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IOT based Smart Bus Stop and Tracking System

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***Abstract:** In this fast life, most are in hurry to achieve their destinations. During this case looking forward to the buses isn't reliable. folks that depend on the general transport there major concern is to grasp the important time location of the bus that they're looking forward to and thus the time it'll fancy reach their stop. The information helps people to make better decisions for travelling. This project gives the foremost challenges within the transport system and discuses various approaches to intelligently manage it. By integrating the GPS on the bus we got the current location of bus. On the tracking device GPS device is enabled and this information is directly display at the bus stops using RF receivers and shipped to centralized control unit. People can track information using LED's at the bus stops. During this project we present a bus system which kept stationary at the stop and system which kept at bus which will effectively help the general public to participate in bus transportation facilities. A bus that's coming toward the stop is identified by the GPS and thus the most points of that specific bus is provided to the passenger on display at stop and on the MAP of the itinerant.*
***Keywords:** IOT (Internet of things), IR sensors, GPS, Public transport, Bus tracking.*

I. INTRODUCTION

Public transport has become part of live. the overall public reach from homes to workplace or school using public transportation. People can loose time in transportation thanks to unwanted waiting. Also people have the proper to understand where the bus is now and also the way while it takes bus to achieve stop. The service provided to passenger by transport system are important. The folks that use heart public transportation vehicles want to induce information about the status of the general public transportation vehicles. it's real time problem to grasp the status of bus to any or all peoples on the stop we are developing the project of Smart bus stop system. The bus identification process involves usage of frequency technology and bus details are displayed in liquid display(LCD) unit. For the display purpose LCD and LED's are used. Illiterate peoples don't understand the info on MAP using GPS so LED's and LCD are used. The bus location is often found by using Geo Positioning Satellite (GPS). There are different wireless technologies like RFID, IR, GPS, Bluetooth and Wi-Fi, etc.

II. PROBLEM STATEMENT

People mostly use public transport system; they have to stay on the stop for waiting of busses. Because of that the important time of people wastes. So, they want to know the information of current location of bus.

III. NECESSITY OF PROJECT

The main objective of this project is to provide the information of current location of bus to the peoples which will save their time. They can see the information of the bus on the stop and at the home also. People can easily travel because of that system. They can save their time and efforts also. 21st century is digital, And in digital India it is important.

IV. LITERATURE SURVEY

A. A Wise Bus Tracking System Supported Location-Aware Services and QR Codes

[1] Authors: Suleyman Eken, Ahmet Sayar

Information: during this paper, author proposed smart bus tracking system that any passenger with a wise phone or mobile device with the QR (Quick Response) code reader can scan QR codes placed at bus stops to seem at estimated bus arrival times, buses' current locations, and bus routes on a map.

B. *Smart Bus Station-Passenger System*

[2] Authors: Cemil Sungur, Ismail Babaoglu, Aysegul Sungur.

Information: during this study, a wise bus stop-passenger system was developed so on enable administers effectively monitor the final public facility and also enable the those that utilize this system simultaneously observe the knowledge about things and standing of those vehicles.

C. The Smart Bus for a wise city — A real-time Implementation

[3] Authors: S. Sharad, P. Bagavathi Sivakumar, V. Anantha Narayanan.

Information: the necessity for a real-time conveyance system is growing steadily. People want to plan their city commutes and do not like anticipating long hours, nor take a long route to realize their destination. The proposed hardware solution during this paper computes the shortest path to appreciate the destination in real time and offers that information to the driving force.

D. Developing a wise Bus for Smart City using IOT Technology

[4] Authors: Anilkumar J Kadam, Virendra Patil, Kapish Kaith, Dhanashree Patil, Sham.

Information: This paper proposes a system to trace public bus using GPS (Global Positioning System), tell the count of number of passengers in bus and also the estimated time arrival to the user. the location of Bus is going to be tracked by public using Android Application. The Android application also will contain the most points of all the bus like Bus number, Bus routes, Bus Stops, Bus timings or the frequency.

