SMART BUS STATION BOARDING SYSTEM FOR VISUALLY IMPAIRED PASSENGERS

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ABSTRACT: In this project, we are trying to help visually challenged people to board public transport buses by voice alert, without asking others for help. That voice alert should fixed in every bus stops and it announce the information like busroute, busnumber & destination…etc of all buses that comes in that bus stop. By getting voice alert passenger will know that their required bus arrived or not and also will know information of all buses from bus stop itself.

INTRODUCTION:

- According to WHO survey, it is estimated that there are 285 million people in this world. Among them 39 million have visual impairment and many others also have low vision.
- Each visually individuals faces different challenges based on their specific level of vision. With the rise of various support based organisations, more visually impaired people given opportunity for education and many other means.
- But still issues of navigation for blind are very complex, not only for them In this advancing world, boarding correct buses has been one of the prominent problems faced by all.
- Even person new to the place face many challenges to board the correct bus for their destination.
- They depend on the other people around them. Sometimes that is also difficult if the surrounding people don't know the correct bus and route.

LITERATURE SURVEY:

Smart bus system for specially challenged individuals(2022).

Based on wi-fi module & tracking system GSM module. Create bus stop with few buttons like indication to alert the bus driver about blind people and indication to blind people about arrival about arrival of bus.

Smart bus alert system for easy navigation for blind people using android application(2018).

They specially designed mobile app for blind people that take input data from them and will give audio note(about destination) if bus arrived

EXISTING SYSTEM

The existing system has many disadvantages related to cost, performance etc. The proposed system is going to reduce all the defects of existing system. The proposed system uses the NODEMCU which provides power of microcontroller as well as microprocessor which is going to increase the performance of the system with less energy consumption.

PROPOSED SYSTEM

The system has two sub systems namely the bus sub system and remote server sub system. The bus subsystem is associated with Bus Identification using UDP . Each entry and exit in bus involves activation of UDP reader and acquisition of bus ID. This is used to determine bus status which is transmitted to server via Wi-Fi module. The location is transmitted at regular intervals to server to track the bus.

The server subsystem involves remote database that stores the bus status as well as co- ordinates along with bus details. Server subsystem is used to update the data and relay the same to application. Each bus has a passive UDP tag which stores unique data for identification. When the tag is in vicinity of reader, internal inductive current produced by the tag in response to the wireless signal transmitted by reader allows the tag to provide the data to the reader. It can work without manual intervention at all making the process automatic.

Vehicle Security using VTS:-

Vehicle Security is a primary concern for all vehicle owners. Owners as well as researchers are always on the lookout for new and improved security systems for their vehicles. One has to be thankful for the upcoming technologies, like systems, which enables the owner to closely monitor and track his vehicle in real-time and also check the history of vehicles movements. This new technology, popularly called Vehicle Tracking Systems has done wonders in maintaining the security of the vehicle tracking system is one of the biggest technological advancements to track the activities of the vehicle. The security system uses Global Positioning System , to find the location of the monitored or tracked vehicle and then uses satellite or radio systems to send to send the coordinates and the location data to the monitoring center. Due to real-time tracking facility, vehicle tracking systems are becoming increasingly popular among owners of expensive vehicles.

Figure 1.1 Vehicle tracking system

MATERIALS AND METHODS:

NODE MCU

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.The term "NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS NodeMCU was created shortly after the ESP8266 came out. On December 30, 2013, Espressif Systems began production of the ESP8266. The ESP8266 is a Wi-Fi SoC integrated with a Tensilica Xtensa LX106 core, widely used in IoT applications (see related projects). NodeMCU started on 13 Oct 2014,when Hong committed the first file of nodemcu-firmware to GitHub. Two months later, the project expanded to include an open-hardware platform when developer Huang R committed the gerber file of an ESP8266 board, named devkit v0.9. Later that month, Tuan PM ported MQTT client library from Contiki to the ESP8266 SoC platform, and committed to NodeMCU project, then NodeMCU was able to support the MQTT IoT protocol, using Lua to access the MQTT broker. Another important update was made on 30 Jan 2015, when Devsaurus ported the u8glib to NodeMCU project, enabling NodeMCU to easily drive LCD, Screen, OLED, even VGA displays.

