SMART VOICE INFORMATION SYSTEM FOR BLIND PEOPLE

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Abstract: **In order to help the blind people, a study that helps the people to walk more positively is proposed. The study agree to take a smart walking assistance device that alerts blind people over obstacles, in front could help them in walking with less accident. It gives a better directional tool for the visually weakened. This paper presents an electronic Travel aid for blind people to navigate safely and quickly, an obstacle finding system using camera based visual direction finding is also considered. This system provides indoor navigation by using Radio Frequency Identifier (RFID), as well as obstacle detection by using ultrasonic sensor. The overall aim of the device is to provide a convenient and safe method for the blind to overcome their difficulties in daily life.**

Index Terms: **Blind walking assistance device; Distance measuring sensor; Microcontroller; RFID and PIC.**

I. INTRODUCTION

There are number of visionless people in the society, who are suffering while working out the basic things of daily life and that could put lives at risk while travelling. There is a need these days to provide security and safety to sightless people. There have been few devices designed so far to help the blind.

Blindness or visual injury is a condition that affects many people around the world. The usage of the blind direction finding system is very less and is not efficient. The blind explorer is dependent on other guide like white cane, information given by the people, trained dogs etc. Blind and visually reduced people find it difficult to travel in unfamiliar places because they do not receive enough information about their location with esteem to traffic and obstacles on the way which can be simply seen by people without visual injury. An Electronic Travel Aid (ETA) is a form of assistive Technology having the purpose of attractive flexibility for the blind ordinary. This paper presents a system concept to provide a clever electronic aid for blind people. We propose to plan an intelligent device which alerts the person on occurrence of obstacles based on distance between the person and the obstacle. Assistance devices designed to aid visually weakened people need to deal with two different issues: at first they need to capture related information (distance of an obstacle, position of the sensors, environment around the user), second they need to connect to the user with those experiential information. The background information captured from this assistance system is distance of the obstacle from the user using ultrasonic sensors. Thus prevents the major coincidences via crossing the roads. [5] discussed about an eye blinking sensor. Nowadays heart attack patients are increasing day by day."Though it is tough to save the heart attack patients, we can increase the statistics of saving the life of patients & the life of others whom they are responsible for.

The proposed system detects the obstacles in three dissimilar stages by using ultrasonic sensors. It alerts the person with the help of fixed voice instructions which are recorded in voice playback board. Wireless information system is applied to find the exact location of the person at present. This voice information also helps them to recognize their location without anyone controversy. The paper contains an impression of the complete system, including the design and application of custom sensors, DC servo motor controllers, communication interfaces and embedded-system based vital control system.

II. PROBLEM STATEMENT AND RELATED WORK

Blind and visually impaired people find it difficult to travel in unacquainted places because they do not receive enough information about their site with respect to traffic and obstacles on the way which can be easily seen by people without visual injury. Now a days, there are different skills like GSM, GPRS which help the blind people to steer.

According to Ji jiancheng[2] Stroke is an world wide disease and almost two thirds of the stroke survivors lose their useful walking ability and cannot walk without assistance in the acute phase.

According to Matevz Bosnak[1] restoration after stroke is an injuries one and it does affects the patients in walking process. By using an assistance device ,to help the people who affected by stroke and the reduced people.

III. SYSTEM ARCHITECTURE

The proposed system is one module which consist

1. Radio-frequency identification (RFID)
2. Ultrasonic sensor for difficulty detection.

The figure below shows the proposed design of an embedded smart walking assistance device. The system elements consist of various sub systems.

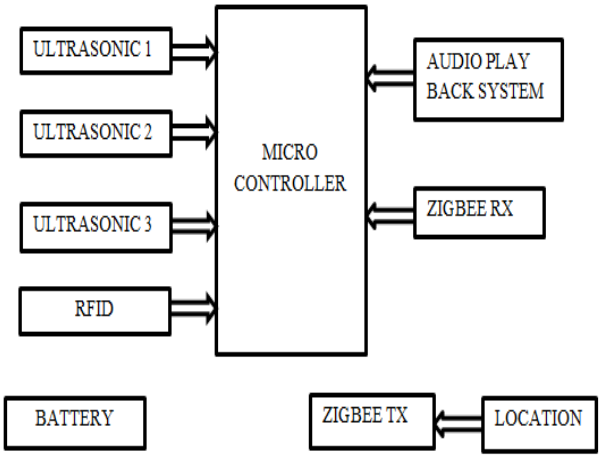

Fig.1: Block diagram of Proposed System

In this fig.1 shows the entire process in proposed system. An Ultrasonic sensor is used to detect the obtect in front of the blind people.An RFID is used to read the object and helps to identify and track the object. Zigbee which is used for the communication purpose and transfer the information to the microcontroller. Audio play back system is used deliver the output through voice message for the blind and impaired people.

