Smart Vehicle System For Urban Commuters

Mr.N.Arunkumar[1], R.Govarthana Parasuram[2], M.Karthikeyan[3], M.Libni Austin Jones[4]
[1]Assistant Professor, Dept of ECE
[2, 3, 4]Dept of ECE
[1, 2, 3, 4] P.A. College of Engineering and Technology, Pollachi

Abstract- *Our Aim is to design and create a data management System for a vehicle rental company. This enables admin can rent a vehicle that can be used by a customer. By using this system admin can manage their rental, Bookings, customer issues and vehicle issues. Renting a vehicle periodically is one alternative to buying a vehicle. It can save money, especially do not use a vehicle regularly or need one to travel to and from work. The modern vehicle utilizes the remote keyless system ,where there is no usage of keyfob, then the vehicle is secured by RF tag ignition ,Where the software key gesture is given to the RF tag .To restrict a movement of the vehicle within a particular area, Proximity sensor is used. Proximity sensor is fixed in the wheel of the vehicle and it monitor the distance that is how much distance is covered by the vehicle. And the distance is calculated by each revolution of the wheel that is 596 revolutions makes one kilometer. When destination reached, ignition will be made to cut off by fixing some relays in driver unit.*

I. INTRODUCTION

Generally, smart vehicles systems are mainly developed for urban people do not have own vehicle. The main objective is to hire out vehicles temporarily for the usage of urban commuters. It lease out vehicles in smarter way enhancement and also to enhance security in vehicles. This project is designed so as to be used by bike Rental Company specializing in renting bike to customers. This project is to produce a web-based system that allow customer to rent vehicles online and for the company to effectively manage their bike rental business. And to ease customer's task whenever they need to rent a bike.PHP Technology used for the development of the webpage. Web-platform means that the system will be available for access 24/7 except when there is a temporary server issue which is expected to be minimal. General customers as well as the company's staff will be able to use the system effectively. A web page is developed with a registration portal to hold customer's details, monitor their transaction and used same to offer better and improve services to them. It offers a bike sharing service which allows users to pick up a scooter from anywhere, ride it to their destination and drop it off at any location. It is developed on the idea of a dockless ride sharing systems that are already popular in different parts of the world. Their technology-enabled solution aims to offer low-cost transportation that can help cover short distances in the fastest time possible. The average cost per km is Rs.5. With most intra-city commute being under 5 km, the service is seeing massive adoption.It has also ventured into others forms of personal transport.We equip all our bikes with 2 helmets. If you encounter any bike without a helmet at the time of ride being started, please alert customer care. Any fines due to violations of traffic rules during the ride will have to be borne by customers. To rent a bike the customers want to do a simple task of recharging a vehicle. This process is done by an RFID Technolgy. If a customer wants a vehicle for rent he/she must recharge a vehicle with an provided RFID Tag. In case of fuel charges, the company will not provide fuel it is customer responsible to fill fuel based on their usage of motorcycles. Here each vehicle is provided by a RFID tag to run a vehicle. Every information about the customer and vehicle is monitored and stored in the web server.

II. EXISTING METHODOLOGY

Vehicles are becoming important in our day to day life. The main aim is to give Security to all vehicles. This makes improved security systems for vehicles. The major objective of existing methodology is influencing security in vehicle systems. The vehicle security and communication scheme is proposed here which prevents vehicle from threat. In case of malicious activity, this scheme can trace malicious vehicle which generates a false message. The GPS are highly useful now a days, this system enables the owner to observe and track his vehicle and find out vehicle movement and its past activities of vehicle. This new technology, popularly called vehicle Tracking Systems which created many wonders in the security of the vehicle. This hardware is fitted on to the vehicle in such a manner that it is not visible to anyone who is inside or outside of the vehicle. Thus it is used as a covert unit which continuously or by any interrupt to the system, sends the location data to the monitoring unit. When the vehicle is stolen, the location data from tracking system can be used to find the location and can be informed to police for further action. Some Vehicle tracking System can even detect unauthorized movements of the vehicle and then alert the owner. This gives an edge over other pieces of technology for the same purpose.

BLOCK DIAGRAM OF EXISTING SYSTEM

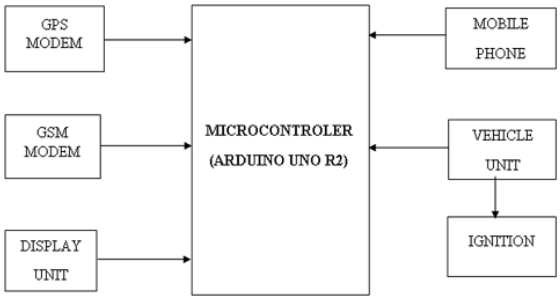

Fig 1 Existing Block Diagram

The diagram of a system in which the principal parts or functions are represented by blocks connected by lines that show the relationship of the blocks. This system is used for positioning and navigating the vehicle with an accuracy of 10m. The exact location is indicated in the form of latitude and longitude along with the exact navigated track on google maps.

