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# Intelligent Covid -19 Pandemic Bus Service With Safety Measure

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**ABSTRACT:** The aim of this project is passenger needs to travel in city buses without conductor and ticket will be charged digitally based on travel distance. Initially passenger's need to get register for e-bus pass card. Then whenever they entered into the bus need to swipe their card and the MCU will Transfer the data of the location and card details to cloud server. Before get down from the bus they need to swipe the card again. Based on the travel distance system will generate the fare and deducted from their E-bus pass card. Additionally we are including add-on safety measures to prevent the spreading of corona virus by read the body temperature we are using wireless temperature sensor and it can also read alcohol status. If body temperature or alcohol is exceed it will trig the buzzer alert. If the driver didn't wear the seat belt bus will not start. All the passenger must follow the guidelines of the bus otherwise will not be allowed for boarding.

**KEYWORDS:** Secured Bus Management System, Internet of Things(IOT), Smart Transport System, GPS, Cloud Server.

## I. INTRODUCTION

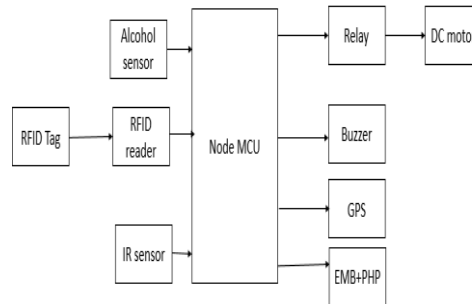
Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol based rub frequently and not touching your face.

Health experts have identified three elements as key risk factors in COVID-19 transmission: closed spaces, crowded places, and close-contact situations. Given these "three C's," we might expect transit vehicles to be a hotspot of COVID-19 transmission. On the other hand, cities such as Hong Kong have kept virus spread under control while retaining significant public transit ridership. For example, ridership on Hong Kong MTR lines in February were only 39 percent lower than in December 2019 and have recovered 18 percent since then. Comparatively, U.S. rail transit systems have seen ridership decreases of 70 to 90 percent while COVID-19 transmission increases in many states.

## II. PROPOSED SYSTEM

We Proposed this "Intelligent covid-19 pandemic bus service with safety measure" to overcome all the drawbacks in existing system. With this project we can do contactless ticketing with digital payments by using RFID cards and the message will send to the corresponding mobile number through GPS. Any one before entering into the bus they need to take thermal screening and breathe analyzing test by using alcohol sensor. If it crosses the threshold limit the buzzer will ON.

**BLOCK DAIGRAM FOR PROPOSED METHOD:**



**Embedded system implementation**

An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, and store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighborhood traffic control systems, etc.

Embedded system includes mainly two sections, they are

1. Hardware
2. Software

**Applications:**

Embedded systems have different applications. A few select applications of embedded systems are smart cards, telecommunications, satellites, missiles, digital consumer electronics, computer networking, etc.

Embedded Systems in Automobiles

Motor Control System

Engine or Body Safety

Robotics in Assembly Line

Mobile and E-Com Access

**HARDWARE AND SOFTWARE REQUIREMENTS:**

**HARDWARE REQUIREMENTS**

**4.1 Node MCU:**

**Introduction to Node MCU:**

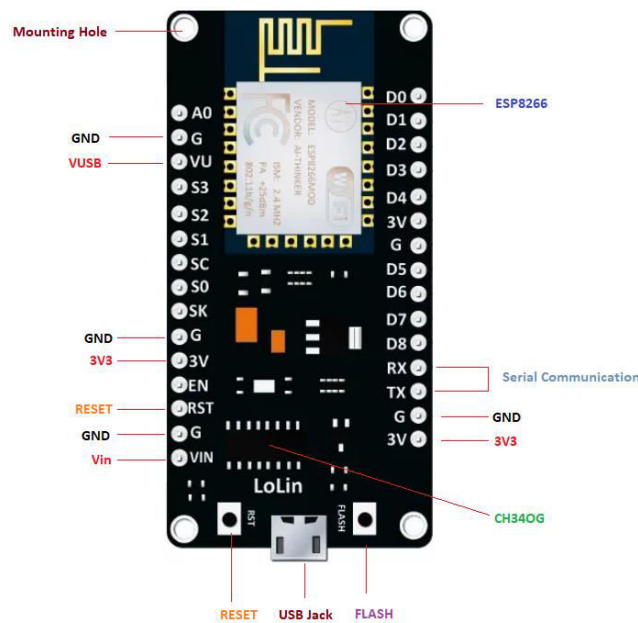
Node MCU is an open-source firmware and development kit that plays a vital role in designing your own IoT product using a few Lua script lines.