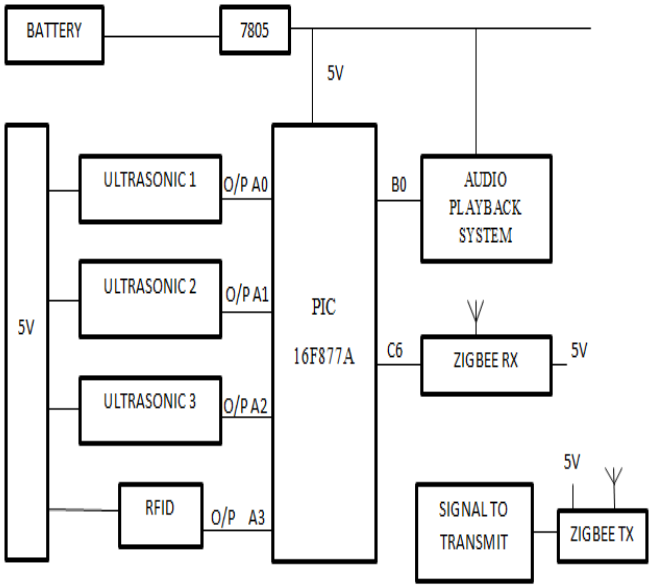

Fig.2 Proposed Assistance Device System

From the fig.2 PIC microcontroller which collect all the datas and also works as an RAM processor.it is very cheap and easily replacable.7805 is an voltage regulator used regulate 12V power supply to 5V to ultrasonic sensor,RFID and play back system and Zigbee.

IV. FUNCTIONAL SETUP

A. Ultrasonic Sensor

The proposed device uses ultrasonic sensor and it can sense any object that lies on the ground, located a distance of certain meters from the user. An ultrasonic sensor transmits ultrasonic waves into the air and detects replicated waves from an object. The smallest size of the object that can be sensed should not be less than 3 cm width (or diameter). In operation a beam of ultrasound of 40 KHz frequency is transmitted at a even interval in the forward direction. The ultrasound will be reflected from a nearby object, if any. The sensor will then detect the presence of any object that lies within that meters by sensing the reflected sound beam. The time intervals at which the transmitter will communicate ultrasound depend on the walking speed of the user.

An ultrasonic sensor communicates ultrasonic waves from its sensor skull and receives the ultrasonic waves reflected from an object. By measuring the length of time from the transmission to function of the sonic wave, it detects the position of the object.

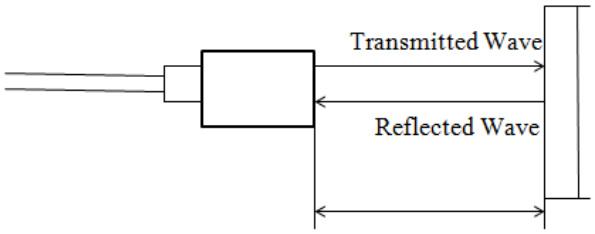

Fig.4 Working of Ultrasonic sensor

The relationship between the distance up to the object L and the reflecting time T is expressed by

$$distance = \frac{speed\ of\ sound\ \times time\ taken}{2}$$

the following formula:

B. RFID

Radio-frequency identification (RFID) uses electromagnetic fields to recurrently identify and track tags close to objects. The tags contain automatically stored data.

RFID tagging is an ID organization that uses small radio frequency identification devices for identification and tracking purposes. An RFID tagging system contains the tag themself, a read/write device, and a host system application for data collection, processing, and transmission. An RFID tag (sometimes called an RFID transponder) consists of a chip, certain memory and an antenna.

RFID methods apply radio waves to achieve

C. Audio Play Back System

The ISD1820 voice module board may be a good response for an extra single sound effect to a project. These boards can record a single audio sample of up to 10 seconds using a built-in microphone and will play back the sample on demand with good fidelity.

Fig.6 Voice Recorder Module

It provides high quality recording and playback with 11 minutes audio at 8 Khz Sampling rate with 16 bit resolution. It is suitable in simple interface or need to limit the length of single message.

