PARKING SLOT ALERT SYSTEM USING WEB APPLICATION

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Abstract - *In today's world, the era of growing population, there is drastic increase in the vehicle population. So, more spaces are required to park our vehicle. In growing cities this is the big issue to find the suitable parking area. Especially for an individual at the new city, it is very difficult to find the parking area. This web based application will serve the purpose to help the individual get the notification at the place of parking area and gives us efficiency to find vacant slots to park a vehicle in parking area.*

***Key Words*: Arduino NANO, IR Sensor, Arduino cable, Arduino IDE.**

1. INTRODUCTION

As the numbers of vehicles on the road are increasing tremendously from thousands to lacs, the traffic problems are bound to exist. Almost all major cities are facing the parking problems, insufficient parking space cause traffic jams, air pollution ,health hazards etc,. The price for parking expansion is extremely high. Smart parking is a parking garage/system that utilizes various technologies to efficiently manage the garage. In the near future the demand for the intelligent parking service will increase because the rapid growth in the automotive industries. The automatic management of parking lots by accurate monitoring and providing service to the customers and administrators is provided by such emerging services.

A parking lot is a cleared area that is intended for parking vehicles. Usually, the term refers to a dedicated area that has been provided with a durable or semi durable surface. In most countries where vehicles are the dominant mode of transportation, parking lot are a feature of every city and suburban area. Shopping malls, sports stadiums and similar venue often feature parking lots of immense area.

Vehicle parking literally steals the most valuable time. There are few researches that estimate the amount of time we spend looking for an available parking space. Lack of parking area or the unavailability of the parking area leads to the waste of resource, time and it increases traffic on the road while the vehicles are searching for the parking area. It will drastically increase the accident rate. So the parking area availability is most important in the growing populated cities.

A web application is an application program that is stored on a remote server and delivers over the internet through a browser interface. Web services are web apps by definition and many, although not all website contain web apps. Web application helps organization reach new customers and let them know about the organization and services provided by it. With its help, it is easier to maintain a proper communication channel between potential customers and business organization.

The proposed project is Parking Slot Alert System, that provides customers an easy way of reserving a parking space. It overcomes the problem of finding a parking space that unnecessary consumes time. Hence this project offers a reservation system where the user get the appropriate parking area and user can view various parking areas and select the space to view whether space is available or not. If the parking space is available then user can book it for specific time slot. When an vehicle comes over any of the parking slot, then the respective parking slot is converted to green so that slot is marked as booked, or the vehicle has been parked. This will reduce the effort of the user to book it separately on manual booking. The slot be booked for the particular user for certain time, after which the slot will be marked to red and free for others to book for parking.

1.1 OBJECTIVES

Providing a simple web application for parking vehicles. To reduce difficulties, searching for empty slot in large and busy traffic areas for parking vehicles and provide smart technology to the parking system. Proposed parking system would save time and provide comfortable

hustle free parking experience to the users. It provides excellent parking service and facility to customers. Enhance the security with simplifying parking system. The main objective of this project is reduces the risk of finding the parking areas and to save the time of the user. It eliminates the unnecessary traveling of vehicles across the filled parking slots.

2. LITERATURE SURVEY

[1] Automated parking lot management system is a fully functional and digital controlled parking lot management system that is implemented with the use and integration of different digital circuitry and micro computing. The design involves different stages, from the main unit, process is passed on to different subunits to achieve the goal of full automation. An oncoming car will communicate wirelessly with the main unit attached to the parking facility gate. The main unit will verify the transmitted access information and will pass control after verification to the gate mechanism drivers, this in turn drives the right gate control system. The main goal of this project is to find immediate usage in large facilities with different access restrictions, government properties and university campuses to sectionalized lecturer's and student's car park etc.

[2] Automatic Parking System using Internet of Things (IOT), which enables the user to find the nearest parking area and gives availability of parking slots in that respective parking area. And it mainly focus on reducing the time in finding parking lots and also it avoids the unnecessary travelling through filled parking lots in a parking area. Thus it reduces the fuel consumption which in turn reduces carbon footprints in an atmosphere.

