BUS IDENTIFICATION FOR VISUALLY IMPAIRED USING HC-12

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Abstract : Intelligent transportation systems have become increasingly important for the public transportation, industries and service sectors. The Economy in big cities is soaring today, and the growing traffic has become a serious challenge. In response for that to provide absolution to improve the traffic condition HC-12 based vehicle monitoring is used. This paper seeks to design the RFID and HC-12 based system architecture at the network level for tracking the vehicle information which has been sent to the centralized server.

The aim of the design is to provide a simple and easy solution to find the location of the moving vehicle and Playback Voice Module in the Speaker. Compared to the old systems, HC-12 based network architecture is able to provide information about the vehicle accurately. The vehicle will be having a unique RF Receiver. The RF Transmitter is placed in particular places. For the beneficial features of RF, we integrate RF transmitter into the Vehicle tracking Information System. This RF receiver can check or collect the data and the information is given to the control station through the HC-12 protocol. The HC-12 protocol is used for the Communication service between the Bus control station and the User Unit.

Keywords: Arduino UNO, HC-12, Embedded C,

INTRODUCTION

In Present days, Road accidents kill 382 in India every single day. India's daily death index due to road accidents especially two wheelers is more than four times the annual death toll from terrorism. Predictably, most of those who die on the roads perish because of preventable causes: speeding, drink driving and driving without a helmet.

Two-wheelers account for the largest share of vehicles on Indian roads. So, it is not a surprise that they also account for the largest number of fatalities. Wearing a helmet can reduce the risk of severe injury by 72% and the risk of death by 39%, according to the World Health Organization. keeping all this in mind, a safety and smart helmet is designed to reduce the fatalities.

This ensures the rider to buckle the helmet, checking if he is sober to drive and also provides authentication for security. If all the conditions are satisfied, then the owner of the bike is all set. The objective at hand is to develop a safety measure for the 2-wheeler riders to avoid fatality, lower the number of accidents and provide security to their vehicles from theft. The prototype includes the safety unit of detection of the wearing of the helmet and alcohol detector to allow the rider to start vehicle.

EXISTING SYSTEM:

Despite an overall improvement in safety, motor-bike accidents are increasing day-by day and they continue to increase 24% of the total population. The thought of developing the system comes from the result of a survey hearing around "750" people die in road accidents occurring due to bike crashes per year. There are many reasons for accidents to occur such as drunk and drive, rash driving etc. In most cases the Blind People suffer from these Accidents to pick up the Bus.

PROPOSED SYSTEM:

In this proposed system we are having APR Voice Module contains Two Units i.e. Transmitter Unit and Receiver Unit. If these two are turned on then using Zig-Bee the communication between User Unit and Bus unit happens then only the bike will get. If the User Unit is waiting for the Bus then When the HC-12 Connects at a Particular Distance, then the User Unit of the HC-12 Pairs and then APR the RF transmitter to stop the Bus. In the Bus Unit when the User RF receiver detects the APR Voice Speaker Playback the Sound and information displayed in LCD, then the Driver Stops the Bus

Infront of Blind People. Voice Module Play a Voice Alert that the Bus is coming. Then the User unit takes the RF transmitter to stop the Bus. In the Bus Unit when the User RF receiver detects the APR Voice Speaker Playback the Sound and information displayed in LCD, then the Driver Stops the Bus Infront of Blind People.

