DESIGN AND IMPLEMENTATION OF BLIND ASSISTANCE SYSTEM

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ABSTRACT

The increased access to books afforded to blind people via e-publishing has given them long-sought independence for both recreational and educational reading. In most cases, blind readers access materials using speech output. For some content such as highly technical texts, music, and graphics, speech is not an appropriate access modality as it does not promote deep understanding. Therefore blind braille readers often prefer electronic braille displays. But, these are prohibitively expensive. The search is on, therefore, for a low-cost refreshable display that would go beyond current technologies and deliver graphical content as well as text. And many solutions have been proposed, some of which reduce costs by restricting the number of characters that can be displayed, even down to a single braille cell. In this paper, we demonstrate that Braille embosser is a type of device which is very useful for the initial stage Braille language learner. Here the input is provided with the help of serial port by mobile through bluetooth module.

This input is in the form of alphabetical form so the input is converted into Braille language which is displayed with the help of actuators. Braille-users can read computer screens and other electronic supports thanks to refreshable braille displays. Blind assistance system also allows visually impaired people to do common tasks such as reading in Braille and reading documents. It is a portable device ,they can carry wherever they want so that they could get information of place they are visting with ease. As this device detect the obstacles and also determine at what distance obstacle is person can safely use this device for indoor purpose.

INTRODUCTION

The phenomenon of blindness has certainly been with human race since the drawn of its civilization. The blind were subjected to utter hospitality, including annihilation, before they could receive the right of "bare existence from the society. But, it was of immerse historical significance since it enabled some promising blind people to prove their intellectual prowess and, thereby, their usefulness for the community.

It is no longer an exercise generated by compassion for a group of persons living on the margins of social conscience. On the other hand, it is now meant to prepare them for shouldering responsibilities in personal as well as community life with confidence and success. It is to prepare them for citizenship in its wider sense.

There are 40-45 million people are blind world wide , in our country there are 15 million people are blind.[5] Braille is the language used mainly by people who are blind or deaf blind.Each braille character is made up using 6 dot positions which are arrange is rectangle .

The **price** of a **braille printer** is directly related to the **volume** of **braille** it produces.**Small**-**volume braille printers cost** between $1,800 and $5,000 and large-**volume**ones may **cost** between $10,000 and $80,000. The aim of this project is to create a refreshable electronics braille display that is capable of converting normal text file to braille .There are currently many refreshable braille display available in market but all of them are face a major problem i.e. high cost, so we propose a design in order to tackle this challenge.
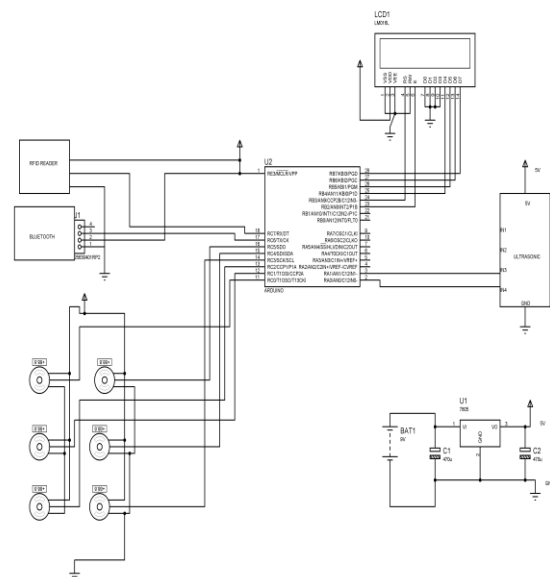
METHODOLOGY:

1) Architectural Model

Figure 1: Architectural Diagram

The explanation of above architectural model is as follows:

1.People with complete blindness or low vision often have Difficult time self-navigating .In fact, physical movement is one of the biggest challenges for blind people, simply walking down may pose great difficulty .Because of this

,many people with low vision will bring a sighted friend or family member to help navigate .

