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PUBLIC TRANSPORTATION SYSTEM USING SWARM TECHNOLOGY

[1]Ms. Princy Vaidya, [2]Dr. S. L. Haridas, [3]Prof. Avinash Ikhar, [4]Prof. Gaytri Bhoyar

[1]Student, [2]Professor, [3]Professor, [4]Professor
Department of Electronic & Telecommunication Engineering,
JD College Of Engineering and Management Nagpur, Maharashtra,India

Abstract : On public roads, there are many different types of road users who travel alone or in groups, including pedestrians, ridden or herded animals, vehicles, streetcars, and buses. The term "road regulations" refers to both unofficial and official standards and laws that have developed over time to support efficient and effective traffic flow. The term "rules of the road" refer to the unofficial regulations and laws that have evolved over time to support the timely and orderly flow of traffic. Priorities, lanes, right-of-way, and traffic management all have defined meanings in organized traffic. The three categories of traffic are heavy motor vehicles (cars, trucks), other vehicles (mopeds, bicycles), and pedestrians. While some nations have intricate and specific traffic regulations, others rely on driver discretion and common sense.

IndexTerms - Overcrowding, Vehicular communication, Wi-Fi, Bus Seat Vacancy, LCD display.

I. INTRODUCTION

Overcrowding public buses have long been a problem in India. The proposed system will assist in reducing the number of serious injuries and deaths caused by overcrowding.

In both academia and the automobile business, vehicular communication is a hot topic. The goal of this developing enthusiasm is to create a reliable communications infrastructure for the Intelligent Transportation System (ITS). It is necessary to increase road safety. Both industry and academia are working to improve traffic efficiency and lessen the environmental effect of road transportation. Researchers are particularly

interested in developing networking technology and vehicular communication in two practical scenarios: vehicle-to-vehicle (w2v) communication in ad-hoc mode and vehicle-to-infrastructure (V2I) communication with fixed nodes along the road. Some cars, such as Mercedes Benz, Toyota, and Volvo, have adopted Wi-Fi Vehicular Communication.

II. LITERATURE SURVEY

In the research process, the literature review is quite significant. It is a place where research ideas can be derived and developed into concepts, and then theories. It also gives the researcher a bird's eye view of the research that has been done thus far. A researcher will know where his or her research stands based on what is d in the literature review. This project's survey has already been discussed in a number of articles and journals, which are listed below. For building automation, they employ a variety of methodologies and software languages.

An article titled Design and Research on Monitoring System of Overload and Unbalanced Load of Cars by Jian Su, Xiugang Wang, Rong Chen, Guan Xu, and Zongju Tian [1]: - Explains the relationship between the vehicle's load and the plate spring's compression deformation. This study offers a new self-overloading device that can precisely determine a vehicle's load state. In addition, this article developed a Lab VIEW drive software for a non-NI DAQ card, as well as a data collection system based on the virtual instrument. Several tests confirmed that the data was correct and that the monitoring system's architecture was reasonable.

"Overview on Passengers Overload Control in Public Buses," a paper by Kilavo Hassan and Dina Machuve [2]: - Describes passenger counts and the usage of various technologies for passenger counting. Other research, on the other hand, has a quite different goal than preventing passenger overcrowding on public buses. Many technologies have been invented to count passengers; however, they are being used for other reasons rather than to regulate overcrowding. Infrared Motion Analyzer, Video Processing, Stereovision, Proposed System, and more ways for counting passengers are available.

J. Ram Harish Yadav and K. Dhanunjaya's paper "Wi-Fi for Vehicular Communication System" [3]: - Presented a well-received wireless base station model. It employs the wireless access point model as a queuing system with variable requests and the auto traffic model. A variety of elements, such as radio communication range, available bandwidth, bit rate, the number of clients in the wireless network range, as well as vehicle speed, can affect the performance of wireless networks.