BLOCK DIAGRAM – USER UNIT (Transmitter UNIT):
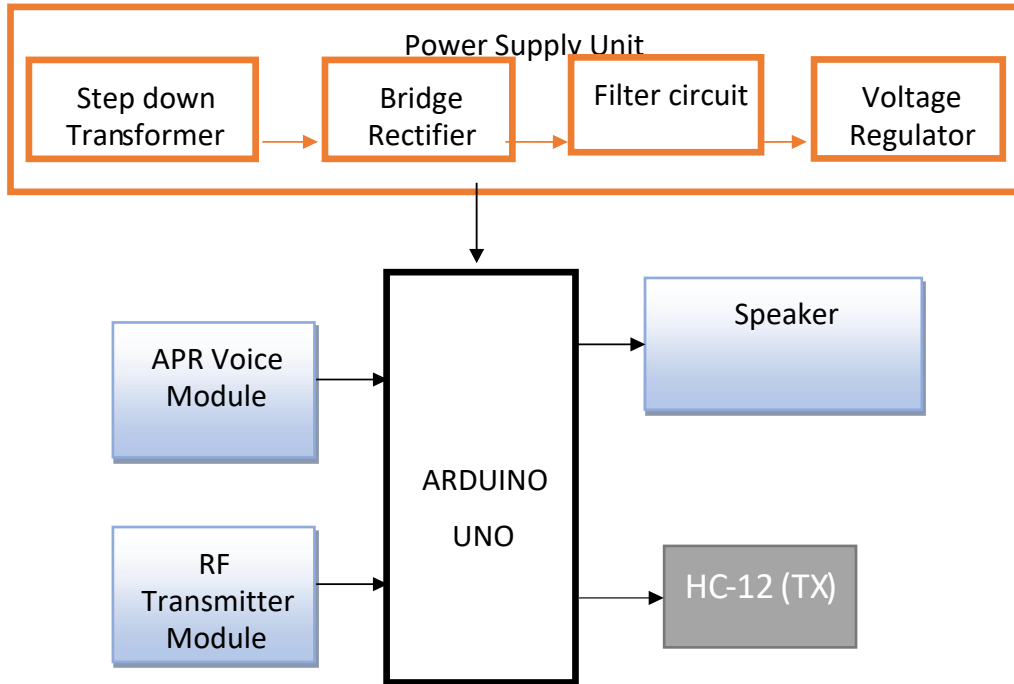
**BLOCK DIAGRAM – HARDWARE UNIT (Receiver UNIT):**
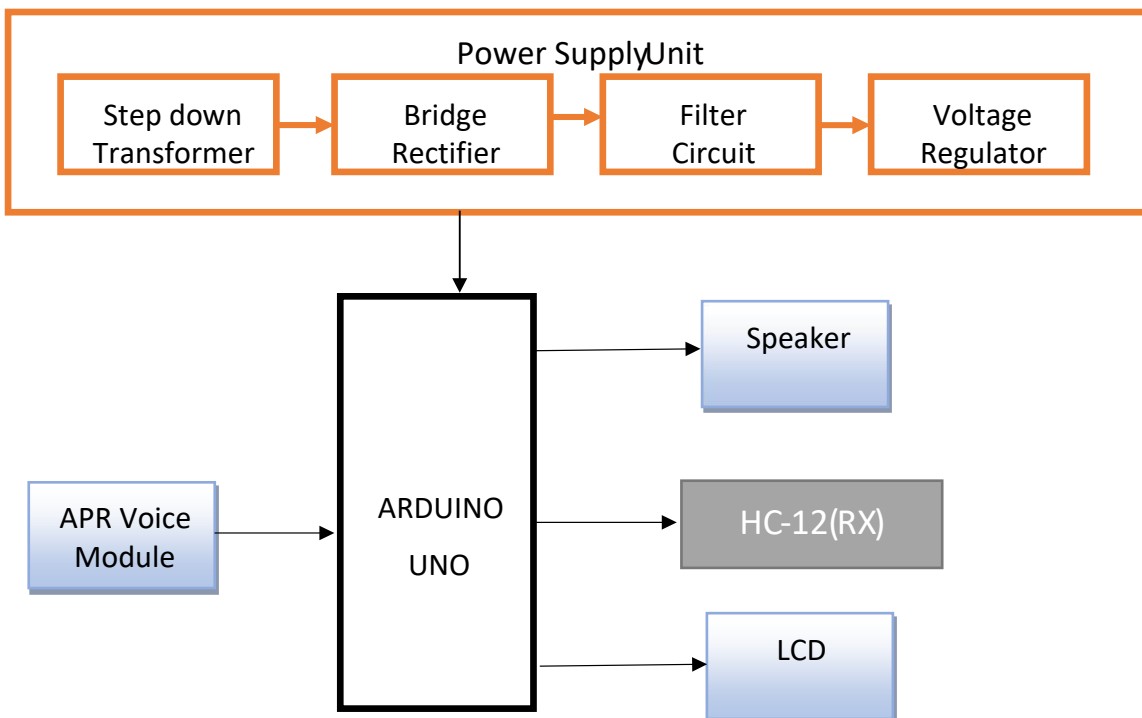
HARDWARE UNIT HARDWARE REQUIREMENTS

- Arduino Uno

- HC-12

- APR Voice Module with Speaker

- Lcd

- Power supply unit.

