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Intelligent Bus Transit System for Navigation of Blind

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ABSTRACT: One of the major challenges to any visually impaired person is to detect and avoid obstacles and to adapt themselves to the surrounding environment. The systems which were used in olden days involved visually challenged person to reach the destination using different methodologies like talking signs or guides etc. In this project, we have discussed some of the existing systems in this domain and we have proposed an idea that can be implemented with the help of wireless sensor networks (WSN) so that visually impaired persons can easily travel through public transport [8]. According to the proposed idea, there are two RF modules one RF unit is placed at a bus stop and one RF unit is placed inside the bus. The RFID tag is the unique identification of a person present at the bus stop. The major challenge to any visually impaired person is to identify and avoid obstacles and to adapt themselves to the surrounding environment.APR9600 is the voice recognition module used to convey information via sound [5]. We are using STM32 as a controller in the project. The bus driver selects the appropriate switch according to the bus stop reached.

KEYWORDS: RFID Tag, Reader, STM32F1038

I. INTRODUCTION

The world is full of innovation but from long time we don't have anything for Blind people who is very much desperate about some special things that push his/her requirements and services including the public transportation requirements and services on to the high which can provide him the rights and ability to move smoothly and independently from one place to another. One of the requirements for ease and comfort in enjoying life is the ability to move independently from one place to another using different transportation means such as cars, metro ...etc. Finally, no one can believe or depend on the manmade system this is the myth of older people but nowadays trends are changed and technology gets upgraded to some advanced one so now we can build proper vehicles for blind people. One of these categories is blind people who face many problems in mobility from one place to another [4]. For example, blindness limits the type of transportation a person can use and hence, the blind may suffer additional delay compared to a normal person because of the limited transportation choices.

The most used transport means for blind people in public transportation which is considered one of the important means of traveling in many countries. It is hard to know the proposed system for blind people in any country [4]. For example, in the case of blind people, the problem is to reach the proper bus stop because they are not aware of that so the main difficulty comes in recognizing and estimating the arrival of buses at the bus stations. In this session, they are not in a situation to read the bus number to identify the correct bus to board as normal people. They always need some kind of support in guiding them to continue to avoid accidents as well as the unacceptable lateness in their appointments and meetings which may affect their performance as active members in society [7].
In addition to the facilities such as the subway which are developed fairly complete, with sound and image messages, the camera network is very modern there, so that it is very well to support people with disabilities, especially blind people. So, we adapt our system which is very much working of the system is initializing the RF module and pressing the switch and sending the voice command, then RF command and display the arriving bus and stop on LCD. This is for Bus Unit. For bus stop unit, starting system then initializing RFID, initializing RF module, check if RFID isvalid or not accordingly activate bus stop command and wait for bus command and depending on that readout bus command [5].

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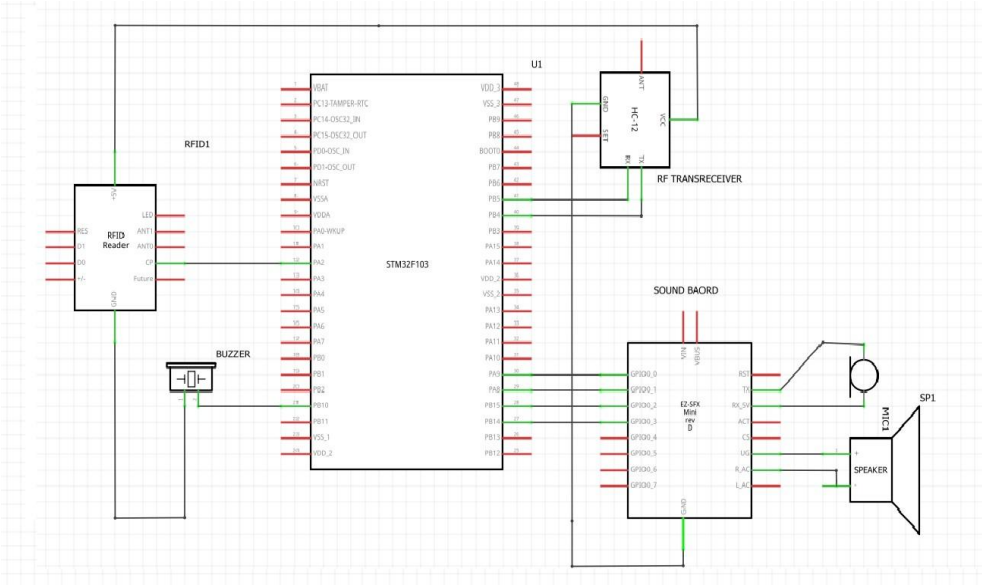