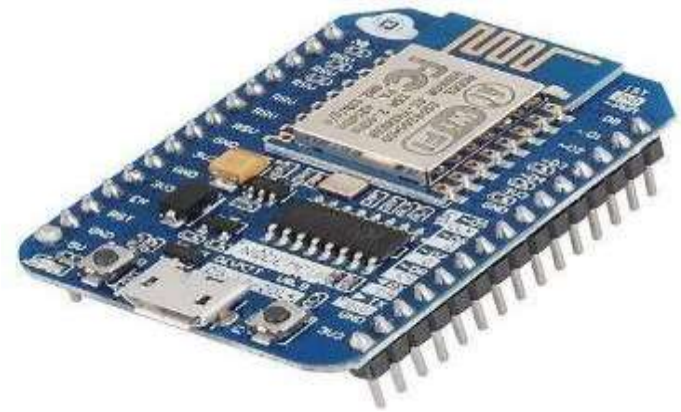
In summer 2015 the creators abandoned the firmware project and a group of independent contributors took over. By summer 2016 the NodeMCU included more than 40 different modules. Due to resource constraints users need to select the modules relevant for their project and build a firmware tailored to their needs.

ESP8266 Arduino Core [edit]

As Arduino.cc began developing new MCU boards based on non- AVR processors like the ARM/SAM MCU and used in the Arduino Due, they needed to modify the Arduino IDE so that it would be relatively easy to change the IDE to support alternate toolchains to allow Arduino C/C++ to be compiled for these new processors. They did this with the introduction of the Board Manager and the SAM Core. A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file for the target MCU's machine language. Some ESP8266 enthusiasts developed an Arduino core for the ESP8266 WiFi SoC, popularly called the

"ESP8266 Core for the Arduino IDE".[16] This has become a leading software development platform for the various ESP8266-based modules and development boards, including NodeMCUs.

NodeMCU is an open source LUA based firmware developed for ESP8266 wifi chip. By exploring functionality with ESP8266 chip, NodeMCU firmware comes with ESP8266 Development board/kit i.e. NodeMCU Development board.



NodeMCU Development Board/kit v0.9 (Version1)

Since NodeMCU is open source platform, their hardware design is open for edit/modify/build.

NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The **ESP8266** is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266, you can refer ESP8266 WiFi Module.

There is Version2 (V2) available for NodeMCU Dev Kit i.e. NodeMCU Development Board **v1.0 (Version2)**, which usually comes in black colored PCB.

NodeMCU Development Board/kit v1.0 (Version2)

For more information about NodeMCU Boards available in market refer NodeMCU Development Boards

NodeMCU Dev Kit has **Arduino like** Analog (i.e. A0) and Digital (D0-D8) pins on its board.

It supports serial communication protocols i.e.

UART, SPI, I2C etc.

Using such serial protocols we can connect it with serial devices like I2C enabled LCD display, Magnetometer HMC5883, MPU-6050 Gyro meter + Accelerometer, RTC chips, GPS modules, touch screen displays, SD cards etc.

How to start with NodeMCU?

NodeMCU Development board is featured with wifi capability, analog pin, digital pins and serial communication protocols.

To get start with using NodeMCU for IoT applications first we need to know about how to write/download NodeMCU firmware in NodeMCU Development Boards. And before that where this NodeMCU firmware will get as per our requirement.

There is online NodeMCU custom builds available using which we can easily get our custom NodeMCU firmware as per our requirement.

Hardware

- Power Supply
- UDP
- DC Motor
- Buzzer
- Gas Sensor
- NodeMcu

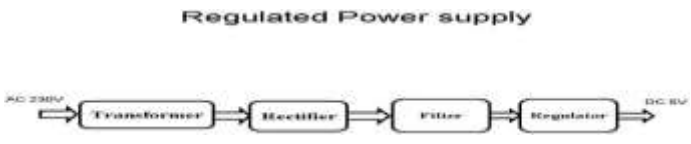
Regulated power supply:

Transformer:

A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled conductors without changing its frequency. A varying current in the first or primary winding creates a varying magnetic flux in the transformer's core, and thus a varying magnetic field through the secondary winding. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the secondary winding. This effect is called mutual induction. If a load is connected to the secondary, an electric current will flow in the secondary