V. METHODOLOGY

People who use centre conveyance system are hurry to reach their destination, but in earlier system people didn't got the knowledge about the bus. The people want to attend of the bus on the stop thanks to this their important time was waste. So, to overcome this problem we develop the project of Smart stop System. During this project we display the knowledge of bus on the stop and current location of bus on MAP using GPS. Therefore, the people can travel easily by conveyance system which they'll save their time also.

Connect the supply to the circuits, switch on the power supply see on the display first. It displays the message Welcome to Sangli naka stop and wait for next bus. Here we used two switches for two routes i.e. Ichalkaranji to Sangli and Sangli to Ichalkaranji. Press one switch by pressing the switch the signal of that bus goes on the stop through RF transmitter and receiver. When the bus is 100m from the bus stop the Red LED turned off and Green LED glows and on LCD displays “Sangli bus is coming’’. When bus is on the stop Green LED glows until bus is gone from the stop and we can see the message on displays “Sangli bus is on the stop”. When the bus is gone from the stop Green LED turned off automatically and Red LED glows until next bus is coming and the message is display “Sangli bus is gone”.

Similarly, we can see the second bus route information by pressing second switch and we can see the current location of bus and speed of bus on our own mobile phone at anywhere by using the Blynk App.

VI. BLOCK DIAGRAM

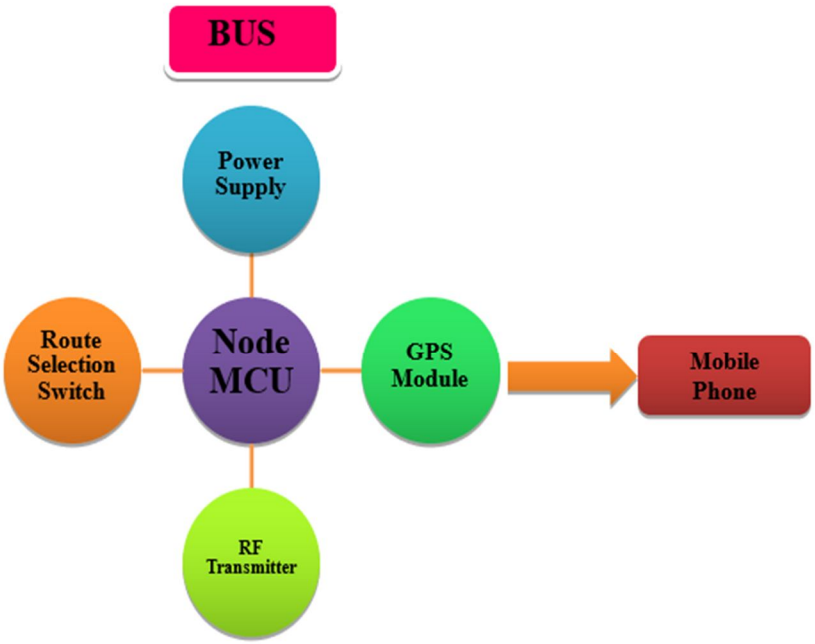

Fig. 1. Block dig of Bus section.

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Fig. 2. Block dig. Of Bus stop section.

Description: Smart bus stop system consists of Two sections. First one is Bus section and Second is Bus stop section. These two sections are connected wirelessly to each other.

It consist of

A. AVR microcontroller.
B. Radio Frequency (RF) module.
C. Infrared (IR) receiver.
D. NodeMCU.
E. Globle Positioning System (GPS) module.
F. Switch.
G. LCD display.
H. LED indicator.

1) AVR microcontroller- We used ATmega8A microntroller. It is high performance, low power 8-bit AVR based microcontroller. Its flash memory is 8KB, 512B EEPROM, 1KB SRAM, 23 general purpose I/O lines, 3 timer/counter, internal and external interrupts, 6-channel 10 bit ADC converter, Programmable watchdog timer with internal oscillator, Serial programmable USART, SPI serial port, and 5 software selection power saving modes.The device operates between 2.7-5.5 volts. By executing powerful instructions during a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed. It is brain of the project; it controls on the circuit.