Multiple GPIO pins on the board allow you to connect the board with other peripherals and are capable of generating PWM, I2C, SPI, and UART serial communications.

The interface of the module is mainly divided into two parts including both Firmware and Hardware where former runs on the ESP8266 Wi-Fi SoC and later is based on the ESP-12 module.

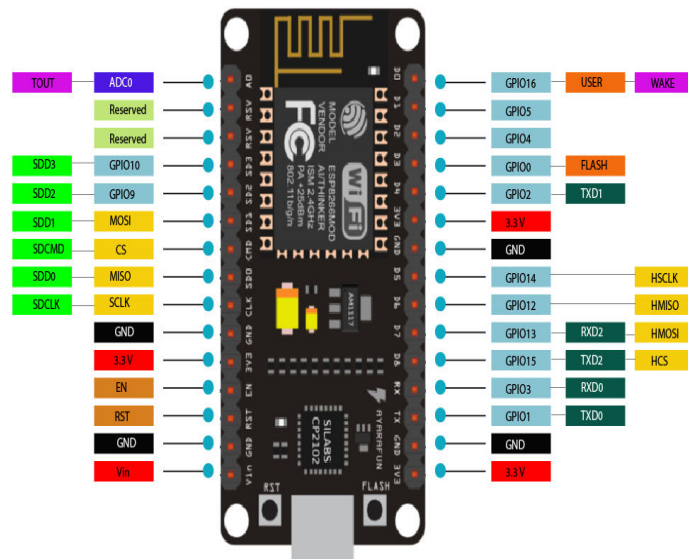
The firmware is based on LUA – A scripting language that is easy to learn, giving a simple programming environment layered with a fast scripting language that connects you with a well-known developer community.

And open source firmware gives you the flexibility to edit, modify and rebuild the existing module and keep changing the entire interface until you succeed in optimizing the module as per your requirements.



**NodeMCU Pinout:**

NodeMCU comes with a number of GPIO Pins. Following figure shows the Pinout of the board



- There is a candid difference between VIN and VU where former is the regulated voltage that may stand somewhere between 7 to 12 V while later is the power voltage for USB that must be kept around 5 V.

**Features:**

- Open-source
- Arduino-like hardware
- Status LED

- Micro USB port
- Reset/Flash buttons
- Interactive and Programmable
- Low cost
- ESP8266 with inbuilt wifi
- USB to UART converter
- GPIO pins

#### **RFID reader and Tag:**

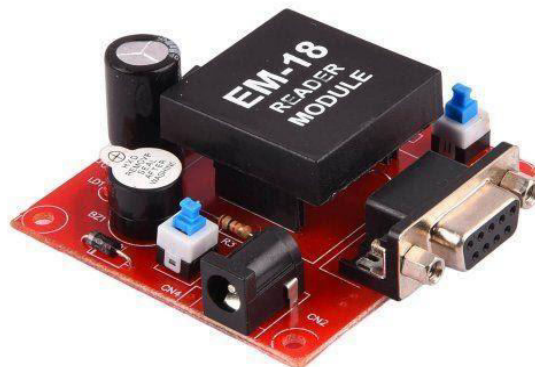
RFID represents ID of radio frequencies. RFID labels are little chips (more often than not as a keen card or a meeting card) that are utilized in our day by day lives to open lodgings, enter autos, and so on. These little chips structure the RFID framework together with a RFID reader.