[3] IOT based Smart Parking System consists of an on-site deployment of an IOT module that is used to monitor and signalize the state of availability of each single parking pace. A mobile application also provided that allows an end user to check the availability of parking space and book a parking slot accordingly.

[4] Implementation of Smart Parking Management System using Apache Tomcat Server manages occupancy of parking slots and allow customers to find and reserve available parking place and to inquire on the vacant slots before vehicle arriving at parking. This system implemented so that the user can book the parking slot in internet before arriving at parking. The parking management system encourage customers to book parking slots in online and make the parking process a hassle free experience.

3. SYSTEM REQUIREMENT AND SPECIFICATION

A System Requirements Specification (SRS) (also known as a Software Requirements Specification) is a document or set of documentation that describes the features and behaviour of a system or software application. It includes a variety of elements that attempts to define the intended functionality required.

3.1 FUNCTIONAL REQUIREMENTS

A functional requirements defines a function of a system or its component. Where a function is described as a specification of behaviour between inputs and outputs.

3.2 NON-FUNCTIONAL REQUIREMENTS

Software requirement can be non-functional and also be a performance requirements. Non-functional requirements are the characteristics or attributes of the system that can judge its operation.

3.3 HARDWARE REQUIREMENTS

Hardware requirement analysis is to define and analyse a complete set of functional, operational, performance, interface, quality factors, design, criticality and test requirements. Water Level uses the Arduino board along with the ultrasonic sensors.

3.3.1 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. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode that is sensitive to IR light of the same wavelength as that emitted bythe IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

Fig. -1: IR Sensor

3.3.2 ARDUINO NANO VERSION 3

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one. It comes with exactly the same functionality as in Arduino UNO but quite in small size. It comes with an operating voltage of 5V, however, the input voltage can vary from 7 to 12V. Arduino Nano Pinout contains 14 digital pins, 8 analog Pins, 2 Reset Pins & 6 Power Pins. They are acted as input pins when they are interfaced with sensors, but if you are driving some load then use them as output. Functions like pinMode() and digitalWrite() are used to control the operations of digital pins while analogRead() is used to control analog pins. The analog pins come with a total resolution of 10bits which measure the value from zero to 5V. It is used to produce a clock of precise frequency using constant voltage. There is one limitation using Arduino Nano i.e. it doesn't come with DC power jack, means you can not supply external power source through a battery. This board doesn't use standard USB for connection with a computer, instead, it comes with Mini USB support. Tiny size and breadboard friendly nature make this device an ideal choice for most of the applications where a size of the electronic components are of great concern. Flash memory is 16KB or 32KB that all depends on the Atmega board i.e Atmega168 comes with 16KB of flash memory while Atmega328 comes with a flash memory of 32KB.

Fig. -2: Arduino NANO VERSION 3

3.3.3 ARDUINO CABLE

Use it to connect Arduino Uno, Arduino Mega 2560, Arduino 101 or any board with the USB female A port of your computer. Cable lenght is approximately 178cm. Cable color and shape may vary slightly from image as our stock rotates.

Fig. -3: Arduino Cable

3.4 SOFTWARE REQUIREMENTS

3.4.1 ARDUINO IDE SOFTWARE

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software. This software can be used with any Arduino board. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution.