Features

- Single chip, high quality audio or voice recording and playback solution.
- User friendly, easy to use operation.
- Nonvolatile flash memory technology.

D. Zigbee

of midway devices to reach more distant ones. Zigbee is classically used in low data rate requests that require long battery life and secure networking (Zigbee networks are secured by 128 bit symmetric encryption keys.) Zigbee has a defined rate of 250 Kbit/s, best suitable for recurrent data transmissions from a sensor or input device.

E. Display

This is used to display result in 2 lines and 16 characters per line. Each and every appeal is displayed in 5×7 pixel matrix. Here locations of a person and other particulars have been displayed.

V. HARDWARE COMPONENT DESCRIPTION

A. PIC Microcontroller

PIC is a family of microcontrollers made by Microchip Technology and it stands for *Peripheral*

Interface Controller. Early models of PIC had Read-Only Memory (ROM) or field-programmable EPROM for program storage and with some provision for erasing memory.

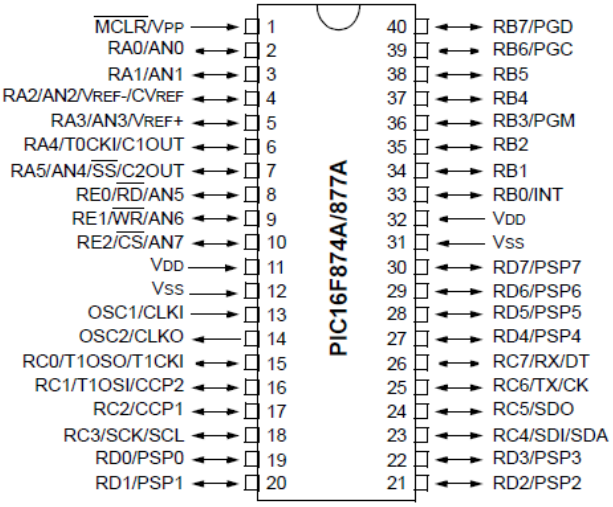

Fig.6 PIC Microcontroller

Current models use flash memory for program storage and newer models allow the PIC to reprogram by itself. Program memory and data memory are separated. Data memory is 8-bit, 16-bit, and 32-bit wide in latest models. A program instruction varies in bit-count and may be 12, 14, 16, or 24 bits long. The instruction set also varies from model to model, with more powerful chips adding to the instructions for digital signal processing functions. The PIC 16F8774A has five serial ports namely A, B, C, D and E. PIC microcontroller is interfaced with raspberry pi kit with LCD display. It is used to move the data content from the memory for the user's imagining and through that user can interconnect with the device.

B. Proteus Software

The Proteus Design Suite is an Electronic Design Automation (EDA) tool with schematic capture, simulation and PCB Layout modules. The PCB Layout module is mechanically given connectivity information in the form of a net list from the schematic capture module. It applies this information, together with the user specified design rules and various design automation tools, to assist with error free board design. Design Rule Checking does not include high speed design limitations. PCB's of up to 16 copper layers can be produced with design size limited by product alignment.

VI. HARDWARE RESULT

The Entire system is monitored and controlled by using PIC microcontroller and Proteus software and for the communication process CAN bus is used. Then for the object detection ultrasonic sensor is used. It can detect the object upto 30cm, RFID read the data and Zigbee used for the transmission of signal.PIC microcontroller used to collect all the data's and deliver the output through voice playback system. Thus the location of the blind people and the other information also displayed in it. This system is low-cost, reliable, portable, low-power consumption and robust solution for navigation with obvious short response time. Though the system is hard-wired with sensors and other components, it's light in weight.

VII. CONCLUSION AND FUTURE WORK

In previous method, there are lots of technology have been introduced to help the weakened and blind people. Some technology such as smart stick for blind people, Robot for restoration people, Wearable assistance device etc. All these

systems having some drawbacks. In this proposed method, the assistance device will tell the user about the distance of the obstacle from the user and different types of materials are illustrious based on light intensity wonder for indoor environment. Also, the audio output to the user can be given using ear phones. We presented information about the Blind people application. It is important to develop this application for the future. In future we are going to detect the potholes in the roads which are coming across the camera video. System will also detect the depth of potholes and guide blind user to get directed. In the distant future it can be extended to a system to suit outdoor environments.

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