During the Second World War, RFID technology was first used to identify enemy aircraft. RFID technology has evolved since then and is now being used in many different industries

A clean example is a smart warehouse where RFID technology is used to automate the warehousing process.

Two parts of an RFID system are 1) RFID Reader and 2) RFID Tag. Data is stored electronically in the RFID tag. The reader collects this data using electromagnetic waves. Tags can only store a few kilograms of data bytes.

The image given below is that of an RFID reader module.



#### **RFID Tag**

The picture given is that of a RFID tag (brilliant card molded tag). RFID labels are accessible in various sorts of size and shapes. The Tag contains an IC for putting away the information, a reception apparatus for transmitting and accepting, and furthermore a modulator. Tags are very small in size and they can hold only few bits of data.

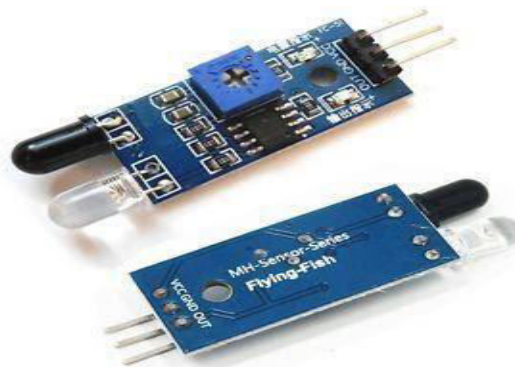


### Working of RFID

RFID has a place with the Automatic Identification and Data Capture (AIDC) innovation gathering. AIDC strategies consequently distinguish objects, gather information on them, and straightforwardly enter this information into PC frameworks with next to zero human mediation. To accomplish this, RFID techniques utilize radio waves.

#### IR sensor:

An infrared sensor is an electronic device, which emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, which can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received.



#### GPS:

Global Positioning System (GPS) is a satellite-based system that uses satellites and ground stations to measure and compute its position on Earth.

GPS is also known as Navigation System with Time and Ranging (NAVSTAR) GPS.

GPS receiver needs to receive data from at least 4 satellites for accuracy purpose. GPS receiver does not transmit any information to the satellites.

This GPS receiver is used in many applications like smartphones, Cabs, Fleet management etc.



### Buzzer:

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices. Active buzzer 5V Rated power can be directly connected to a continuous sound, this section dedicated sensor expansion module and the board in combination, can complete a simple circuit design, to "plug and play.

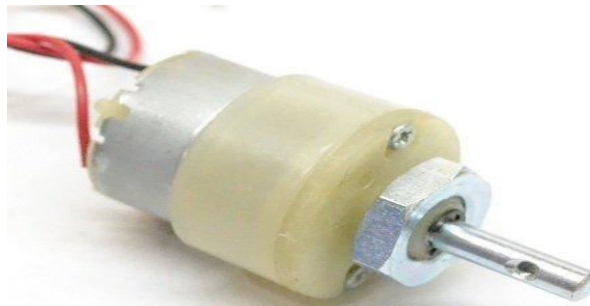


### DC Motor:

A machine that converts D.C power into mechanical power is known as a d.c motor. Its operation is based on the principle that when a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force. The direction of this force is given by Fleming's left hand rule and magnitude is given by;

$$F = BIl \text{ newton's}$$

Basically, there is no constructional difference between a D.C. motor and a D.C. generator. The same D.C. machine can be run as a generator or motor.



### MQ2 sensor:

In current technology scenario, monitoring of gases produced is very important. From home appliances such as air conditioners to electric chimneys and safety systems at industries monitoring of gases is very crucial. Gas sensors are very important part of such systems. Small like a nose, gas sensors spontaneously react to the gas present, thus keeping the system updated about any alterations that occur in the concentration of molecules at gaseous state.