Imagine the vehicle has left coimbatore at 6 o clock in the morning. If the owner in charge for that vehicle wants to know where the vehicle is, he will come to the computer and click on the vehicle number on the VB program. The VB program will send an SMS to the vehicle number.

The system tracks the location of particular vehicle and sends to users mobile in the form of data and also to microcontroller. The arrived data is in the form of latitude and longitude is used to locate the vehicle on the google maps and we can see the output on the LCD. The vehicle is implanted with GPS/GSM module. The vehicle terminal can adopt GPS technology. The GPS module is used to track exact location.The GPS module is used to track exact location. The wireless communication link of the system can adopt trunking system. Here the vehicle terminal can use the wireless communication module to transmit the data. The microcontroller is interfaced with all components.

In case of auto theft, GSM module transmits the data as a via message to the mobile object and the fuel supply is made to cut off there by disabling the vehicle. And to restrict the vehicle within a particular area, GPS fencing is used. Here the GPS and GSM technologies enable the vehicle owners to track and monitor the vehicle at anytime from anywhere.

The drawback of above methodology is not plays a major impact on society.

III. PROPOSED TECHNIQUE

INTRODUCTION

This proposed system is mainly developed for an commuter without a vehicle. We found that it would be ridiculous that someone had to wait for one vehicle. That we realized that it would be a problem for any users without a vehicle. And instead of spending several money on buying vehicles it is better to rent it.

BLOCK DIAGRAM OF THE PROPOSED SYSTEM

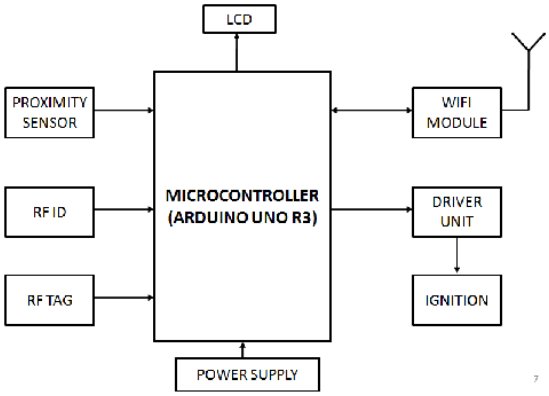

Figure 2 Proposed block diagram

This is the block diagram of the proposed methodology and it describes the functions and arrangement of hardware. All the modules are interfaced with a microcontroller refer figure 2.

Every module pays attension towards the Arduino. Each having it unique specifications and it is used to design new systems and to improve existing ones. Its structure provides a high-level overview of major system components, key process participants, and important working relationships.

The motivation behind the project Revolution is to make an embedded system which is to bring people the convenient way of utilizing the hire out vehicles. In this project the vehicle is secured by RFID technology. The RFID uses electromagnetic fields to automatically identify and track tags attached to objects. The RFID tag consists of a tiny radio transponder, a radio receiver and transmitter. Here the WiFi module is used to transfer following information about the vehicle to the web server. Proximity sensor pays an major role of monitoring the distance of the object. It senses the object at 5mm distance. The 16x2 LCD displays the information.. for eg. Amount, distance.

Each and every information of the vehicle which is transferred from the WiFi module is monitored and stored in

the web server. Here MYSQL and PHP are commands that is used to establish the backend processing and communication link between webpage and web server.