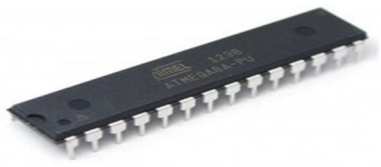

Fig. 3. AVR microntroller

2) *RF module*-An RF module (radio-frequency module) could be a small device want to transmit and receive radio signals between two devices. In an embedded system it's often desirable to speak with another device wirelessly. This wireless communication is also accomplished through optical communication or through radio-frequency (RF) communication. RF modules may accommodate an outlined protocol for RF communications like Zigbee, Bluetooth Low Energy, or Wi-Fi, or they'll implement a proprietary protocol. It covers the range around 20kHz to 300GHz. RF transmitter sends the signal by pressing the switch, receiver receives that signal and display the knowledge.

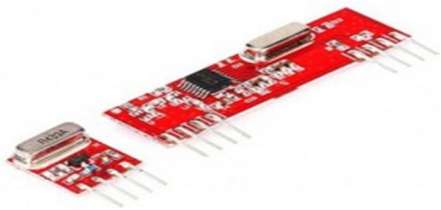

Fig. 4. RF module

3) *IR receiver*- Infrared technology addresses a good kind of wireless applications. the most areas are sensing and remote controls. Infrared Sensor is used as Obstacle detector is to transmit an infrared signal, this infrared signal bounces from the surface of an object and therefore the signal is received at the infrared receiver. There are two styles of IR sensor i.e. Quantum and Active, in this we used active IR sensor. It senses the bus is on the stop or not and provides signal to the circuit.

Fig. 5. IR receiver

4) *NodeMCU*- NodeMCU may be a low-cost open source IoT platform. It included initially firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which supported the ESP-12 module. Later, support for the ESP32 32-bit MCU was added. As Arduino.cc began developing new MCU boards supported non-AVR processors just like the ARM/SAM MCU and employed in the Arduino Due, they needed to switch the Arduino IDE so it might be relatively easy to alter the IDE to support alternate toolchains to permit Arduino C/C++ to be compiled for these new processors. A "core" is that the collection of software components required by the Board Manager and also 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". This has become a number one software development platform for the varied ESP8266 i.e. NodeMCUs. it's inbuilt WIFI module. it's advance version of Arduino. We used nodeMCU for wireless connection and to work out the placement of bus on the mobile phone.

Fig. 6. Node MCU

5) *GPS module*- NEO-6M global positioning system (GPS) module, a cost-effective, high-performance GPS module with a ceramic patch antenna, an on-board microchip, and a backup battery that may be conveniently integrated with a broad range of microcontrollers. The u-blox NEO-6M GPS engine on these modules is sort of an honest one, and it also has high sensitivity for indoor applications. The module works well with a DC input within the 3.3- to 5-V range. the foremost popular antenna type is that the patch antenna. Patch antennas are flat, generally have a ceramic and metal body, and are mounted on a metal base plate. GPS module accustomed see the present location of bus. We can see this on our mobile phone by using Blynk app.

Fig. 7. GPS module

6) *Switch*- A switch is an electrical device that connect or disconnect the circuit, it interrupts the electrical current or divert it from one conductor to a different. The foremost common form of switch is a mechanical device consisting of one or more sets of movable electrical contacts connected to external circuits. When the contacts are separated no current can flow, and when a pair of contacts is touching current can pass between them. We use two switches to pick the route of bus, by pressing the switch we are able to select the route of bus.

Fig.8. switch

7) *LCD display*- LCD modules are very commonly used in most embedded projects, because of being its cheap price, availability and programmer friendly. Most folk would have stumble upon these displays in our day to day life, either at PCO's or calculators. LCD Display's the knowledge of bus i.e. Bus is coming, Bus is on the stop, Bus is gone.