2. Here we are using microcontroller PIC18f25k20 input is given to microcontroller from bluetooth module, RFID sensor and ultrasonic sensor and output will be in a form of braille on servo motor which is refreshable braille display.

3. Bluetooth module on a portable device is connected to mobile through bluetooth terminal HC-05 through which any text document is transmitted and converted to braille language word by word.

4.Ultrasonic sensor detect distance of obstacle in a way of blind person that input is given to controller to convert it into braille and also with that buzzer is connected if obstacle is below certain threshold level then it will buzz to indicate blind person .

5.RFID reader is used to read RFID card to indicate at which place person is standing or to give information of place person wants to visit.

6.Here we are using servo motor as refreshable braille display which works on command and rotates at 90 degree , 180 degree and 360 degree.
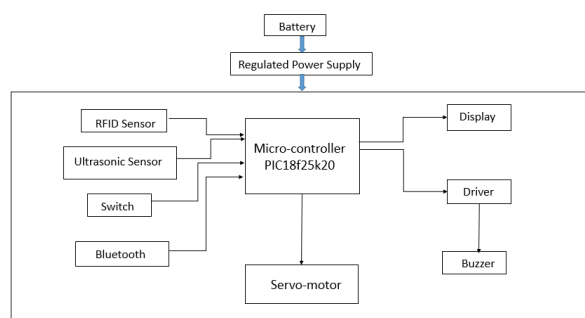
2) Block Diagram

Figure 2: Block Diagram

The above block diagram represents our proposed Blind assistance system using Refreshable braille display:

2.1 PIC18f25k0 :

PIC microcontrollers are a family of specialized**microcontroller** chips produced by Microchip Technology in Chandler, Arizona. The acronym **PIC** stands for "peripheral interface **controller**".[8] The PIC18F25K20-I/SP is a high-performance PIC18 family 8-bit powerful (200 nanosecond instruction execution) yet easy-to-program CMOS flash based Microcontroller packs powerful PIC®(RISC) architecture with up to 16 MIPS of processing power with benchmark nanoWatt XLP extreme low power consumption. This product offer all of the advantages of the well recognized high-performance x16 architecture with standardized features including 32kB of addressable program memory size, 1536bytes of data memory size, 25 general-purpose I/O pins, two comparators and 10-channel 10-bit analog-to-digital (A/D) converter. This device operates at a maximum frequency of 64MHz wide operating voltage of 1.8 to 3.6V. [10]

3.2 RF ID reader:

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader.

RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.

3.3 Ultrasonic Sensor:

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object

3.4 Servo Motor:

The servo motor is most commonly used for high technology devices in the industrial application like automation technology. It is a self contained electrical device, that rotate parts of a machine with high efficiency and great precision. The output shaft of this motor can be moved to a particular angle. Servo motors are mainly used in home electronics, toys, cars, airplanes, etc.

AC servo motor is an AC motor that includes encoder is used with controllers for giving closed loop control and feedback. This motor can be placed to high accuracy and also controlled precisely as compulsory for the applications. Frequently these motors have higher designs of tolerance or better bearings and some simple designs also use higher voltages in order to accomplish greater torque. Applications of an AC motor mainly involve in automation, robotics, CNC machinery, and other applications a high level of precision and needful versatility.

3.5 Bluetooth Module

HC-05 module is an easy to use **Bluetooth SPP (Serial Port Protocol) module**,designed for transparent wireless serial connection setup.The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.This serial port bluetooth module is fully qualified **Bluetooth V2.0+EDR (Enhanced Data Rate)** 3Mbps Modulation with complete

2.4GHz radio transceiver and baseband. It uses **CSR Bluecore 04**-External single chip Rluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

7)CONCLUSION:

An attempt has been made to make a practical model of 'Blind Assistance System using Refreshable Braille Display.' Blind assistance system allows visually impaired people to do common tasks such as reading in Braille, reading electronic mail and reading documents. It is a portable device ,they can carry wherever they want so that they could get information of place they are visting with ease. As this device detect the obstacles and also determine at what distance obstacle is person can independently travel anywhere safely.

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