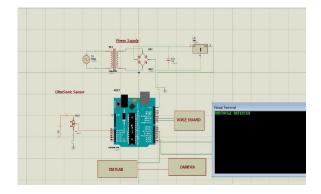
RESULT AND DISCUSSION

Fig-2 Obstacle Detected Alert

The Smart assistive consists of a sensor system . Ultrasonic sensors detect and avoid obstacles located in front of the user. A controller is required to determine the instructions that will be executed. It uses purely ultrasonic sensors for its operation, which can detect very short distances and delivered voice alert.

CONCLUSION

The paper proposed the design and architecture of a new concept of Smart Electronic Travel Guiding system for blind people. The benefit of the system is the fact that it can prove to be very cheap cost solution to billions of blind person worldwide.This ETA kit is implemented with efficiency of object detection and with clear information to a blind people for their guidelines which helps the blind persons in navigation.

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