Fig -1: Block diagram

OVERVIEW

1. **RFID: -** Radio frequency Identification (RFID) is a wireless identification technology where digital data is encoded in RFID tags and is captured by reader through radio waves. As like the bar code reader, RFID technology identifies people, objects in their presence. For bar code technology the bar code is kept in front of the reader, but for RFID technology we bring RFID tags in range of readers. There are cases of barcode reader getting damaged while it is not the case with RFID technology [5].

2. **RFID Tag: -** This card must be unique id of user Aadhar will be printed on this kind of id so that this card can be recognized by RFID reader every person will have its own id.

3. **STM32F103C8: -** We see the in-depth reading of STM32F103xx is a medium-density performance line family which has an embedded high-performance ARM Cortex®-M3 32 bit RISC core operating at a 72 MHz frequency, high-speed embedded memories (Supports flash memory up to 128 Kbytes and SRAM up to 20 Kbytes), and it also consist of extensive range of enhanced I/O and peripherals connected to two APB buses. All the devices provide three general purpose 16-bit timers plus one PWM timer, two 12 bit ADCs and also consist of standard and advanced communication interfaces: three USARTs, an USB, a CAN, up to two I^2Cs and SPIs present init [2].

II. WORKING AND EXECUTION PROCESS

The working of the product is split into four parts:

1. **Signalling to bus driver**: - This is 1st of our four parts of modelling in this model application is getting signals from the blind people who is standing at blind spot of bus stop through this spotting they can get it into the bus. To implement this kind we need to form of wireless communication of transmitters and receivers nature of infrared remote control protocols using microcontrollers. So this section has two module IR transmitter and receiver module [9]. During this our data present is modulated at the selected carrier frequency of 36 kHz or 40 kHz providing a simple, single-chip solution for infrared data communications and remote control applications. The easiest way to receive these pulses is to use an integrated IR receiver/demodulator module which is a 3-pin devices that receive the infrared burst and output the demodulated bit stream on the output pin which is connected directly to buzzer which beeps on receiving signal from transmitter intimating bus driver about blind waiting in the bus stop.
2. **Destination input (voice) by the blind**: - Voice is more important function in this project to provide a clear message to the target object to get react on current situation [9].

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3. **Tag identification and destination matching: -** Identification is for making communication smoother on between different chips and pins presents in the board. So, for that purpose we use RFID. International Journal of Electronics, Electrical and Computational System [4].
4. **Buzz ring and bus boarding using IR sensor: -** The IR Sensor-Single is a general purpose proximity sensor. It is used to act as IR emitter and IR receiver pair. Always on detection IR signal gives high precision. The module consists of 358 comparator IC. The actual o/p of this sensor is always higher than usual once IR frequency is high otherwise its value is always low. We have indicator to check whether the output is pinged or not w/o hardware using LED. The power consumption of this module is low. The output line of IR sensor is providedas an input to microcontroller(ATMEGA328) which provides a buzzer output through D6 pin on controller [4].

WORKING:

For this reason we have to maintain two different areas at bus station one for normal people and other for blind people.At that reason stick came into play which is like sensors need to place where the door is placed if, person hold that stick and wait at door then it get some message through the station from that area. When the system recognizes people as above, the bus and bus station communicate. Now, the bus station will announce exiting of blind people at station to any bus in the RF communication area. Here, blind person gets message that will send information about itself number etc. Where we can see the signal shows with different lights and different messages they can sign that red is non-existing and green is existing of the blind at bus station [10]. And this system announce the information about bus number to blind people just one and distance 2m between the bus and bus station. It makes the blind choose right bus which is stopping in front of them. So, after the bus station announces the number through speaker, this system reset to start line [3] [4].

