



DESIGN AND IMPLEMENTATION OF VISUALLY IMPAIRED PEOPLE BASED ON GPS TECHNOLOGY

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Abstract - The major challenge to any visually impaired person is to identify and avoid obstacles and adapting themselves to the surrounding environment. VIP's will have the opportunity to get information about bus/transit stop locations and departure times or other transit schedule information. The motivation behind this paper is that buses are vital in enabling blind people to participate in society, access public transport facilities and services.

I. INTRODUCTION

Eyes plays a vital role in our life. All of us have seen the blind people and known their problems they face in their life. There are about 45 million blind people in the world according to the survey of World Health Organization. In particular, these people are faced with huge difficulties moving in cities, streets, public transportation systems and shopping malls representing a hostile ever-changing environment. As a result, blind people are in danger while moving on their own. Blind people generally remember their way to some places but they don't know in advance which obstacles they will stumble upon. It leads the visually impaired to restrict their universe to a small set of known places. Based on these complications many systems are developed to help the visually impaired immobility.

Generally guide cans are largely used by the blind people in order to indicate the presence of an obstacle. For travelling in bus, it is not possible for the visually challenged person to view the number plate of the buses. It is difficult for them to locate the bus for boarding. In crowded bus stop or bus stands its difficult for them to board the correct bus. An announcement of the bus arrivals device at the bus stop was not feasible always. In non office hours visually challenged people will suffer without assistance. [6] discussed about a project, in this project an automatic meter reading system is designed using GSM Technology. The embedded micro controller is interfaced with the GSM Module. This setup is fitted in home. The energy meter is attached to the micro controller. This controller reads the data from the meter output and transfers that data to GSM Module through the serial port.

To help them to access public transport by themselves our proposed system consists of hardware modules like bus unit and blind unit. Bus unit interface with PIC microcontroller, wireless transceiver, GPS, voice synthesizer and blind unit also interface with PIC microcontroller, GPS, voice synthesizer, easy VR, which are placed at the bus and held by visually challenged people. The visually impaired are waiting that is recognized with the help of mic at the blind unit and transfer into other unit through wireless transceiver. A voice synthesizer is used to convert the bus routes into an audio output as location. The bus routes from the bus are sent through the wireless transceiver to the blind and announcement about the bus routes are made through the speaker to the visually impaired individual. This



system helps blind people to find buses themselves, able to locate exact position and also get information about the time of bus stopped.

II. MATERIALS AND METHODS

PIC microcontroller (18F4520, 16F887), voice synthesizer, speech recognition, ultrasonic sensor, wireless transceiver, GPS, RPS.

III. SYSTEM MODEL

This is the block diagram of blind unit. The blind people will hold this unit which is in the form of wearable device. When they are in need of bus, they convey their need through the speaker and that is transferred into bus unit through the wireless transceiver and the information about the bus is sent back through the blind by wireless transceiver.

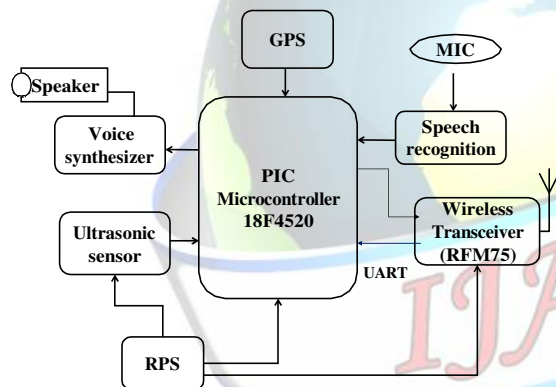


Fig 1: Blind Unit Transmitter

Fig 2. Defines the bus unit. This unit helps the blind people to get information about the status of the bus and provides information to each and every passengers about the current location and next

stopping.. It is not only useful for the blind but also other people.

