REAL TIME TRACKING SYSTEM FOR BLIND PEOPLE USING ADVANCED SMS BRAILLE PAD

[1]Poonam S. Koshti, [2]Dr. A. J. Patil

[1]Student, [2]Professor
[1]Department of ENTC,
[1]SGD college of Engineering, Jalgaon, Maharashtra, India

Abstract: Now-a-days, our life is becoming more and more Hi-Tech. In this Hi-Tech life telecommunication technology plays important role. Apart from this advancement in telecommunication field, there are limited technologies that can be accessed by physically impaired people. This is the gap between bling people and advanced technology in telecommunication field. So we are going to take a step to bridge the gap between bling people and advanced telecommunication field. Here we are going to use Braille pad which will be interfaced with GSM module, aurdino. This will convert received SMS into Braille code so the blind person and read the SMS. Voice module is also be interfaced with ATMEGA 2560 for making voice announcement of SMS. Blind person can send his location through GPS module which is interfaced. The system can further be modified to read whole SMS, an E-mail too.

Keywords – **GSM module, Aurdino ATMEGA 2560, GPS module, visually impaired.**

I INTRODUCTION

The main air of the work is to design real time, low cost handheld device that converts received SMS into Braille code and voice announcement so that blind person can read and hear received SMS. We are designing the device real time so that blind people can his location to another person who can help him anytime by interfacing GPS module. Therefore this becomes the two way communication path by using wireless communication technology. Here the SMS will be sent to blind person's mobile number which is connected to aurdino ATMEGA 2560 which is interfacing the GSM module with Braille pad means received text SMS will be converted into braille code. Using GPS module blind person can send his location to another person whenever he needs.

Background of study

Visual impairment or vision loss is low ability to see to degree that cause problems and repairable by easy means such as glasses. A person who has less than 20/200 vision is legally blind.. More than 250 million people in the world are blind or visually impaired in some way. And globally, it is estimated that approximately 1.3 billion people live with some form of vision impairment. With respect to distance vision, 188.5 million people are having mild vision impairment, 217 million people are having moderate to severe vision impairment and 36 million people are blind.

India presently has around twelve million blind folks against thirty six million globally that makes the country home to 1 third of the world's blind population. This paper introduces the electronic device or a system which makes blind people able to communicate and aid to help them for their normal life.

Braille Code

Braille is a tactile writing method used by visually impaired person. Braille is invented by Louis Braille. He lost his sight as a result of childhood accident. In 1824, at the age of 15, Braille developed his code for the French alphabet as an improvement on night writing. He published his system, which subsequently included musical notation, in 1829. The second revision, published in 1837, was the first digital (binary) form of writing. In Braille's original system, letters are designed by the dot patterns.

Braille is universally accepted, utilized by and for blind persons and consisting of code of sixty three characters, every fabricated from one to 6 raised dots organized in a very six-position matrix or cell.

Fig 1. English Braille

II RESEARCH METHODOLOGY

By survey, it is seen that amongst visually impaired people, ten percent are fully blind. So, the braille is invented so that they can read. Therefore conventional braille books are available for communication and transformation of information. But this way of communication is not economical one. This becomes limited access for blind people to the advanced technology. Thus, to make blind people more independent, we are designing the system so that, they can communicate through SMS, and in future they may communicate through E-mail

also. For this we are interfacing braille pad with the GSM module. Braille was invented by Louis Braille. It is a code, not a language. Its characters have rectangular blocks called cells consisting of tiny bumps called raised dots so that blind people can read it through their touch sense. These raised dots are including six dots and arranged in 3*2 configurations. Each letter, number and punctuation is represented through the cell, raised dots configuration.

Telecommunication technology is the inseparable part of our day to day life. It is completely revolutionaries the way we are communicating, especially long distance communication. Therefore, mobile is the big milestone in advanced telecommunication field. This paper is taking step to bridge the gap between the blind people and the technology by making it accessible for blind people through braille. And braille is one of the most important ways for blind people to learn and share the information.