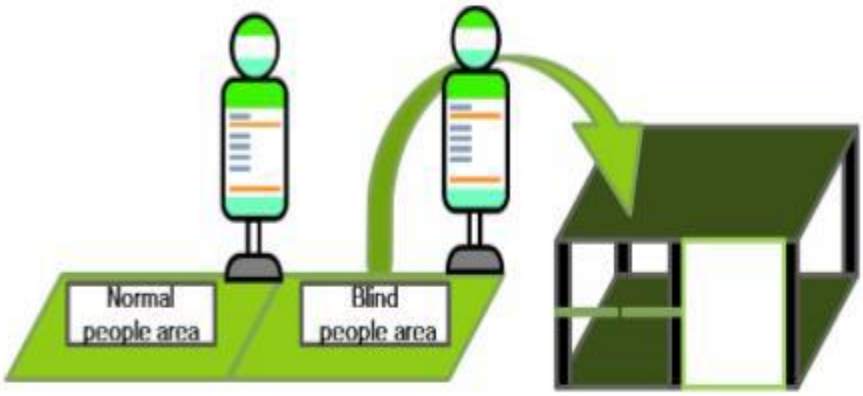

Fig -2:Bus Station Structure

III. EXISTING SYSTEM AND PROPOSED MYTHOLOGY

EXISTING IDEA

In the previous systems there was no unit made available stationary at the bus stop.RFID cards were not used for recognition or authentication of the person with the bus system .Voice synthesizer modules were not used previously for making announcement of the particular bus arriving at a particular stop & in this system we have given driver the authority to choose & press the particular switch according to the particular or respective bus arriving at the stop.

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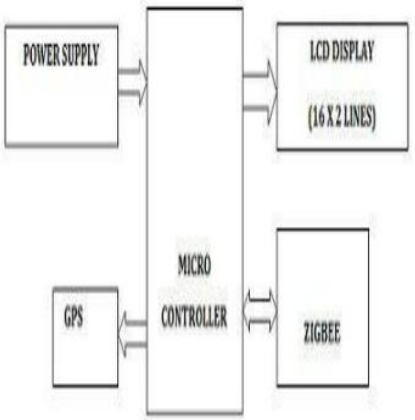

Fig -3:Existing Architecture

Disadvantages of Existing Methods

- No proper model to get proper interaction to the client.
- Cost is high and accuracy of getting proper service is unavailable.
- Hard to use and understand.

PROPOSED IDEA

RFID module implementation along with using STM 32 instead of preferring Arduinoseries of microcontrollers and voice synthesizer module is a new conceptual idea presented and implemented in the project.

PROPOSED FEATURES OR ADVANTAGES

- As compare to older model it is fast and super secure using RFID cards.
- Easily maintainable and easy to adopt.
- Implementation cost is not too high as compare to others proposed methods.

IV. HARDWARE SIMULATION

Fig -4:At Initial Stage with No Power Supply

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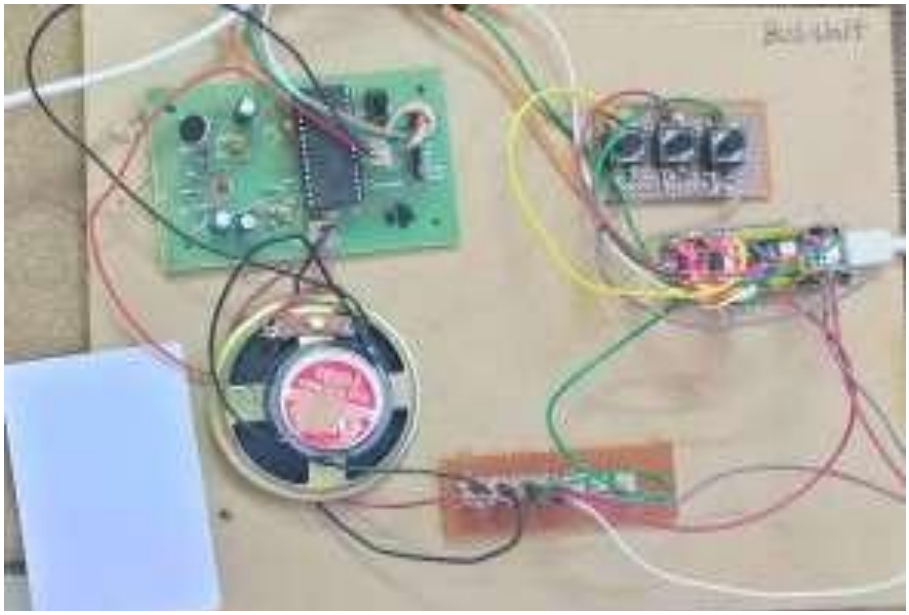