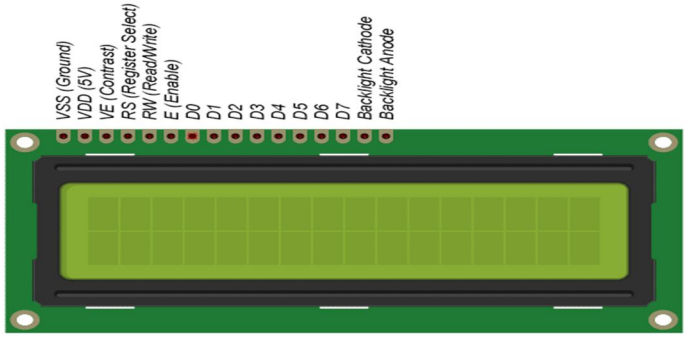

Fig.9. LCD display

8) *LED Indicator:* when current flows through it. Electrons within the semiconductor recombine with electron holes, releasing energy within the sort of photons. the colour of the sunshine (corresponding to the energy of the photons) is decided by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the conductor. LED is employed to indication purpose; it indicates the placement of bus to illiterate peoples also. Green led indicates bus is coming or on the stop and Red led indicates bus is gone from the stop.

Fig.10. LED's

VII. WORKING PRINCIPLE

In the stop side circuit, LCD is provided to display the study of the bus one IR sensor is provided to detect either the bus is on the stop or not. After powering on the circuit WELCOME message is displayed on the LCD. subsequently circuit starts to go looking out the nearby buses, by detecting the RF signals transmitted from the Bus unit. Once the RF signal is caught by the bus unit. Bus details are displayed on the LCD. that's Bus is coming, Bus is on the stop and Bus is gone. within the bus unit RF transmitter is present that transmitter transmits 4-bit data through RF signals. By reading that data we'll find the route and display it on the LCD. the situation of the vehicle is indicated using GPS (global positioning system) technology. Exact location of the target vehicle is received with the assistance of a GPS receiver. GPS will give the data of parameters like longitude, latitude, by which we'll easily identify the situation of the vehicle and map it on Google map. First the communication takes place between GPS receiver and GPS satellite. GPS satellite continuously tracks the target vehicle and also the position of the vehicle is sent to the controller from GPS receiver. Vehicle is prepared with the GPRS connectivity which sends the continual information about the position of the vehicle to the server unit.

VIII. BENEFITS

A. You'll improve passenger satisfaction and reduce customer complaints.
B. Good contact with the local actual (Contact with the local process).
C. Public welfare is strong, near the connection between business and customers (close business, business and business).

IX. RESULT

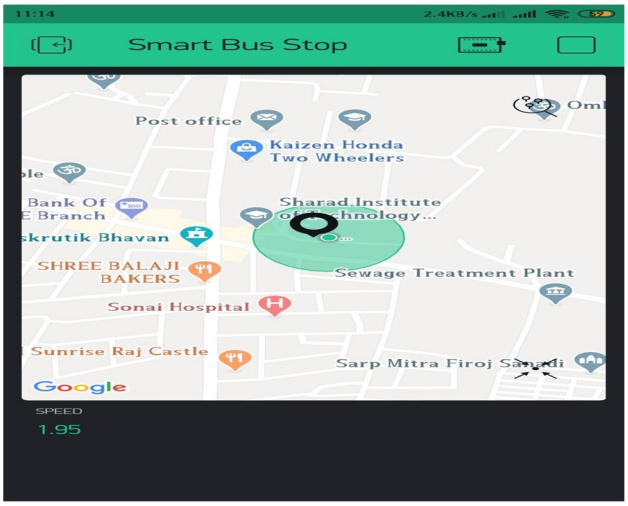

Fig.11. Location of bus.

Public transport system is very essential in daily life. So, the system is developed. The status of bus is displayed on the LCD display and on LED's also. First Red led glows until bus is coming when the distance between bus and stop is 100m then green led indicates that bus is coming and this displays on LCD display. When the bus is on the stop then it displays that bus is on the stop. And when bus gone from the stop then red led glows and it displays bus is gone. The location of current position of bus is display through GPS on the Blynk app as shown in figure.

X. CONCLUSION

The proposed system was developed and tested. The developed system is that the need of the day which is able to help people save time. Such a system is additionally very beneficial for people with disabilities. the key highlight of this technique is that the user can know the situation of bus which suggests that this technique will put the general public transport system in an exceedingly favorable spot for people. this technique can thus motivate more people to use conveyance system and thereby reduces traffic jam. The key feature provided if this technique is implemented in situ is reduction in number of personal vehicles and so pollution. With India taking the eighth spot for pollution such a system if implemented can create a large positive impact on the pollution scenario.