Now-a-days, there are many existing systems to help the blind people for translation. For example, OCR-optical character recognition, but it is very costly and have some disadvantages such as requirement of camera which should move along the line of the statement to be read. In recent days, the electronic braille pads are available in the market with low cost. Braille is the universally accepted basic system that is used by blind people for reading and writing. Braille is read by touching the characters designed by one to six raised dots by figure.
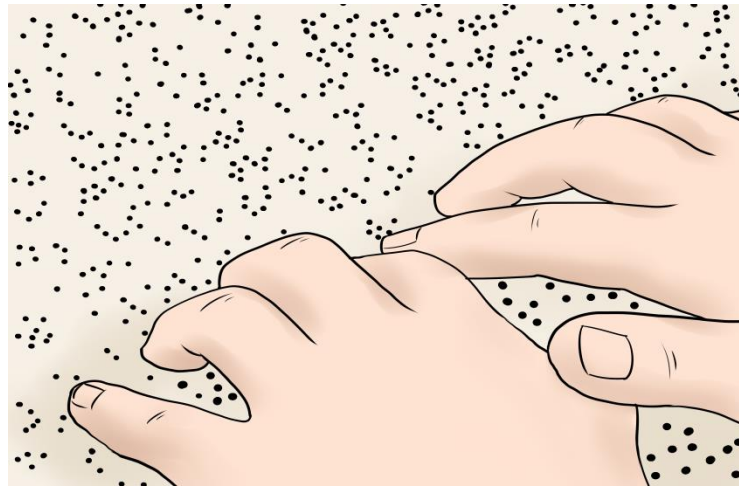

Fig 2. Traditional method to read the Braille

It is not a language but it is the way of writing other language. This six dots cell system helps to recognize alphabets, by passing fingertips, sensing all the raised dots at once. These systems are arranged in rectangular patterns of dots so that the system can easy to learn.

In Ying's research, it also converts the message to braille but its output is different from the research study. Instead of using a device to emboss the converted braille, he used a printer for embossing dots while the study used a braille device that will emboss series of rivets on braille pins. As for Yanase, Takatsuji and Shiraishi, they have used different materials to emboss braille characters. In the research study, the use of acrylic, rubber, rivets, spacer, frame, microcontroller, GSM Module, servo motors and stepper motor provides a low-cost braille. Acrylic was laser cut as a braille slate. Rubber as a stopper for the braille pins once embossed. Rivets act as braille pins. Microcontroller works as the brain of the whole device. GSM Module receives and transmits messages. Servo motors push the designated braille pins. Stepper motor moves the servo motors from left to right. We are designing the electronic device which is accessible by blind person. So, we are interfacing low cost Braille pad with mobile so the impaired person can have access to the SMS system and call for help by sharing his location through GPS module. Voice announcement system is also provided with it, as extra feature so blind person can hear SMS directly.

III DISCUSSION

A SMS Read

Here the sender sends the SMS to the blind person's mobile connected to the aurdino. The aurdino reads the SMS through the AT commands and then converts the letters of the SMS in to the Braille language using the lookup table stored in its memory. Aurdino vibrates the Braille pad on which the blind person can read the SMS.

B SMS Hear

Here the sender sends the SMS to the blind person's mobile connected to the aurdino. The aurdino reads the SMS through the AT commands and then converts into voice through speaker so the blind person can hear the text in SMS