DESIGNAND IMPLEMENTATION

The design and implementationdone by two kind of process, one is to develop a webpage which is said to be software part and assembling of hardware setup. Initially the web page is created with following information that is meant to display the vehicle information and customer information. The web server which monitor and store the information in the real time. In real time analysis if the customer wants the vehicle for rent, the vehicle must be recharged for certain amount. This could be done using an RFID technology. The RFID tag is recharged from the webpage to initiate the process. When the tag is recharged the reader reads the tag information and it fetch the information as a input to a mircrocontroller (Aurduino Uno R3). The tag must be recharged when the circuit is in off condition. Here the microcontroller will send data to the web server when the circuit set to off condition. When the circuit is in on condition the microcontroller will read the data from the web server and it accordingly. The WiFi module (ESP8266) is used to transfer the information to the web server wirelessly. Here the WiFi module acts as a mediator between the microcontroller and web server. This system is designed by an RFID which is interfaced with amicrocontroller.The RFID which senses the tag information, where the information is fetched by the microcontroller. The microcontroller will check for the object information from the web server ie..the Arduino will check whether the tag is recharged or not. If the tag is recharged the LCD will display the object information ie..recharged amount or else it displays the amount as zero. The 16x2 LCD will display the amount, distance and revolutions. The vehicle is implanted with a relay driver circuit which can function appropriately in a circuit. The driven relay can operate as a switch in the circuit which can open or close, according to the needs of the circuit and operation. The 2 channel relay driver circuit is connected to the ignition system which delivers or shuts the power supply to the vehicle with respect to the instruction given to the Arduino. When the vehicle is recharged the microcontroller fetch the instruction to driver circuit and it sets vehicle to on condition or else sets to off condition. The distance and payment are pre-instructed to the Arduino (ie.. for a range of 1 km the charges will be 5rs). The distance is measured using inductive proximity sensor. Inductive proximity sensors can be used to recognize any conducting metal target. An inductive proximity sensor consists of an oscillator that generates a high frequency electromagnetic field. This field is radiates from the sensing face of the system. When this field contacts a conducting metal target, a small current is induced within the metal target. This Proximity sensors are used to sense the metal object in 5mm distance. Here the proximity sensor is fixed in the wheel of the vehicle and also the metal object is fixed near the sensor at the distance of 5mm. The circumference of the wheel and revolutions is studied. When the vehicle is on running condition 592 revolutions of the wheel makes 1 kilometer. In this project, proximity sensor senses each revolutions of the wheel and the distance is measured. The microcontroller gathers the information provided by the proximity sensor and it displays in LCD ie..how much distance is covered by the vehicle. The switch is given in the circuit to send and read every updates from the web server.

IV. LITERATURE SURVEY

BOUNCE - Bounce's parent company, Wicked Ride, was founded in 2014 by Vivekananda H R, Anil G and Varun Agni. Its app allows the users to pick up a scooter and drop it at any legitimate parking spot. The firm said accessibility and affordability have made it one of the "preferred" modes of transport, both for first- and last-mile connectivity, as well as regular commute. The company has plans to introduce over 50,000 vehicles during the current year.

Start-ups addressing short-distance transport have taken the mobility space by storm recently, most notably with the rise of bike and scooter firms, according to research firm CB Insights. It said bikes and scooters, which allow people to easily move shorter distances, can help commuters access public transport hubs several miles away. Approximately 42 per cent of Bounce rides either originate or culminate at metro stations, which means roughly five per cent of all metro commuters use Bounce as their preferred mode of commute for first- and last-mile connectivity. Bounce said it has also been empowering women, who constitute more than 25 per cent of its users.

In June this year, Bounce's rival, Vogo , raised Rs 25 crore as debt from Alteria Capital. Last year in December, the firm formed a strategic partnership with Ola, where the ride-hailing giant will boost Vogo's supply by investing in 100,000 scooters on the Vogo platform, worth $100 million. Its offerings will be available for Ola's customer base of over 150 million, directly from the Ola app.

VOGO - Founded in 2016 by Anand Ayyadurai, Padmanabhan Balakrishnan and Sanchit Mittal, Vogo offers a cost-effective quicker alternative to existing forms of transport. Vogo users can access scooters from designated pick up and drop points across Bengaluru and Hyderabad and drop the scooter at any other point in the city. Vogo’s fund

raise comes less than a week after peer Metro Bikes raised capital from Sequoia Capital and Accel Partners.

Vogo's app enables users to locate, unlock and pick up its scooters and bikes at one point, and drop them off at a different point, without the need for a docking stationsCurrently operational in pockets of Bengaluru and Hyderabad, Vogo is looking to add over 1,000 pick up points across the two cities in the coming year as it looks to invest in scaling its 500-unit strong fleet of scooters, marketing and brand building while also beefing up its team. Beyond capital, the firm is also looking to leverage upon Ola's technology and network to plan its growth trajectory better.

V. MATERIALS AND METHODS

1. RC522 RFID MODULE

RFID or Radio Frequency Identification system consists of two main components, a transponder/tag attached to an object to be identified, and a Transceiver also known as interrogator/Reader.A Reader consists of a Radio Frequency module and an antenna which generates high frequency electromagnetic field.On the other hand, the tag is usually a passive device, meaning it doesn't contain a battery.

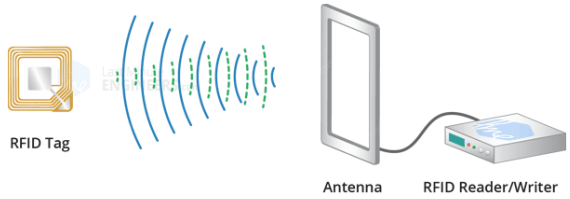

Figure 1.RFID module

Instead it contains a microchip that stores and processes information, and an antenna to receive and transmit a signal to read the information encoded on a tag, it is placed in close proximity to the Reader (does not need to be within direct line-of-sight of the reader).