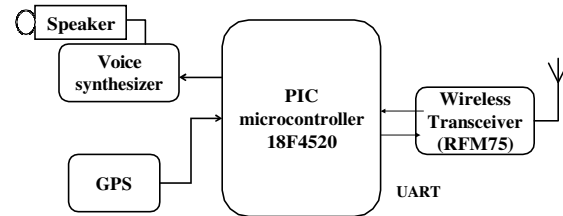


Fig 2: Bus Unit (Receiver)

(A) PERIPHERAL INTERFACE CONTROLLER:

Peripheral Interface Controller (PIC) was originally designed by General Instruments. In the late 1970s, GI introduced PIC 1650 and 1655 – RISC with 30 instructions. PIC was sold to Microchip Features: low-cost, self-contained, 8-bit, Harvard structure, pipelined, RISC, single accumulator, with fixed reset and interrupt vectors. It has wide operating range, programmable code protection and program memory read/write during run time. It has standby current of -50nA@2.0v, typical and maximum CPU frequency of 20MHZ. convenient packaging through hole(Dip) and surface mount(SMD).

(B) GPS (Global Positioning System)

It is based on the high performance features of the Media Tek MT3337 single-chip architecture. Satellite based and tracking sensitivity is 165dBm that extends positioning coverage into place like urban canyons and dense foliage environment where the GPS was not possible before .GPS(SKG13BL) is



a complete GPS engine module that features super sensitivity ,ultra low power and small form factor. The GPS signal is applied to the antenna input of module ,and a complete serial data message with position , velocity and time information is presented at the serial interface with NMEA protocol or custom protocol. It is accurate, reliable and unlimited user capacity.

(C) WIRELESSTRANSCEIVER

Wireless transceiver (transmitter /receiver)RFM75 module has a ability to communicate short or long range. While consuming low power and maintaining high levels of interference rejection over transport peer-to-peer, point-to-point, point-to-multipoint and multi-drop networks. It has automatic packet processing, 2400-2483.5 ISM band operation, support 250kbps,1Mbps and 2Mbps air datarate.

(D) ULTRASONICSENSOR

The SRF005 ultrasonic range sensor detects objects in it's path and can be used to calculate the range to the object. It is sensitive to enough to detect a 3cm diameter broom handle at a distance of over 3m. This module can be used in two different modes: single pin(single microcontroller pin) and dual pin(separate PICAXE microcontroller trigger and echo pins). It is small in size 43mm*20mm*17mm height.

(E) VOICESYNTHESIZER:

The voice synthesizer APR33a3 series are powerful audio processor along with high performance audio analog-to-digital converters and digital-to-analog converters. The APR33a3 seriesc2.0 is specially designed for simple key trigger, and user can record and playback the message averagely for 1,2,4 or 8 voice messages by

switch,it is suitable in simple interface or need to limit the length of the single message. E.g. toys,leave message system, answering machine etc. meanwhile his mode provides the power management system. It can effectively reduce electric current consuming and increase the time in any projects powered by batteries.

(F) SPEECHRECOGNITION

Easy VR is a multipurpose speech recognition module designed to add versatile, robust and cost effective speech and voice recognition capabilities to virtually any application. It is a second generation version of the successful VR it can be used with an UART interface powered at 3.3v-5v such as PIC and arduino board. It is ideal application for automation or adding hearing to most popular robots on the market. A host of built-in Speaker Independent (SI) commands for ready to run basic controls in the following languages: English, German,French.

IV. RESULTS &DISCUSSION

Once the required components are connected they undergo testing and the outputs are verified. The



Fig 3: Bus Unit

Output of the bus unit is given in fig.3 and blind unit output is given in fig.4. To make this project even more compatible, instead of wearable device it would be a application in mobile phones. This will be implemented in future.



Fig 4: Blind Unit

V. CONCLUSION

With this proposed scheme, a visually impaired person can successfully travel from his/her location to his desired destination using this system. Global Positioning System (GPS) module helps in tracking the person at each and every time instance. The passenger bus alert system does not only to restrict to Blind people, it can also be used by the normal people for getting the bus details to reach their destination..This a very convenient device that can be used by blindpeople.

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