LCD DISPLAY

Liquid crystal cell displays (LCDs) used to display of display of numeric and alphanumeric characters in dot matrix and segmental displays. They are all around us in laptop computers, digital clocks and watches, microwave, CD players and many other electronic devices. LCDs are common because they offer some real advantages over other display technologies. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it.
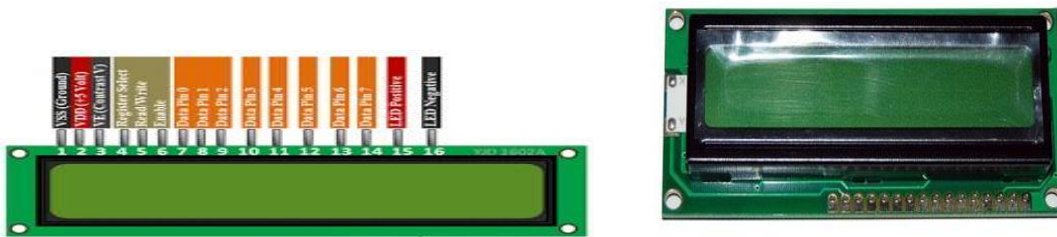

LCD (Liquid crystal display)

An LCD is made with either a passive matrix or an active matrix display grid. An active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time. Passive matrix LCD's have dual scanning, meaning that they scan

POWER SUPPLY UNIT

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others
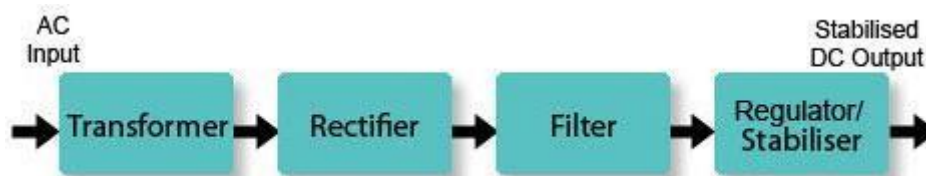

ARDUINO

An Arduino is actually a microcontroller based kit which can be either used directly by purchasing from the vendor or can be made at home using the components, owing to its open source hardware feature. It is basically used in communications and in controlling or operating many devices. It was founded by Massimo Banzi and David Cuartielles

in 2005.The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino
1.0.The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions.
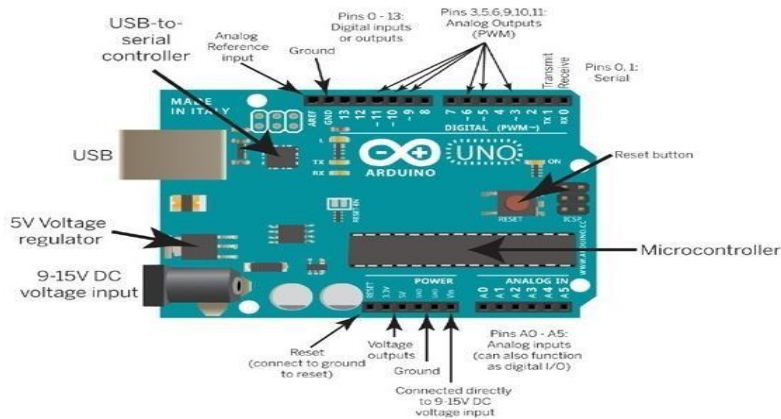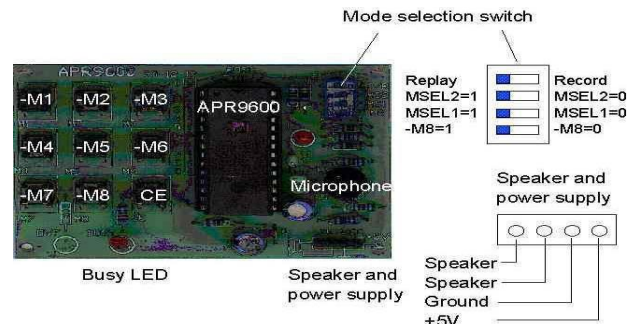