Rectifier:

A rectifier is an electrical device that converts alternating current (AC) to direct current (DC), a process known as rectification. Rectifiers have many uses including as components of power supplies and as detectors of radio signals. Rectifiers may be made of solid-state diodes, vacuum tube diodes, mercury arc valves, and other components. A device that it can perform the opposite function (converting DC to AC) is known as an inverter. When only one diode is used to rectify AC (by blocking the negative or positive portion of the waveform), the difference between the term diode and the term rectifier is merely one of usage, i.e., the term rectifier describes a diode that is being used to convert AC to DC. Almost all rectifiers comprise a number of diodes in a



specific arrangement for more efficiently converting AC to DC than is possible with only one diode. Before the development of silicon semiconductor rectifiers, vacuum tube diodes and copper

I) oxide or selenium rectifier stacks were used.

Filter:

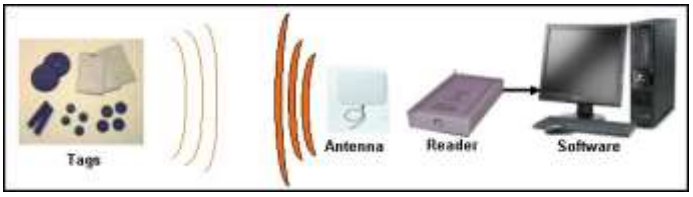
The process of converting a pulsating direct current to a pure direct current using filters is called as filtration. Electronic filters are electronic circuits, which perform signal-processing functions, specifically to remove unwanted frequency components from the signal, to enhance wanted ones.**Regulator:**

A voltage regulator (also called a ‗regulator') with only three terminals appears to be a simple
device, but it is in fact a very complex integrated circuit. It converts a varying input voltage into a constant ‗regulated ‗output voltage. Voltage Regulators are available in a variety of outputs like 5V, 6V, 9V, 12V and 15V.

Jumper Wires

A **jump wire** (also known as jumper, jumper wire, jumper cable, DuPont wire, or DuPont cable)is an electrical wire or group of them in a cable with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided



in a breadboard, the header connector of a circuit board, or a piece of test equipment.

UDP

UDP History

In 1946, a Russian invented an espionage tool called the Covert Listening Device. This device retransmitted incident radio waves with audio information. Sound waves vibrated diaphragm which slightly altered the shape of the resonator, which modulated the reflected UDP. This passive device was attributed to be the first known device and a predecessor of the UDP technology. The British invented a similar system during the World War II to identify enemy aircraft. It was called the Identification of Friend or Foe (IFF). Initial

application was during World War II-The United Kingdom used UDP devices to distinguish returning English airplanes from inbound German ones. RADAR was only able

to signal the presence of a plane, not the kind of plane it was. It was invented in 1948 by Harry Stockman. In 1971, an UDP device that was passive, powered by the interrogating signal, with a 16-bit memory transponder was invented.

The FOUR CORE Components of an UDP SystemAn UDP system has four basic components:

A tag which is composed of a semiconductor chip and an antenna.

An interrogator (sometimes called a read/write device), which is composed of an Antenna, a RF electronics module, and a control electronics module.

A controller (sometimes called a host), which most often takes the form of a PC ora workstation running database and control (often called middleware) software.

An antenna, which converts electrical power to RF power.

Basic Building blocks of an UDP system

Software:

- NODEMCU IDE
- Embedded C

NODEMCU IDE

NODEMCU is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready- made software called NODEMCU IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

NODEMCU provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

A program for NODEMCU may be written in any programming language for a compiler that produces binary machine code for the target processor. Atmel provides a development environment for their microcontrollers, AVR Studio and the newer Atmel Studio.

The NODEMCU project provides the NODEMCU integrated development environment (IDE), which isa cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntaxhighlighting, and provides simple one-click mechanisms to compile and upload programs.

NODEMCU board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.A program written with the IDE for NODEMCU is called a sketch. Sketches are saved on the development computer as text files with the file extension .ino. NODEMCU Software (IDE) pre-1.0 saved sketches with the extension .pde.

The NODEMCU IDE supports the languages C and C++ using special rules of code structuring. The NODEMCU IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only

requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution.