XI. ACKNOWLEDGMENT

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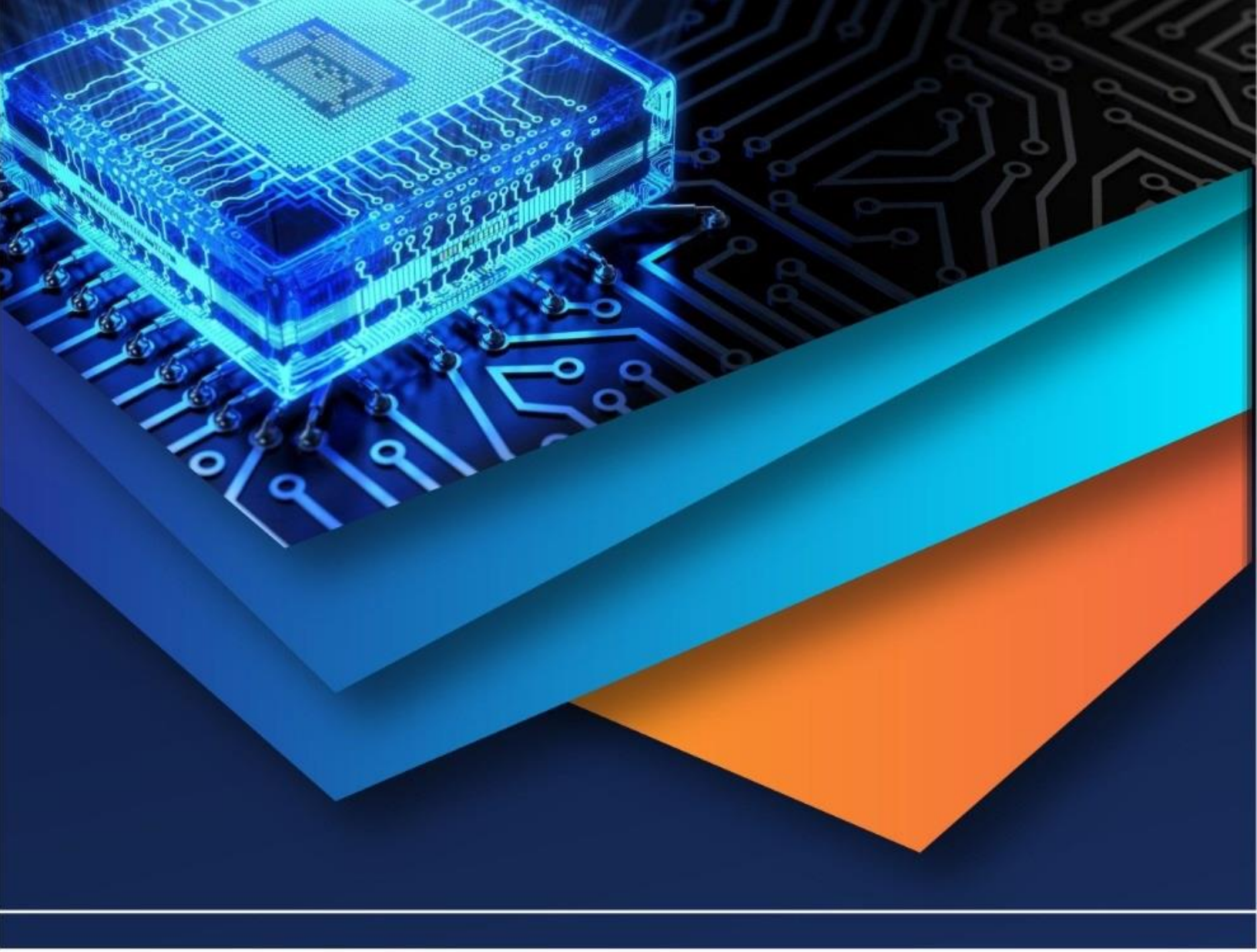

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