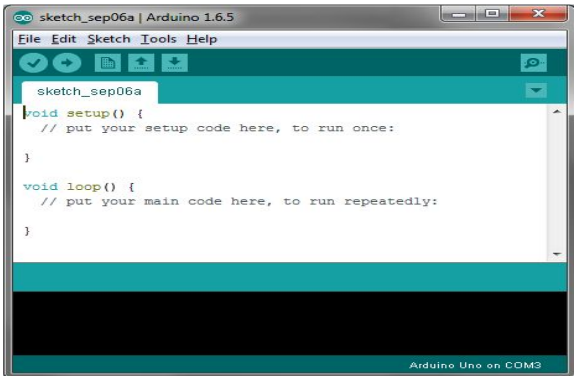

Fig. -4: Arduino Software IDE

3.4.2 NOTEPAD++

Notepad++ is a text and source code editor for use with Microsoft Windows. It supports tabbed editing, which allows working with multiple open files in a single window. The project's name comes from the C increment _operator. It features syntax highlighting, code folding and limited auto completion for programming, scripting, and markup languages, but not intelligent code completion or syntax checking. As such, it may properly highlight code written in a supported schema, but whether the syntax is internally sound or compilable, cannot be verified.

3.4.3 XAMPP

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages.XAMPP's is of deployment means a WAMPP or LAMP stack can be installed quickly and simply on an operating system by a developer. Xampp is regularly updated to the latest releases of Apache, Maria DB, PHP and Perl. Self-contained, multiple instances of XAMP3P can exist on a single computer, and any given instance can be copied from one computer to another

3.4.4 MYSQL

MySQL is an open-source relational database management system. Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language. MySQL can be built and installed manually from source code, but it is more commonly installed from a binary package unless special customizations are required. On most Linux distributions, the package management system can download and install MySQL with minimal effort, though further configuration is often required to adjust security and optimization settings.

3.4.5 PHP, HTML, CSS3

PHP is a popular general-purpose scripting language that is especially suited to web development. It was originally created by Danish-Canadian programmer Rasmus Lerdorf in 1994; the PHP reference implementation is now produced by The PHP Group.

Hypertext Markup Language is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets and scripting languages such as JavaScript.

Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

4. SYSTEM DESIGN AND IMPLEMENTATION

4.1 BLOCK DIAGRAM

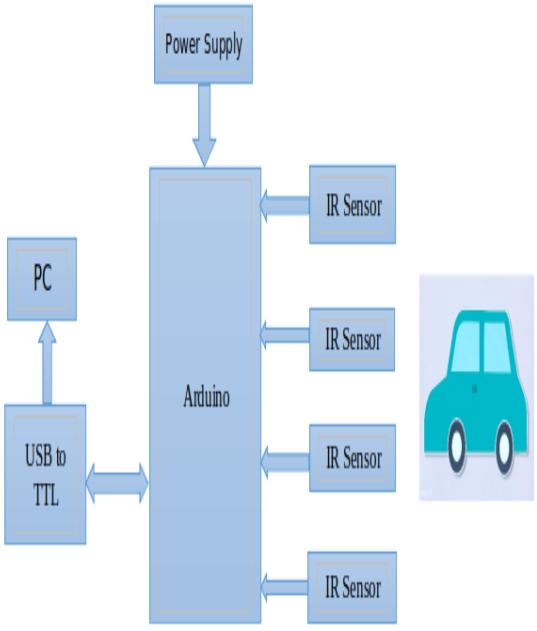

Fig. -5: Block Diagram

When the vehicle arrives on the parking slot proved which is with IR sensor, it sense the vehicle. It is connected to arduino with power supply, which

provides the power to the system. This system is connected to the PC via USB.

All the parking slots will be in green color which is represents availability of the slot to park the vehicle. When the vehicle arrives, it is sensed by the IR sensor and it transfer the data to the software system which is connected. The respective slot which is in green is transformed into red, which represents the slot has been booked. When the vehicle leaves the space then the slot will be turned to green again by making the slot available for parking. When the vehicle arrives on the parking slot proved which is with IR sensor, it sense the vehicle. It is connected to arduino with power supply, which provides the power to the system. This system is connected to the PC via USB.

5. RESULTS AND SNAPSHOTS

This will contains the snapshots of the graphical user interface (GUI) of the proposed system showing the user interface pages, the intermediate results, final result of timetable generation.