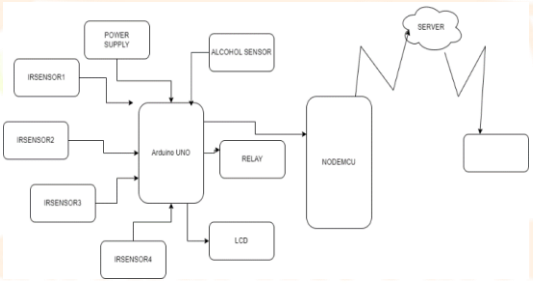
The "IEEE 802.11 performance for er-Vehicle Communication Networks" study by Y. Khaled, Ducourthial, and M Shawk [4]: - Describes communication within automobiles. In the last few years, inter-vehicle communication has got a lot of attention. Automatic driving and improving road safety by disseminating emergency notifications are two of the applications discussed in this study. This network has a very dynamic topology, a high loss rate, and a very short communication duration because of the high mobility of the cars. According to early testing using an IEEE 802.11 interface and external antennae, vehicles crossing each other at 90 km/h can only connect for 10 seconds with a 250-meter communication ray.

A study by N. G. Ghatwai and Mangesh Kale titled "Vehicle to Vehicle Communication for Crush Avoidance System" [5]: - Describes how there is a push toward Vehicle to Vehicle (V2V) Communication, and an accident-avoidance system is one that provides safety to both the vehicle and the driver. Vehicle-to-Vehicle Communication (V2V) may assist in gaining access. Safety and the avoidance of crashes are the primary motivations for car-to-car communication systems. The vehicle-to-vehicle communication technology isn't specific to any one car or brand. For a small alteration, this can be utilized in any vehicle. The adoption of wireless communication technology for vehicle networks can significantly improve road safety by enabling new services such as collision detection and traffic management, as well as other improvements.

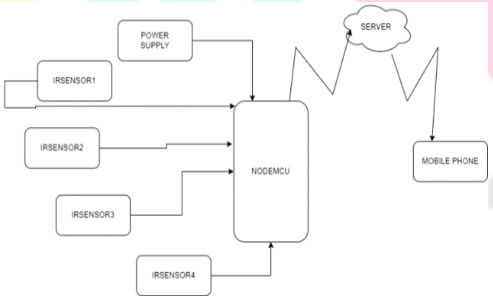
The paper "Several-point Ultrasonic Distance Measurement and Communication Using Simulations" by Andrei [6]: - Describes a new method for measuring the distance between many sites and communicating data using an ultrasonic transceiver. The study starts with a discussion of the theoretical challenge of ultrasonic distance measuring and how communication might be encoded into the transmission. Then it will provide a functional hardware prototype capable of communicating at a bit rate of 200 bits per second over a distance of 5 meters. The experimental data and simulations used to refine the solution, as well as future developments, are then discussed.

Mrs. Swati Chandurkar, Sanjana Sinha, Sneha Mugabe, Megharani Misal, and Pocoja Borekar's paper, "Implementation of Real Time Bus Monitoring Passenger Information System," [7]: - Describes real-time vehicle monitoring. While a lot of money is spent on IT-based apps like real-time at-stop displays, there is little concrete understanding regarding the behavioral consequences these have on consumers or potential customers in the real world. This paper presents a review of relevant literature, with a particular focus on user reactions to public transportation information delivered via mobile devices, the Internet, and stop displays. Several studies have been launched in the past to solve the challenge of predicting bus arrival times.

III. BLOCK DIAGRAM OF PUBLIC TRANSPORT SYSTEM



. fig. 1 Block diagram of Bus1



. fig. 2 Block diagram of Bus2

IV. HARDWARE USED IN OF PUBLIC TRANSPORTATION SYSTEM

IoT (internet of things) are devices that are connected to the internet and may be managed by users over the internet. They are also known as the web of things. The Internet of Things (IoT) is used in conjunction with hardware components to collect data, such as sensors that perceive and transmit data to IoT devices. The following is a list of some of the hardware components that were used.

