RFID AND GPS BASED SYSTEM USING CONVENIENT BUS TRANSIT FOR SMART CITY

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Abstract -- This paper presents a bus system which kept stationary at bus that can effectively help the students to reach college at time. A bus that is coming toward the bus –stop is identified by this passenger through unique passenger card the details of that particular bus is provided to the passenger on display at bus-stand. Bus location identified using GPS & same will be announce in Bus This information send to next bus stop for passengers. The bus identification process involves usage of Radio Frequency technology and bus details are announced by Voice and displayed in monitor unit. Details includes the exact position of the bus, seat availability and total number of passengers. These information can be displayed on monitor or can be given as audio output. Here both bus and bus stop is interconnected through IoT, here we use MQTT protocol for communication.

Keywords- Buzzer, IR sensors, Node MCU, RFID, Smart Bus

I. INTRODUCTION

The movement of college buses is affected by varying precarious circumstances as the day gets shorter such as traffic congestion, unexpected delays, and irregularity in passenger demand, irregular vehicle-dispatch times and many more incidents. Many students and staff members are often late for college because they decide to wait for the bus instead of using an alternate transportation. To reduce this confusion and inconvenience, a message will be shown on the web that will provide the real-time information about the bus showing its arrival time which could reduce the worries of passengers waiting for the bus. With the advent of GPS and the omnipresent cellular network, real-time vehicle tracking for better transport management has become possible.
These technologies can be applied to transport systems especially buses, which are not able to adhere to predefined timetables due to reasons like traffic jams, breakdowns etc. The increased waiting time and the uncertainty in bus arrival make public transport system unattractive and impractical for passengers to manage their daily transportation. The real-time bus tracking system uses GPS (Global Positioning System) technology to fetch data and display the data using a software that allows the user to monitor a particular bus on a particular route. When this information is presented to the passenger by wireless media or online web media, they can manage their time efficiently and arrive just before the bus arrives. Can take alternative means. They can plan their trip well in advance until they actually start them. Real-time tracking of the bus can be done by our proposed system and this information is then passed on to a remote user who wants to know the real-time bus information.

II. EXISTING SYSTEM

To design a system that can automate the process of tracking, monitoring and location updation services of Public transport system. Existing system has majority of functions that are manually operated which is error-prone. This project also aims in developing an optimal solution by instant updation system to decrease the chances of error. It provides conventional bus stop and information of all buses are provided.

III. PROPOSED SYSTEM

The proposed system consists of two modules. The first module is the sensing module and the second is the IoT application. Sensing module comprises of RFID unit which is used for sensing the bus when it reaches the bus stop. It also has a GPS module to get the live location of the bus with the assistance of RFID reader. Second module is an IoT application which provides user interface and gives location updates to the passenger. The modules is further divided into three sections namely, Bus unit, Central processing unit, IoT application. The proposed system consists of two modules. The first module is the sensing module and the second is the IoT application. Sensing module comprises of RFID unit which is used for sensing the bus when it reaches the bus stop. It also has a GPS module to get the live location of the bus with the assistance of RFID reader. Second module is an IoT application which provides user interface and gives location updates to
the students. The modules is further divided into three sections namely, Bus unit, Central processing unit, IoT application. The bus unit includes a GPS device, RFID tags are placed inside the bus and RFID readers outside the bus unit. RFID tags are of front and rear tags which is placed on respective position within the bus. RFID reader is used to find the arrival and departure of bus at bus stops. GPS is used to give the location of the bus. Central processing unit comprises of Arduino UNO that process the data received from various modules of the system. IoT application is built using Blynk platform which provides better user interface and facilitates ease of access to the system. GSM module is used explicitly to send SMS or alerts to the authorized members that can help the system in following the respective schedule.

IV. BLOCK DIAGRAM

Fig.1. Bus Stop Mode
Fig. 2. Bus Mode

- Here we have two nodes
- Bus stop node is made with raspberry pi
- RFID reader is connected serially to raspberry pi using Rx and Tx pins of UART
- RFID is used for customer identification
- Nodemcu is used for bus node
- GPS modem is connected serially same as RFID
- Both nodes are connected through MQTT protocol

**HARDWARE REQUIREMENT**

- Raspberry pi
- Nodemcu

www.turkjphysiotherrehabil.org
• IR sensor
• Gas sensor
• RFID reader
• GPS modem

SOFTWARE REQUIREMENT

• Programming environment: Arduino IDE, Python IDLE
• Programming language: embedded C, python

V. MODULE DESCRIPTION

HARDWARE REQUIREMENTS:

A. RASPBERRY PI

The heart of the Raspberry Pi is a Broadcom System on Chip (SOC) which includes ARM compatible CPU and on-chip graphic processing unit and Vediocore IV. The key feature from First generation to the Third generation includes:

• CPU speed ranges from 700 MHz to 1.2 GHz.
• On board Memory (RAM) ranges from 256 MB to 1 GB.
• USB slot differs from 1 slot to USB slots.
• HDMI, composite video output and 3.5mm phone jack.
• Low level output is provided by GPIO pins which support common protocols like I2C (inter-integrated circuit). • Ethernet 8 Position 8 Contact (8P8C).
B. NODE MCU :

Node MCU is the heart of the project. It collects the details of the customer from the RFID tag. It interprets the data and gives an alert to the respective customer. This Node MCU has on board to send message in it which will be used by the customer for seat availability and total number of passengers.

- Node MCU ESP8266 development board is the controller used in the project.
- It is based 32-bit LX106 RISC microprocessor and supports RTOS.
- Has in-built WiFi / Bluetooth features used for remote access.
- Consumes less energy.
C. IR SENSOR:

IR sensor is an electronic device which emits and detects IR radiation in order to find out certain objects/obstacles in its range. Some of its features are heat and motion sensing.

IR sensors use infrared radiation of wavelengths between 0.75 to 1000 which meters between the visible and microwave fields of the electromagnetic spectrum. The IR region is not visible to the human eye. Infrared spectrum is classified into three regions based on its wavelength i.e. infrared, mid infrared, far infrared.

![Infrared Sensor Module](image)

Fig.5. IR Sensor

D. GAS SENSOR:

The MQ-6 Gas sensor can detect or measure gases. The MQ-6 sensor module comes with a Digital Pin which makes this sensor to operate even without a microcontroller and to detect only one particular gas. When it comes to measuring the gas in ppm also TTL driven and works on 5V and hence can be used with most common microcontrollers.
E. RFID READER:

A radio frequency identification reader (RFID reader) is used to gather information from an RFID tag, which is used to track individual objects. RFID is in principle a technique similar to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-vision to a reader. It consists of a scanner with antennas to transmit and receive signals and is responsible for communicating with the tag and receiving information from the tag.

**Fig. 7. RFID Reader**

RFID is in principle a technique similar to bar code. However, the RFID tag does not have to be scanned directly, nor does it require line-of-vision to a reader. RFID tag It must be within the range of the RFID reader, which ranges from 3 to 300 feet for reading. RFID technology allows multiple objects to be scanned quickly and enables rapid identification of a particular product, even if

F. GPS:

The Global Positioning System (GPS) is a satellite-based navigation system made up of at least 24 satellites. GPS works in any weather conditions, anywhere in the world, 24 hours a day, with no subscription fees or setup charges.
GPS satellites revolve around the Earth in a precise orbit twice a day. Each satellite transmits a unique signal and orbital parameters that allow GPS devices to decode and find the exact location of the satellite. GPS receivers use this information to find a user's exact location. Essentially, the GPS receiver measures the distance from each satellite to the time it takes to receive a transmitted signal. With distance measurements from some more satellites, the receiver can determine the user's position and display it.

SOFTWARE DESCRIPTION:

PYTHON:

Python is an interpreted high-level language for programming. Python offers multiple options for developing GUI (Graphical User Interface). Out of all the GUI methods, tkinter is the most commonly used method. This is a standard Python interface for the TK GUI toolkit shipped with Python. Python with Tuctor is the fastest and easiest way to build GUI applications. Creating a GUI using tkinter is an easy task.

it is surrounded by many other objects.

PYTHON FEATURES:

Python is a type of dynamic system and has automatic memory management. It supports multiple programming paradigms, including object-oriented, imperative, functional, procedural and has a large and
comprehensive library. Python is a multiparadigm programming language. Object-oriented programming and structured programming are fully supported, and many of its features support functional programming and aspect oriented programming (including by mrta programming and meta objects(magic methods)). Many other paradigms are supported through extensions, which include design by contract and logic programming.

VI. RESULT AND OUTPUT

Fig.9. Circuit Connection

Fig.10. Monitor Output
VII. CONCLUSION

The real-time bus tracking system uses GPS (Global Positioning System) technology to fetch data and displays the data using a software allowing a user to monitor a particular bus on a particular route. When this information is presented to the students by wireless media or online web media, they can manage their time efficiently and reach the bus stop just before the bus arrives. They can even plan their trip long before they actually initiate them. The real-time tracking of the bus can be done by our proposed system and this information is then given to the students who wants to know their real-time bus information.

VIII. REFERENCES