Gas sensors are available in wide specifications depending on the sensitivity levels, type of gas to be sensed, physical dimensions and numerous other factors. This Insight covers a methane gas sensor that can sense gases such as ammonia which might get produced from methane. When a gas interacts with this sensor, it is first ionized into its constituents and is then adsorbed by the sensing element. This adsorption creates a potential difference on the element which is conveyed to the processor unit through output pins in form of current.



### Relay:

#### What is a relay?

A relay is an electromagnetic switch that is used to turn on and turn off a circuit by a low power signal, or where several circuits must be controlled by one signal.

Most of the high end industrial application devices have relays for their effective working. Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays.

## SOFTWARE REQUIREMENTS

### PHP SERVER

- PHP started out as a small open source project that evolved as more and more people found out how useful it was. Rasmus Lerdorf unleashed the first version of PHP way back in 1994.
- PHP is a recursive acronym for "PHP: Hypertext Preprocessor".
- PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites.
- It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.
- PHP is pleasingly zippy in its execution, especially when compiled as an Apache module on the Unix side. The MySQL server, once started, executes even very complex queries with huge result sets in record-setting time.





- PHP supports a large number of major protocols such as POP3, IMAP, and LDAP. PHP4 added support for Java and distributed object architectures (COM and CORBA), making n-tier development a possibility for the first time.
- PHP is forgiving: PHP language tries to be as forgiving as possible.

PHP Syntax is C-Like.

#### **Arduino IDE:**

**Arduino IDE** where IDE stands for Integrated Development Environment – An official software introduced by Arduino.cc, that is mainly used for writing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.

#### **Introduction to Arduino IDE:**

- Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module.
- It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process.
- It is easily available for operating systems like MAC, Windows, and Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment.
- A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more.
- Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code.
- The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board.
- The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module.
- This environment supports both C and C++ languages.
- **EMBEDDED C**
- Implanted C makes use of KEIL IDE programming. The framework program written in implanted C can be placed away in Microcontroller. The accompanying is a portion of the actual motives behind composing applications in C as opposed to get collectively. It is much less disturbing and much less tedious to write down in C then amassing. C is less traumatic to trade and refresh. You can utilize code available in capacity libraries. C code is compact to different microcontrollers with subsequent to 0 alteration. Genuine, installed C programming need nonstandard expansions to the C driver with a view to bolster charming components, as an example, settled point range catching, numerous unmistakable reminiscence banks, and fundamental I/O operations.
- In 2008, the C Standards Committee prolonged the C data to deal with these problems via giving a normal well known to all executions to purchaser to contains numerous additives not handy in standard C, for example, settled factor wide variety catching, named address spaces, and vital I/O equipment tending to.
- Installed C utilize the greater part of the grammar and semantics of well-known C, e.G., number one() paintings, variable definition, facts type statement, contingent proclamations (if, switch. Case), circles (even as, for), capacities, exhibits and strings, structures and union, piece operations, macros, unions, and so on.
- **Embedded systems programming**
- Installed frameworks writing computer programs is not quite the same as creating applications on a desktop PCs. Key attributes of an implanted framework, when contrasted with PCs, are as per the following:
- Embedded gadgets have asset limitations (restricted ROM, constrained RAM, constrained stack space, less handling power)



- Components utilized as a part of installed framework and PCs are distinctive; implanted frameworks ordinarily utilizes littler, less power devouring segments. Inserted frameworks are more fixing to the equipment.
- Two remarkable components of Embedded Programming are code speed and code estimate. Code speed is represented by the handling power, timing requirements, while code size is administered by accessible program memory and utilization of programming dialect. Objective of implanted framework writing computer programs is to get greatest elements in least space and least time.

#### **ADVANTAGES AND APPLICATIONS:**

##### **ADVANTAGES**

- Contactless ticketing options like passes and digital payments must be developed and promoted.
- Saves time

##### **APPLICATIONS**

- Used for passengers

#### **IV. CONCLUSION**

The goal of this project was to design and implement a intelligent covid19 pandemic bus services with safety measures. With this project we can do contactless ticketing with digital payments by using RFID cards and the location will send to the corresponding mobile number through GPS.

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