APR Voice Module

APR9600 is a low-cost high performance sound record/replay IC incorporating flash analogue storage technique. Recorded sound is retained even after power supply is removed from the module.The replayed sound exhibits high quality with a low noise level. Sampling rate for a 60 second recording period is 4.2 kHz that gives a sound record/replay bandwidth of 20Hz to 2.1 kHz. However, by changing an oscillation resistor, a sampling rate as high as 8.0 kHz can be achieved. This shortens the total length of sound recording to 32 seconds.
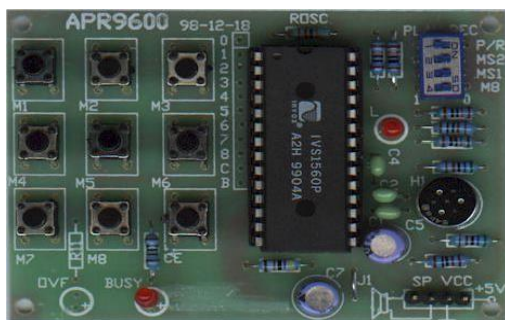

APR9600 Experimental board   APR9600 module with connector details

HC-12

HC-12 is a mesh network specification for low-power wireless local area networks (WLANs) that cover a large area.HC-12 was designed to provide high data throughput in applications where the duty cycle is low and low power consumption is an important consideration. (Many devices that use HC-12 are powered by battery.) Because HC-12 is often used in industrial automation and physical plant operation, it is often associated with machineto-machine (M2M) communication and the Internet of Things (IoT).

HC-12 is based on the Institute of Electrical and Electronics Engineers Standards Association's 802.15 specification. It operates on the IEEE 802.15.4 physical radio specification and in unlicensed radio

frequencybands, including 2.4 GHz, 900 MHz and 868 MHz. The specifications are maintained and updated by the HC-12 Alliance.
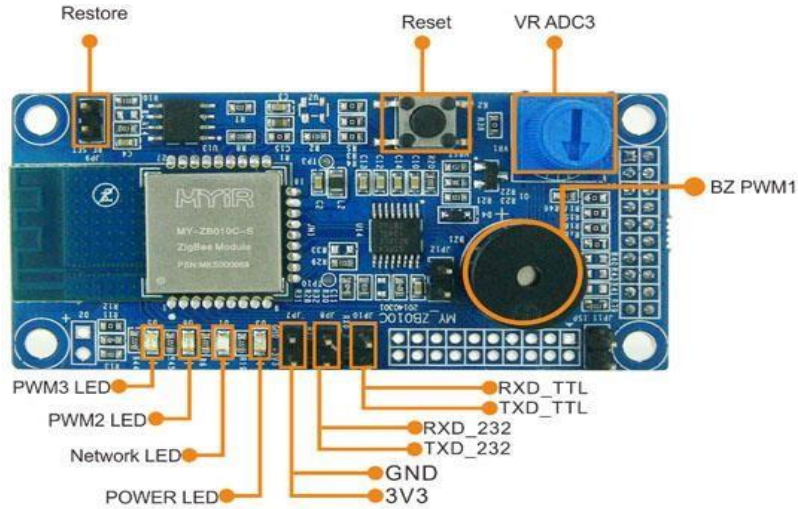
RFID READER :

This module directly connects to any microcontroller UART or through a RS232 converter to PC. It gives UART/Wiegand26 output. This RFID Reader Module works with any 125 KHz RFID tags

SPECIFICATIONS:

- 5VDC through USB (External 5V supply will boost range of the module)

- Current <50mA

- Operating Frequency: 125Khz

- Read Distance: 10cm

- Size of RFID reader module: 32mm(length) * 32mm(width) * 8mm(height).

RFID READER   RFID TAGS

SOFTWARE UNIT EMBEDDED C

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

In 2008, the C Standards Committee extended the C language to address these issues by providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as, fixed-point arithmetic, named address spaces, and basic I/O hardware addressing.Embedded C uses most of the syntax and semantics of standard C, e.g., main() function, variable definition, datatype declaration, conditional statements (if, switch, case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc.

A Technical Report was published in 2004 and a second revision in 2006.