A. Arduino UNO

fig.3 Arduino UNO

The Arduino/Genuino Uno is a microcontroller board that uses the ATmega328P microcontroller (datasheet). It features 14 digital input/output pins (six of which can be used as PWM outputs), a 16 MHz quartz crystal, a USB port, six analog inputs, a power jack, and an ICSP header. To get started, simply connect it to a computer through a USB, battery, or AC-to-DC adaptor. You can tinker with your UNO without fear of making a mistake, and if something goes wrong, you can replace the chip for a few dollars and start over.

B. .Node MCU

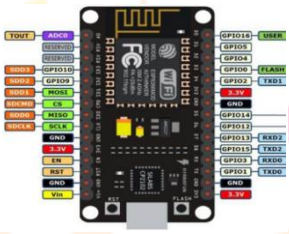


fig.4 Node MCU

Node MCU is an open-source IoT platform with a low cost. It came with firmware that ran on Espressif Systems' ESP8266Wi-Fi SoC and hardware that was based on the ESP-12 module at first. Later, the ESP32 32-bit MCU was introduced to the mix.er, the ESP32 32-bit MCU was introduced to the mix.

C. .IR Sensor

fig. 5 IR sensor

A radiation-sensitive optoelectronic component with spectral sensitivity in the infrared wavelength range 780 nm - 50 m is known as an infrared sensor (IR sensor). Infrared sensors are increasingly commonly employed in motion detectors, which are utilized in building services to turn on lights or in security systems to detect unwanted visitors.

D. LCD (Liquid Display Crystal)

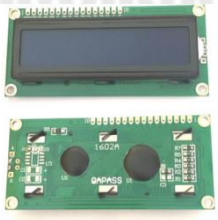


fig.6 LCD

A liquid-crystal display (LCD) is a flat-panel display or another electronically modified optical device that employs liquid crystals with polarizers to manipulate light. Liquid crystals do not emit light directly, instead relying on a backlight or reflector to generate color or monochrome images.

E. Relay

fig.7 Relay

A relay is a switch that is controlled by electricity. A set of input terminals for single or multiple control signals, as well as a set of operating contact terminals, make up this device. The switch can have any number of contacts in any contact form, including make contacts, break contacts, and combinations of the two.

F.MQ135 (Alcohol Sensor)

fig 8. MQ135 Alcohol Sensor

A Sno2 with a lesser conductivity of clean air is the MQ135 alcohol sensor. When the target explosive gas is present, the sensor conductivity rises in lockstep with the rising gas concentration. It turns the charge of conductivity into a signal that corresponds to gas concentration using basic electrical circuits.ds to gas concentration using basic electrical circuits.

V. WORKING PRINCIPLE

The bus that is seen to be substantially loaded can be stopped since the load is higher than the standard rate. If the load exceeds the maximum, the ignition is turned off. Wi-Fi is used to communicate between the two buses. This entails signal transmission and reception. This can be improved by using Bus Seat Vacancy. The number of vacancies outside the bus is displayed on the LCD, and the vacancy of the seat is declared, which is useful for physically disabled and illiterate people. The system uses the ESP8266 to display the exact time of the next arriving bus as well as the amount of space available on that bus. Connect two (or more) ESP8266s and have them communicate with one another.

Once you have connected them together you then need a way to make them talk to each other. As humans do, while one is talking, the other one needs to listen. The advantage of ESP8266 is that at the same time, can be both Client and Access Point / Server. In this project client Node, MCU measures how many seats are filled and how many seats are vacant with the help of an IR Sensor person is sitting at some particular seats that seat will provide information to Node MCU that seat is filled now and when a person left the seat will provide information seat is empty now, this all information will be collected and given to server Node MCU which is fitted in another bus, from this application we will easily get to know how much seats are available in next bus and will be display information using the LCD display.

VI. CONCLUSION

We are presenting the system which gives the number of vacant seats in the current bus and the next bus with its arrival and departure time. This system will help travelers to choose their buses wisely which creates a Low rush system in buses. This system can also be used for avoiding an accident on road and it is helpful for physically disabled and illiterate persons. In this proposed project we use an MQ sensor to check if the driver is drunk or not which avoids the accident by drinking alcohol.

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