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IoT Based Bus Seats Vacancy Unit for Roadways

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Abstract
Public transportation plays a big role in the transportation Facility which provides mobility and creates better transport planning, for example, metro train and buses. In this project, we are solving the problem of manual counting of passengers in the city buses and the crowds of public buses in the covid situation. The passenger can get the update of the number of passengers in the bus station. So, with the help of a research paper, we get the idea to develop over a project. India and the biggest problem these people are facing is related to the availability of seats on the bus. The safety and comfort of the passengers are considered, the bus through which they are travelling should not be overloaded. An Automated Passenger Counting System is hardware and mobile-based application system. This project involved the design and implementation of automated passenger counting which provides a solution to remove the overloading of the passengers. It counts how many passengers are sitting on the seat and shows on the display screen in real-time monitor and the authority can see the total number of passengers. This system is made with the help of microcontrollers which has in build wi-fi module in it.

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I. INTRODUCTION

During the lockdown in May 2020 due to COVID-19, the government first started the intra-district bus services, and as per the guidelines issued by the government, public buses started to run with 50-percent capacity. But during this period, if any bus attendant allows more passengers than capacity, this leads to the breach of the guidelines provided by the government. In order to get rid of this situation, we made the automated solution for public transport buses which provides the continuous monitoring of seat availability. The impact of COVID-19 is nowadays visible in many public sectors. Governments implemented measures to reduce the risk of contamination by crowding, for example, shutting down public sectors, implementing travel restrictions or supporting home offices. This change in the world heavily affects public transport services. In a post-lockdown period, some activities will resume and will result in an increase in passenger demand. This will force public transport operators to use physical distancing measures to reduce the virus transmission risk. These options are managing the limited capacity, redesigning public transportation services, crowd management. With the help of our project, we can manage the count of public services.

II. LITERATURE SURVEY

- The current framework for controlling over-burdening of travelers openly transports in India is manual checks. Manual check is finished by positioning cop at various areas. The manual check can be requesting on occasions such as around evening time or during helpless climate.
- This are another kind of travelers tallying framework which is includes travelers who are get/out of a transport dependent on the" Infra-Red Motion Analyzer (IRMA)". It depends on detached, non-transmitting infra-red innovation to distinguish and check individuals traveling through an entryway or door.
- There is another technique for counting passengers is image processing that needs a standard camera which nis very costly. Sometimes the image captured by camera is not accurately detected and this is the major drawback of these technique. Since the distribution of targets is not as dense as the open scenes, but it is

also hard for crowd counting methods. So, due to the high expenses of 3D cameras, we can't use them in this project [1].

- The statistical method based on stereo vision requires two or more cameras to photograph the same location, which not only costs high on cameras but also requires a large amount of data transmission and calculation [2].

III. PROPOSED SYSTEM

The proposed system is mainly designed to provide the number of vacant seats present in each of the different buses so as to avoid the passenger overloading in different buses. The IR sensor is used to count the number of passengers entering the bus and also count the number of passengers leaving the bus. Here we use the ESP8266 as a controller unit which sends the data to the cloud at the transmitter side and also receives the data from the cloud at the receiver side which is being displayed on to the display unit by using I2C module. As we cannot directly interface the LCD with ESP8266, so that the I2C module is used in between the controller unit and display.

IV. BLOCK DIAGRAM

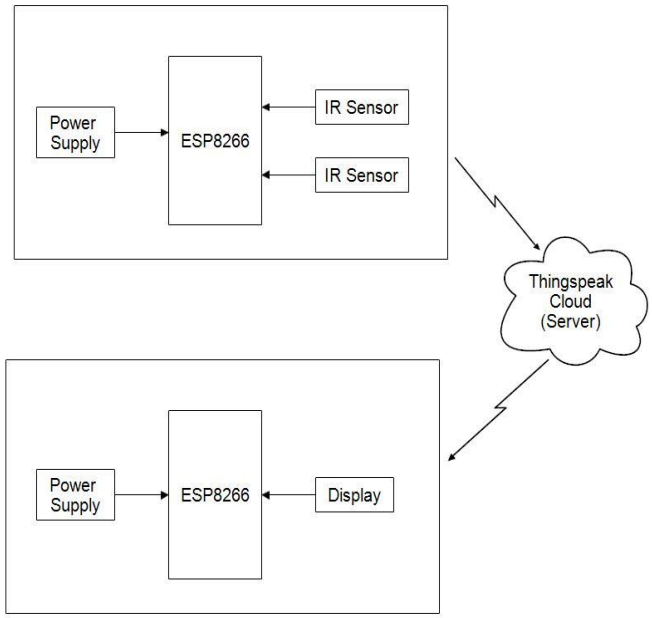

Fig.1: Block diagram of proposed system

The project is basically intended to give the quantity of empty seats present in each of the transports in order to keep away from the traveler over-burdening in various public transports. The IR sensor is utilized to tally the quantity of travelers entering the transport and furthermore tally the quantity of travelers leaving the transport. Here we have use the ESP8266 as a main controller unit which sends the information to the cloud at the transmitter side and furthermore gets the information from the cloud at the receiver side which is being shown on to the display unit by using the I2C module. As we can't straightforwardly interface the LCD with ESP8266, so the I2C module is used in the middle of the controller unit and show. It consists of a transmitter and receiver section. Transmitter section comprises of ESP8266, 2 IR sensors, power supply and receiver section comprise of ESP8266, I2C module, display, power supply. As we can use N number of buses, but in this project, we use only 3 buses. Transmitter section placed in 3 different buses and which counts the number of passengers present in the buses. Then it will send the count of the number of passengers present in the bus to the cloud (ThingSpeak). The receiver section receives the data from the cloud (ThingSpeak), process it and display the number of vacant seats present in each bus with bus number.