PROTUES:

Proteus (PROcessor for TExt Easy to USe) is a fully functional, procedural programming language created in 1998 by Simone Zanella. Proteus incorporates many functions derived from several other languages: C, BASIC, Assembly, Clipper/dBase; it is especially versatile in dealing with strings, having hundreds of dedicated functions; this makes it one of the richest languages for text manipulation.

Proteus owes its name to a Greek god of the sea (Proteus), who took care of Neptune's crowd and gave responses; he was renowned for being able to transform himself, assuming different shapes. Transforming data from one form to another is the main usage of this language.

ARDUINO SOFTWARE (IDE)

The Arduino Integrated Development Environment or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.
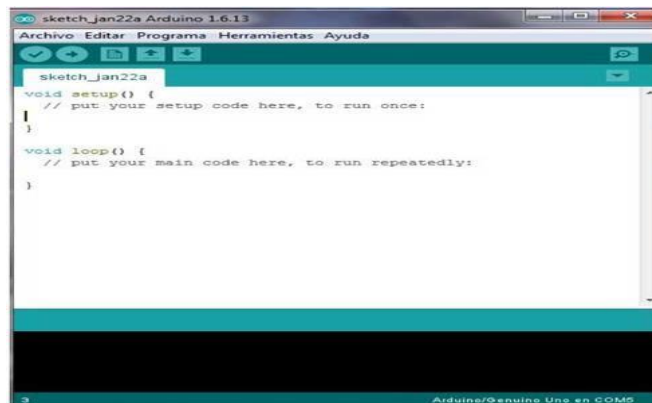
MODULE DESCRIPTION

- **Module 1:** Arduino Uno
- **Module 2:** HC-12 Module
- **Module 3:** APR Voice Module with Speaker
- **Module 4:** RFID Reader
- **Module 5:** Embedded C
- **Module 6:** Arduino IDE

CONCLUSION

This paper presented a new approach to bus identification system for visually impaired. Study of Challenges Faced by *Visually Impaired* Persons in Accessing Public *Buses* In this project is very Useful to Visually Impaired persons. The financial analysis showed that the components of such a system are cheaper than other systems; however, the performance is higher.

HARDWARE KIT

REFERENCES

[1] Herdiansyah, P., Hapsari, G. I., Mutiara, G. A., & Meisaroh, L. (2019). Smart Bus Arrival Notification for Visually Impaired. 2019 International Conference on Electrical Engineering and Informatics.

[2] El Alamy, L., Lhaddad, S., Maalal, S., Taybi, Y., & Salih-Alj, Y. (2012). Bus Identification System for Visually Impaired Person. 2012 Sixth International Conference on Next Generation Mobile Applications, Services and Technologies.

[3] Preetha, M., Elavarasi, K., & Ramyadevi, K. (2017). An intelligent digital system for visually impaired person (vip's). 2017 International Conference on Information Communication and Embedded Systems.

[4] Kaushik, C., Kumar, S., Gandhi, S., Gandhi, N., & Rajput, N. K. (2018). Automated Public Bus Identification System for Visually Impaired. 2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI).

[5] Abdullah, S., Noor, N. M., & Ghazali, M. Z. (2014). Mobility recognition system for the visually impaired. 2014 IEEE 2nd International Symposium on Telecommunication Technologies (ISTT).

[6] Yadav, A. B., Bindal, L., Namhakumar, V. U., Namitha, K., & Harsha, H. (2016). Design and development of smart assistive device for visually impaired people. 2016 IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT).

[7] Choudhary, S., Bhatia, V., & Ramkumar, K. . (2020). IoT Based Navigation System for Visually Impaired People. 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO).

[8] Sykes, J.-D., Fleur, R. S., Norkulov, D., Dong, Z., & Amineh, R. K. (2019). Conscious GPS: A System to Aid the Visually Impaired to Navigate Public Transportation. 2019 IEEE 40th Sarnoff Symposium.

[9] A. Jonathen, "Braille Pen 12," in living made easy, Electronics, Web, pp. 96-100, Feb. 2012.

[10] T.Quoc, M. Kim, H. Lee, and K. Eom, "Wireless Sensor Network apply for the Blind Ubus System," International Journal of u- and e- Service Science and Technology. Vol. 3, No. 3, Sep. 2010.