IOT Based Intelligent Parking System in Smart City Developments

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***Abstract* - The main aim of the project is to implementing a parking system in order to eliminate the traffic problem on roads. Generally in this modern world the usage of area on the earth is much more and the place provided is very less. Traffic congestion due to vehicles parked in No parking zones has become a serious problem in major cities of India. Due to traffic congestion environment, economy and overall quality of life is affected. Hence it is high time to effectively manage the traffic congestion problem. With increase in number of vehicles, discipline in road regulation or traffic system becomes mandatory. With the advent of new technology this problem can be tackled by using Wi-Fi enabled microcontrollers, RF Transmitter/Receiver and cloud systems to monitor every vehicle on the road all the time. This becomes easy for the government in regulating its traffic rules with high efficiency without affecting the smoothness of the traffic.**

I. INTRODUCTION

The present scenario around us we see excess vehicles and the ineffectiveness to manage them in the correct order. As the population increases day by day the rate of utilization also increases and coping up with the numbers becomes a task. An omnipresent problem around the world is finding a parking space to park your vehicle. This task looks simple on side roads and interior lanes but the actual problem arises

when parking in malls, multistory parking structures, IT hubs and parking facilities where several hundred cars are parked and it becomes arduous to find a spot. The general approach to finding a parking space is to go around and drive aimlessly until a free space is found. Finding a parking space could be the easiest task or could be the most tedious one when it involves wide acres of distributed space across one level or multiple levels. The time and fuel are consumed unnecessarily because the destination is unknown. The easiest way of approach is to provide a destination specific driving within the parking structure.

II SYSTEM MODEL

As the name signifies, an embedded system is embedded or builds into something else. Embedded systems encompass a variety of hardware and software components, which perform specific functions in host system, for example satellites, washing machine, handled telephones and automobiles.

A few years ago, embedded technology existed in standalone devices such as vending machines and copiers that did their jobs with little regards for what went on around them. But as technology advance to connect devices to the internet and to each other, the potential of embedded technology has increased. Home appliances, mobile phones, cars, avionics etc.., are all using embedded technology.

ADVANTAGE:

- ✓ The proposed method reduces almost traffic in smart cities.
- ✓ It also reduces time complexity of vehicles congestion
- ✓ Enhancements are used to make it easier for parking and every vacant available.

III. SYSTEM ANALYSIS

EXISTING SYSTEM

The existing traffic system is very accurate but not efficient enough to monitor all the vehicles on the road. To cater to such a huge population, the number of vehicles sold every day is increasing enormously. The probability of congestion increases with the increase in number of vehicles. Majority of the traffic we go through every day is created due to parking of vehicles in NO-Parking zones. Currently we do not have systems to detect the vehicles parked at no parking zones.

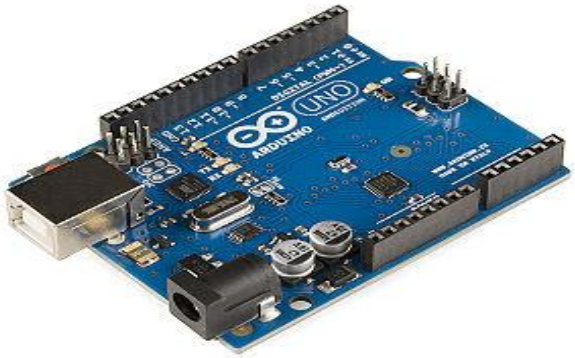
PROPOSED SYSTEM:

The proposed system is establishing a technique to avoid the parking violence with smart parking. A RF transmitter is placed in the NOP board, which transmit a code continuously. The RF receiver is fitted in the vehicle. Whenever the vehicle passes nearer to the institution, the RF receiver receives the code transmitted by the transmitter. Upon the reception of the code, it will produce a beep indication through buzzer to alert the driver and also the control of the vehicle ignition is transferred to microcontroller section which makes vehicle ON.The proposed system also provides the smart parking guidance system. The IR sensors are placed in parking place If the car is present at the all parking slot, it denote as PARKING FULL. Else, it denotes the all slots information through LCD screen as well as Mobile App. Trough this , the user can identify the parking details and avoids traffic congestion.