Fig -5: When Push Button1 Is Pressed Detection of Bus1

Simulation is to imitate the real world scenarios or phenomenon and to simulate something first we require to develop a model and model represents key characteristics or behaviours or function of the selected physical or abstract system.

V. FLOWCHART AND CODE SNAP

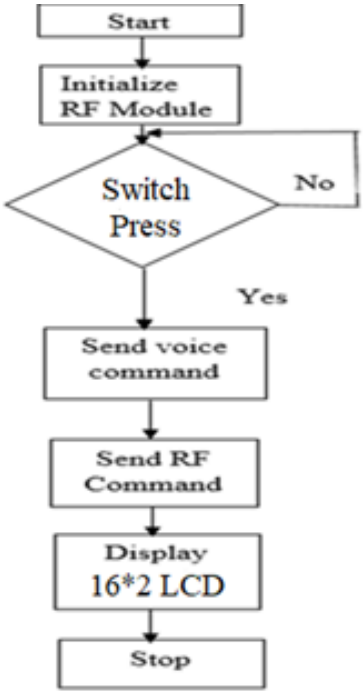

Fig -6: Flowchart of our project

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```
blindbusstop | Arduino 1.8.10
File Edit Sketch Tools Help
blindbusstop

#include <SPI.h>
#include <MFRC522.h>

#define SS_PIN 10
#define RST_PIN 9
MFRC522 mfrc522(SS_PIN, RST_PIN);   // Create MFRC522 instance.


int busstop1=6;
int busstop2=7;
int busstop3=8;
int buzzerpin=9;

String incomingdata;
int activatealerts=0;

void setup() {
Serial.begin(9600); // Starts the serial communication

pinMode(busstop1, OUTPUT);
pinMode(busstop2, OUTPUT);
pinMode(busstop3, OUTPUT);
pinMode(buzzerpin, OUTPUT);

digitalWrite(busstop1,1);
digitalWrite(busstop2,1);
```

```
blindbusstop | Arduino 1.8.10
File Edit Sketch Tools Help
blindbusstop
}

void loop() {
if (Serial.available() > 0) {
    incomingdata = Serial.readString();
    Serial.print("Read:"); Serial.println(incomingdata);
    if (incomingdata == "1") {
      Serial.println("********* STOP 1 ********************");
      if(activatealerts==1){
      stoplalert();
      }

    } else   if (incomingdata == "2") {

      Serial.println("*********   STOP 2  ********************");
      if(activatealerts==1){
      stop2alert();
      }

    }
    else if (incomingdata == "3") {
      Serial.println("*********   STOP 3 ********************");
       if(activatealerts==1){
      stop3alert();
      }
    }
```

Fig -7: Code of our project

VI.RESULTS

In the past system or traditional existing systems, the methodology was blind person was required to carry a bus stop unit but the specified system frames an idea where the bus stop unit is kept stationary or steady at the bus stop and this medium is called Smart Assistive Navigation System because Bus is also used as navigation of such people who is completely disable from eyes to see and detect the necessary facts among the face [7]. The combination of a voice synthesizer and the speaker system will enable the blind at the bus stop, to find his/her bus that passes through a required/desired route and reach his/her destination.

VI. CONCLUSION AND FUTURE WORK

CONCLUSIONS

The project ensures that the blind just need to carry a RFID card which is authorized with system [4]. The detection of card and then appropriate signals are generated to make sure that the blind catches the proper bus and driver ensures the bus arrival and departure at the particular stop at right time.

FUTURE SCOPE

The project aims to build a system which is unique & not prevalent in existing economy. We are delivering a cashless and easily accessible transactional methodology for blind making their navigation easier and convenient. The public transits makes possible through this methodology which can be implemented in various other sectors like shopping market where the blind can access buy good specifically to their , railway transportation and to some extent in bank Atms [8].

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