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C Send Location

Here the blind person can send his location through GPS module connected to the aurdino to the known person whenever needed.
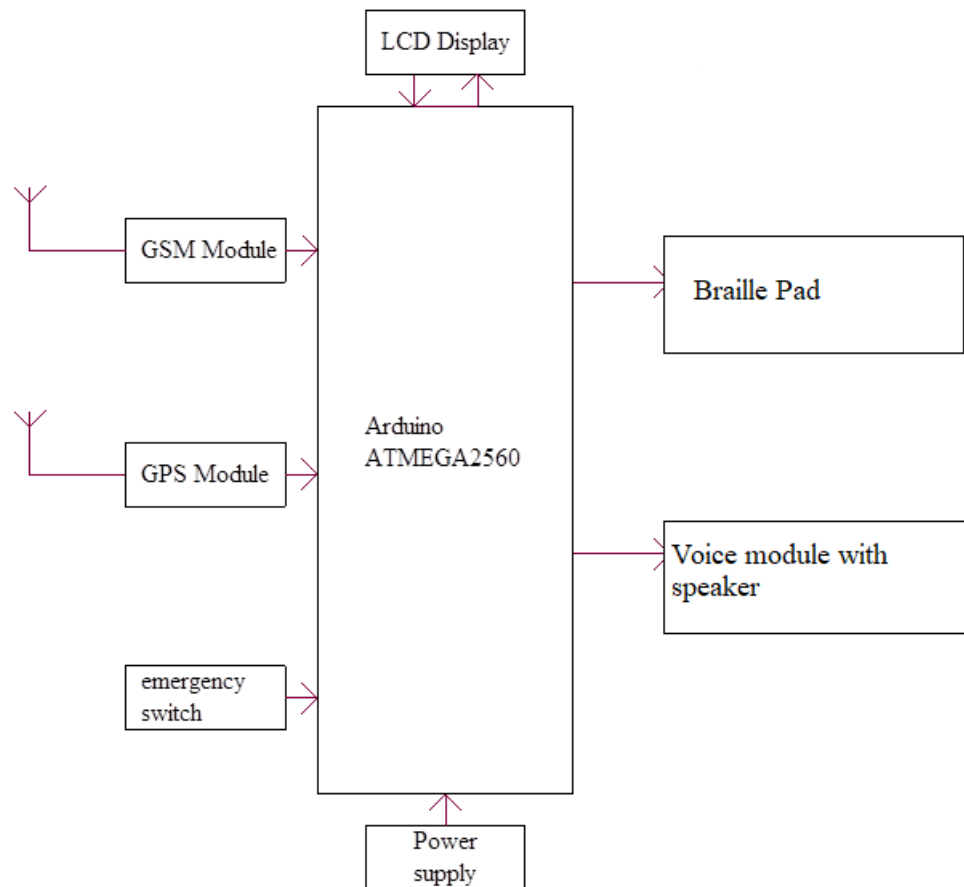
Fig 3. Block Diagram

The proposed project consists of following modules

1. GSM interfacing module.
2. GPS interfacing module.
3. Braille pad
4. Voice module
5. Aurdino ATMEGA 2560

1. GPS module

Global System for Mobile Communications i.e. GSM which is a standard developed for second-generation (2G) digital cellular networks used by mobile. Now it has became the default global standard for mobile communications.

A GSM modem is a wireless modem. It works with a GSM wireless network. It requires a SIM card, then it operates over a subscription to a mobile operator, just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to communicate over the mobile network. GSM Modem sends and receives data by using radio waves. In our proposed project GSM 900 modem will be used to send the messages. It consists of a GSM/GPRS modem with standard communication interfaces like RS-232 (Serial Port), USB, so that it can be easily connected to the other devices. There is in built power supply circuit that can be turn ON by using a suitable adaptor.

2. GPS module

GPS (Global Positioning System) is the satellite based navigation system which provides geolocation and time information to GPS receiver. It works for anywhere on or near the Earth in the line of sight to four or more GPS satellites. It works independently this makes it very useful. This concept works on time and the known position of satellites. Each satellite continuously transmits radio signal containing the current time and position.

3. Braille pad

A low cost Braille pad is developed for enabling the visually impaired people to read. Each Braille cell is actuated by 36V solenoids, which has fast magnetization and demagnetization property and possess good torque. Solenoids are the most common actuator components. The basic principle of operation involves a moving ferrous core called as a pistont will move inside a wire coil. When a voltage is applied to the coil and current flows, which generates a magnetic field that attracts the piston and pulls it into the centre of the coil.

4. Voice module

The aPR33A series are powerful audio processor. It has high performance audio analog-to-digital converters (ADCs) and digital-to-analog converters (DACs). The aPR33A series are integrated with analog input, digital processing and analog output functionality. The aPR33A series includes all the functionality required to perform demanding voice applications. Because of its integrated analog data converters and

full suite of quality-enhancing features such as sample-rate convertor High quality voice systems with lower bill-of-material costs can be implemented with the aPR33A series.

5. Aurdino ATMEGA 2560

The Aurdino Mega 2560 is a microcontroller based board. It has 54 digital input and output pins out of which, 14 can be used as PWM outputs, 16 analog inputs, 4 UARTs. It has a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It is supportable to the microcontroller; and with a USB cable it simply connects to a computer or powers it with a AC-to-DC adapter or battery to get started. For the Arduino, the Mega is compatible, with most shields designed.

IV CONCLUSION

With this proposed project, we can conclude that Braille system offers a way of communication for visually impaired people. There are ways to create a low-cost Braille system by avoiding small sized solenoids. This project will also give the real time tracking system for blind people on single button which will be pressed by blind people whenever they need.

V Acknowledgment

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