ARDUINO PROCESSING

Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible. The hardware consists of an open-source hardware board designed around an 8-bit AtmelAVR microcontroller, or a 32-bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller.Arduino boards can be purchased pre-assembled or as do-it-yourself kits. Hardware design information is available for those who would like to assemble an Arduino by hand. It was estimated in mid-2011 that over 300,000 official Arduinos had been commercially produced.Arduino started in 2005 as a project for students at the Interaction Design Institute Ivrea in Ivrea, Italy. At that time program students used a "BASIC Stamp" at a cost of $100, considered expensive for students. Massimo Banzi, one of the founders, taught at Ivrea.

A hardware thesis was contributed for a wiring design by Colombian student Hernando Barragan. After the wiring platform was complete, researchers worked to make it lighter, less expensive, and available to the open source community. The school eventually closed down, so these researchers, one of them David



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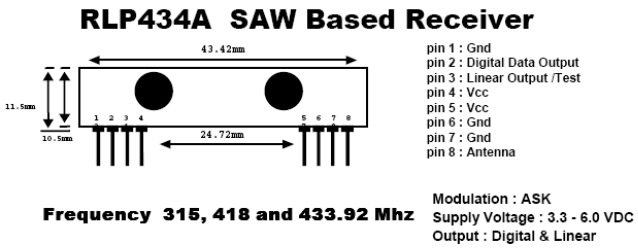
NO PARKING SYSTEM

The mictrocontroller used in the project is arduino uno. When it detects the car from the Entry gate then it checks whether there is any vacant space in the parking lot. The Arduino Uno is a Mictrocontroller based on ATmega328p mictrocontroller developed by arduino. Uno is anItalian word which is meant by one. IR sensors are Infrared Sensors. Emitter emits the infrared lights and receiver taking back it. RF means Radio Frequency in our project, we use both RF transmitter and RF Receiver.

An Ignition system generates a space or heats an electrode to a high temperature to ignite a Fuel-air Mixture in spark ignition. Wifi Module ESP 8266 is a self contained Soc with Integrated TCP/IP protocal stack (Transmission Control Protocol and Internet Protocal) The transmitter/receiver (Tx/Rx) pair operates at a frequency Of433 MHz. The RF transmitter receives serial data and transmits it wirelessly through its RF antenna. RF Receiver receives the transmitted data and it is operating at the same frequency as that of the transmitter.

Some of the main features which make the transmitter complex are higher clock speed, higher transmit power, directional antennas and need for a linear amplifier. With these more complex RF instruments, engineers can measure the individual spectral components across frequency.

RF RECEIVER



Typical range of this product is around 100 meters (300 feet) in an open area and 30 meters (100 feet) in a built up area when used with the corresponding RLP receiver modules. The results may vary considerable depending on the surroundings, antenna and operating voltage of the transmitter. We recommend an antenna to be 1/4 wave and 17cm long calculated from the speed of light / frequency .These modules operate on433.92MHz, same as thestandered TLP433 modules but they have made significant changes in the size of the unit. They are SAW based and offer about 100 meters range in Line-of-Sight operating form 2 - 12 volts. The new version has a data rate of 4.8KB/s, over double te speed of the previous version and still provides 16DBm of output power off under 20mA of current The size and simplicity of these units make them a profesional and economical solution for many wireless applications.

IV. SOFTWARE DESCRIPTION

The Omega2 runs an Onion-customized version of OpenWRT Linux, based on the modern 4.14 Linux kernel. Users can rely on the Linux system to abstract away complexity in device operation and on the networking and cryptography stack to simplify connectivity. The OS is open-source and available on GitHub, allowing users to customize it to meet their individual needs. By virtue of the Linux OS, developers are not limited in their choice of programming language. Supported programming languages included

V.EXPERIMENTAL RESULTS

VI. CONCLUSION

The project proposed the development of IoT based intelligent parking system. The proposed system performs continuous real-time monitoring. In this work, an initial prototype has been developed three basic modules. First, using sensors, the internal body vital signals, and the external environment are monitored and data is fetched from them. Next, the data acquisition module for data gathering. Finally, secured storage of data with the help of clouds. In order to incorporate cost-effective, low-cost sensors and Arduino and Embedded boards are used.

VII. FUTURE WORK

For the future expansion, this system can easily monitor the traffic. The use of RF transmitters gives continuous output of no parking system and maintenance. We can also add some parking lanes to know about the status of availability in the parking slots.

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