Description:

ESP8266 (NodeMCU): we are using nodemcu for our design as it is low-cost device which gives us feature like controlling the devices connected to it and according to the sensor data take action. It provides us an iot platform to send our sensor data on cloud server and take action according to that.

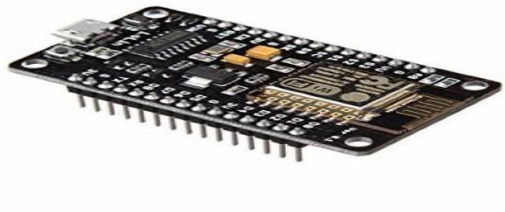

Fig.2: Nodemcu

IR Sensor: An infrared sensor is an electronic device, that 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 measure only infrared radiation, rather than emitting it that is called a passive IR sensor.

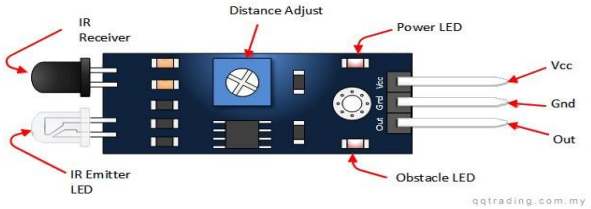

Fig.3: IR sensor

I2C module: I2C Module has an inbuilt PCF8574 I2C chip that converts I2C serial data to parallel data for the LCD display. These modules are currently supplied with a default I2C address of either 0x27 or 0x3F. ... With this I2C interface module, you will be able to realize data display via only 2 wires.

Fig.4: I2C module

16*2 LCD display: The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments.

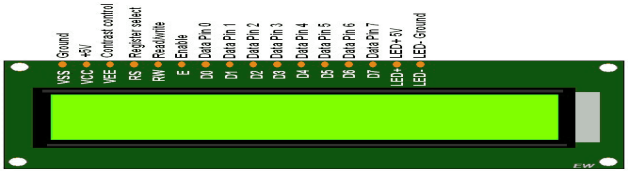

Fig.5: 16*2 LCD display

Power supply: 5v constant dc power supply is used as all the device is work on the regulated dc power supply and it need constant power.

V. WORKING

It consists of a transmitter and receiver section. Transmitter section comprises of ESP8266, 2 IR sensors, power supply and receiver section comprise of ESP8266, I2C module, display, power supply. As we can use N number of buses, but in this project, we use only 3 buses. Transmitter section placed in 3 different buses and which counts the number of passengers present in the buses. Then it will send the count of the number of passengers present in the bus to the cloud (ThingSpeak). The receiver section receives the data from the cloud (ThingSpeak), process it and display the number of vacant seats present in each bus with bus number.

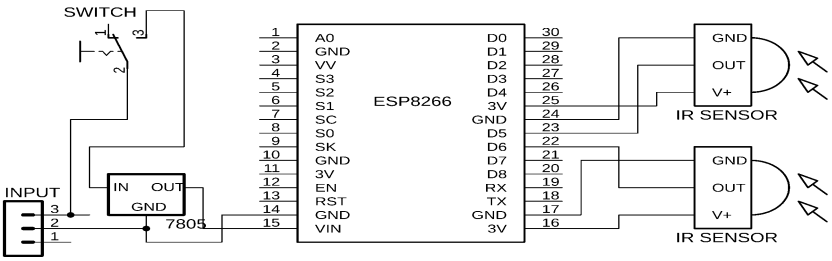

Fig.6: Circuit diagram (Transmitter section)

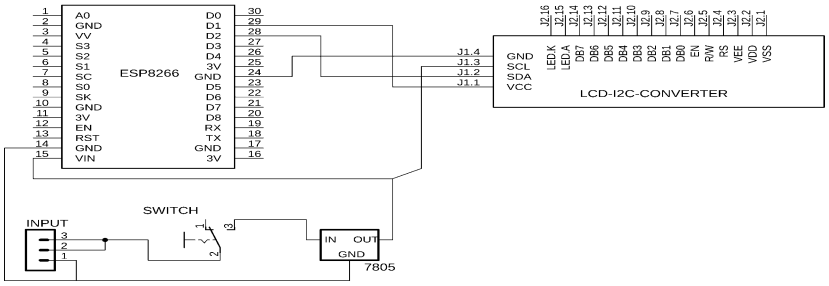

Fig.7: Circuit diagram (Receiver section)

VI. RESULT

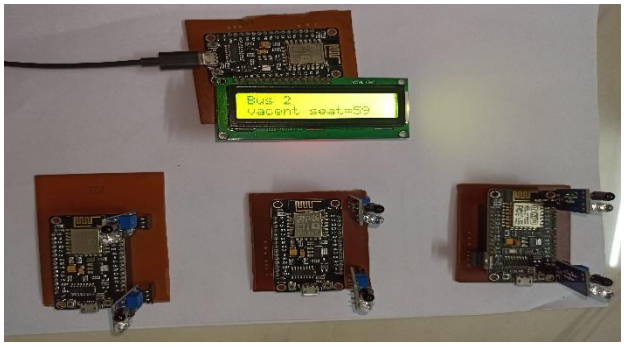

Fig 8: Result

VII. CONCLUSION

In this paper, we have presented an automated system for passenger counting in sitting service bus. The proposed project provides efficient and innovative way to give complete access, flexibility and satisfaction to the authority. It will work like a virtual helper. Corruption problem cannot be erased in one day but it can be cured if we stand against the matter. Our system can be a milestone to reduce the corruption in public transport system in India. It is an easy and efficient way to implement in real-time applications. The proposed system deals with accident detection and alert. ESP8266 is the heart of the system which helps in sending data to the cloud.

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