Types of RFID Systems

PASSIVE - In a passive RFID system, the tags do not use a battery; instead, they receive their energy to run from the reader. The reader emits an energy field of a few feet, providing the energy for any tag in the vicinity. The tag gathers the electromagnetic energy from the card reader, powers up, and responds with 'hello world' and its identification information.Passive tags have the benefit of being able to be read at a fast rate (10 or more times a second).They are extremely thin (allowing them to be placed between layers of paper) and are extremely cheap (less than $0.05 in 10,000+pcs volumes).

ACTIVE - Active RFID systems include tags that have their own internal power supply for increased range. Active tags possess a battery and usually have larger SMD components. After a preset amount of time the tag emits an RF '*chirp*'. A reader in the vicinity can listen and hear for this chirp. Because an active tag is they can be read over much larger distances than passive tags (tens of feet).

Figure 1.1m130 Active RFID asset tag from RF Code

Downsides to active tags include greater bulk (because of the battery), limited life span (tag is dead when the battery is exhausted), increased cost per tag, and varying report rates.

2. ARDUINO UNO R3

The Arduino UNO R3 is a microcontroller board based on a removable, dual-inline-package(DIP) ATmega328P AVR microcontroller. It has 20 digital input/output pins in which six pins can be used as PWM outputs and six can be used as analog inputs. Programs can be loaded on to it and the user can execute based on specific application.

The operating voltage of Arduino UNO R3 is 5V and the clock speed is 16Mhz in which the programming interface can be done by USB via ATmega16U2.

Fig.2 Arduino UNO R3

3. INDUCTIVE PROXIMITY SENSOR

The Inductive Proximity Sensor/Switch which is the most frequently used position/proximity sensor in many applications. Inductive proximity sensors can be used to recognize any conducting metal target. Inductive proximity sensors make use of electromagnetic field that penetrates through the target. An inductive proximity sensor consists of an oscillator that generates a high frequency electromagnetic field. This field is radiates from the sensing face of the system. When this field contacts a conducting metal target, a small current is induced within the metal target.

Figure 3.Inductive Proximity Sensor

4. ESP8266-WiFiMODULE

The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network.

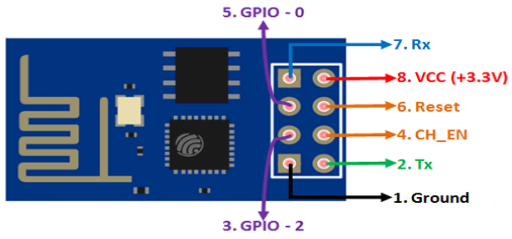

Figure 4 WiFi Module

To communicate with the ESP8266 module, microcontroller needs to use set of AT commands. Microcontroller communicates with ESP8266-01 module using UART having specified Baud rate. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers. The ESP8266 module is an extremelycost effective board with a huge, and ever growing, community.

5. BUZZER

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave owen. The circuit is designed to control the buzzer. The buzzer ON and OFF is controlled by Microcontroller. High Pulse is used for Buzzer ONby microcontroller and Low Pulse is for Buzzer OFF.

VI. CONCLUSION

The smart vehicle rental system for the usage of urban commuters is proposed here. This methodology is designed using Arduino and other co-components. This renting system will be useful for users without a vehicle and it is a kind of a personal transportation. We analysed the condition of a vehicle based on the condition the design is implemented. Proximity sensor are used here to sense distance with the excellent accuracy. It is based on the circumference of the wheel of the vehicle. Every action of the vehicle is monitored in the web server in real time condition.In the future, the renting systemwill be convert entire fleet into electric vehicles.

VII. RESULTS

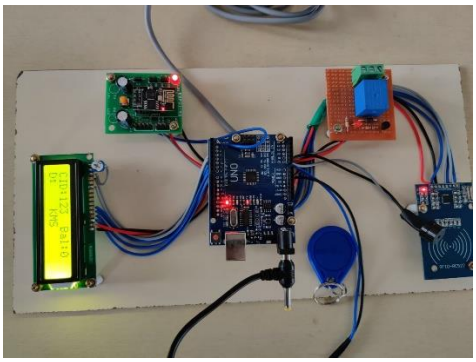

Figure ON condition

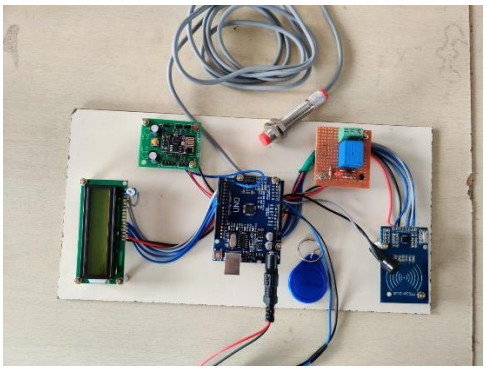

Figure OFF condition

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