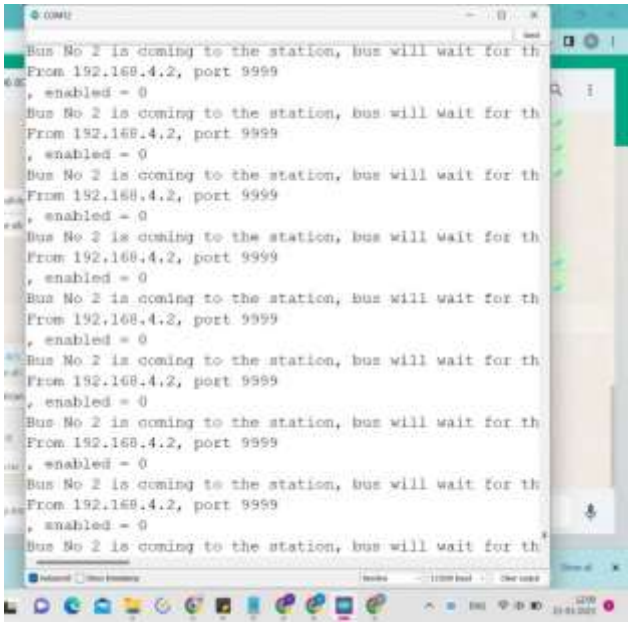
A minimal NODEMCU C/C++ sketch, as seen by the NODEMCU IDE programmer, consist of only twofunctions:

setup(): This function is called once when a sketch starts after power-up or reset. It is used toinitialize variables, input and output pin modes, and other libraries needed in the sketch.

loop(): After setup() has been called, function loop() is executed repeatedly in the main program.It controls the board until the board is powered off or is reset.

RESULT:

The below figure shows the output after the bus has arrived the bus stop, that is the receiving unit placed in bus stop and sender unit placed in bus itself. Whenever the bus comes it will communicate with receiving unit and produces the respective voice in speaker which is placed along with receiving unit.



CONCLUSION:

In this paper, the bus identification system for blind people was successfully implemented. The proposed technique is more suitable for blind passengers. When the blind passenger reaches the bus station, with the help of voice they can find the buses that pass through a location.

REFERENCES:

India's missing children, by the number. Link available at: http: // blogs.wsj.com/indiarealtime/2012/10/16/indias-missing-children-bythe-numbers/

Children injured after drunk driver rams bus into railing of bridge.See more at: http:// indianexpress.com/ article/cities/ chandigarh/children-injured-after-drunk-driver-rams-school- bus-intorailing-of bridge/#sthash.f8k6D7Vz.dpuf/

Saranya. J, Selvakumar. J, "Implementation of children tracking system on android mobile terminals," Communications and Signal Processing International Conference, Vol., no., pp.961, 965, 3-5 April 2013.

Mori, Y.; Kojima, H.; Kohno, E.; Inoue, S.; Ohta, T.; Kakuda, Y.; Ito, A, "A Self-Configurable New Generation Children Tracking System Based on Mobile Ad Hoc Networks Consisting of Android Mobile Terminals," Autonomous Decentralized Systems (ISADS), 2011, 10th International Symposium , vol., no., pp.339,342, 23-27 March 2011.

Shu, C., "Guardian Uses Bluetooth Low Energy Tech To Keep Your Child Safe" Available at:http://techcrunch.com/2013/10/09/guardianuses-bluetooth-low-energy-tech-to-keep-your- child-safe/

Akshay Shetty, Harshad Shinde, Ashwath Kumar, Ankit Verma, Popat Borse, " Proposed BLE(Bluetooth Low Energy) – Based Safety System for bus Network," International Journal of Technical Research and Applications, Vol. 3, Issue 5, 5th (September-October 2015), pp.272-274.

Nitin Shyam, Narendra Kumar, Maya Shashi, Devesh Kumar, " SMS Based Kids Tracking

Khaled Shaaban, Abdelmoula Bekkali, Elyes Ben Hamida, Abdullah Kadri,"Smart Tracking System for buses using Passive UDP Technology to Enhance Child Safety," Journal of Traffic and Logistics Engineering,Vol,1,No.2, December, 2013.