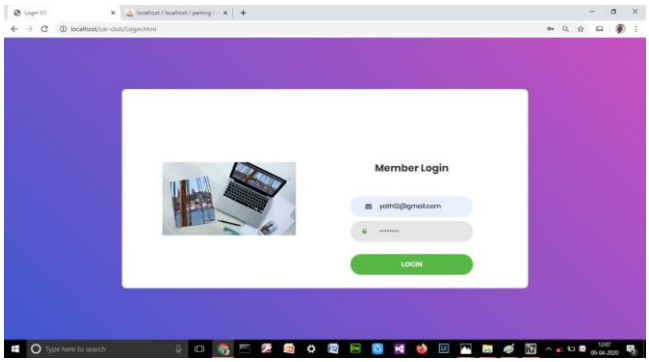

Fig. -6: Login Page

The Fig. 6 shows login page. This page will provide the user to login to the system by entering the essential credentials needed. By entering the details required user can login to the system.

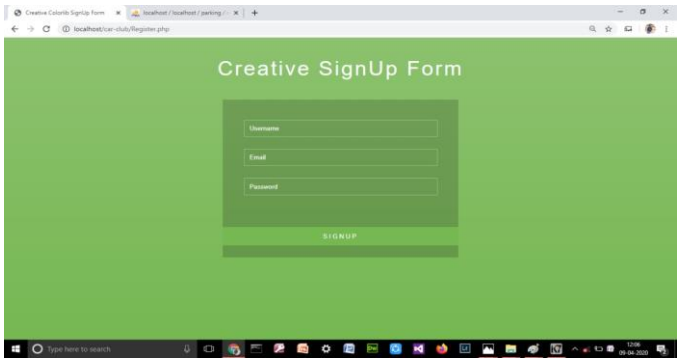

Fig. -7: SignUp Page

The Fig. 7 shows SignUp page. Any user who will use the system has to register through this page by providing essential requirement.

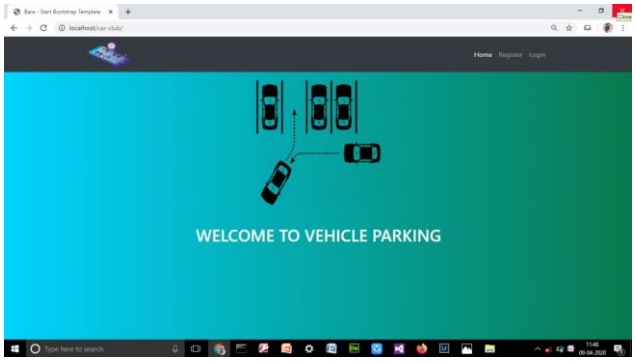

Fig. -8: Home Page

The Fig. 8 shows Home page. This is the home page of the system where the user will can go to different pages like homepage and register page.

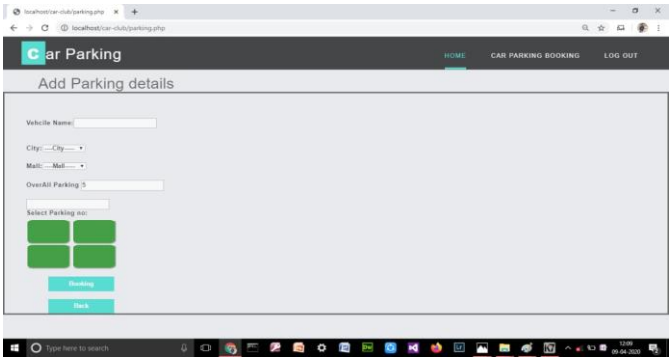

Fig. -9: Add Parking details page

The Fig. 9 shows Add Parking details page. Logged in user can book the vehicle in this page, by entering the required details like vehicle name, City Mall, and by clicking on the convenient parking slot available.

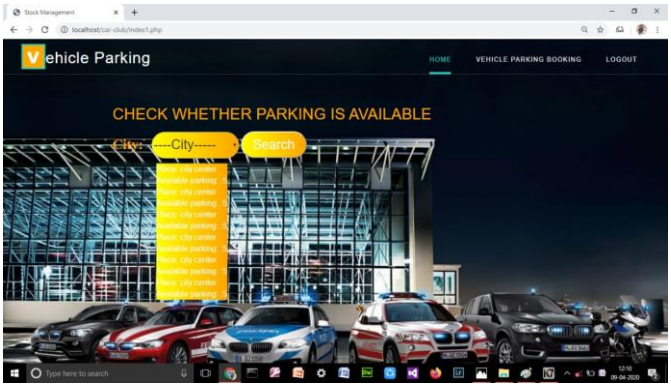

Fig. -10: Checking Parking Details Page

The Fig. 10 shows Checking Parking details page. User will get in to this page when he logged into the system. He will get the option to search for the city to know about the available parking slot in each parking area. This page also include the option to the user to book the parking slot and to logout from the system.

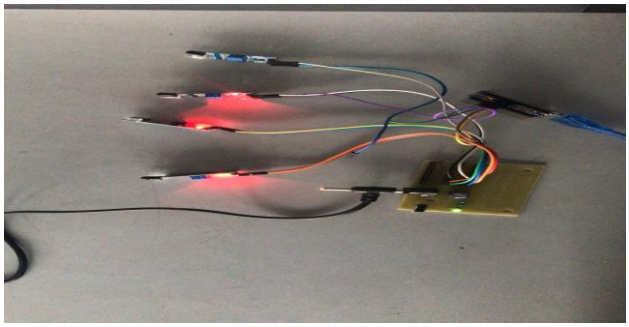

Fig. -11: Connection of IR sensor and Arduino Nano

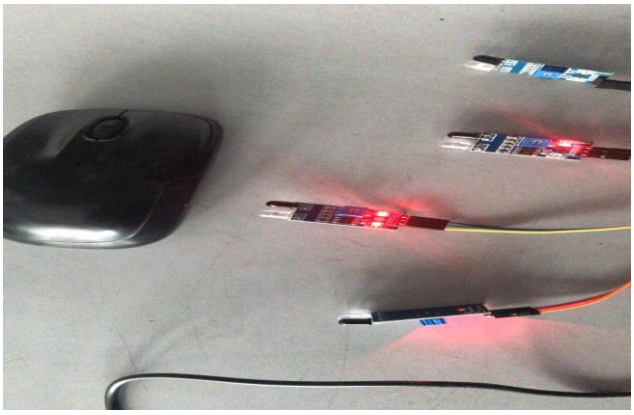

Fig. -12: When Vehicle is Present in the Parking Slot

Figure 11 and 12 shows the IR sensor connected to the arduino nano. IR sensors senses the object and transfer the information to the software system. Each IR sensor is fitted in each parking slot. When the vehicle arrives in the parking slot, IR sensor sense the presence of the vehicle and informs it to the software system via arduino. Then the slot in the system is turned to red representing the parking slot has been booked. When the vehicle is moved from the slot IR sensor transfer the information to the system and the slot is turned to red representing the slot is available for further booking.

6. CONCLUSION

The vacant vehicle parking slots are given as per priority based. The main contribution of study is to introduce the most significant parking problem that is finding vacant space in a parking area. It helps to give the proper management of parking. It reduces instances of single vehicle improperly parking across two spaces. Parking detection system would decrease searching time for vacant slots. And therefore, it reduces the effort of the driver to find vacant slot. We ensure that the database updates are carried at regular interval of time. This web application helps to know the web availability of different parking slots in the respective areas. This system will encourage customer to make parking slots in online and make parking process a hassle free experience. It also eliminates unnecessary traveling of vehicles across the filled parking slot in a city. So it reduces time and it is cost effective also.

7. FUTURE ENHANCEMENTS

The future enhancement of the system is where users get the notification of the nearest parking area based on his location.

8. REFERENCES

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