Smart Parking System

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Abstract: Over the years there has been a tremendous increase in the number of automobiles and parking is the major issue that affects our daily life. Difficulty in parking vehicles leads to stress, wastage of time and fuel. Research shows that people have tob travel more that 500 meters in search of a parking lot. We are introducing a simple and efficient smart parking system to tackle this problem. Our system divides the parking area into different slots. As the name suggests, when any vehicle enters the allotted slot the lights that display the slot is vacant(green) is turned to engaged position(red). The color of the light changes when a vehicle comes in front of the sensor, it sends a signal and immediately changes the color from green to red. Also we have set up an LCD display outside the parking lot to find out the free parking space easily. The biggest advantage is that we save the fuel, time and money and can avoid accidents and unnecessary disputes among the people.

Index Terms: Arduino, Fuel, Lights, Parking

I. INTRODUCTION

This paper is work from the project called smart parking system. This project is mainly focused on simplifying the parking procedures in a building or inn general, a more efficient way to easily park your vehicles using the simplest of techniques. With the coming of Industrial Revolution, the automotive industry has seen a ever rising growth. This is evident even today, with the number of vehicles on road, increasing day by day, as well as the technologies powering them evolving at a speedy rate. The rate of vehicle production has been quite alarming throughout all these decades. It has even reached a scenario where the vehicle population of the world would outnumber the human population of the same. India, has also experienced a similar phase where the sheer number of vehicles on the road increased exponentially over the course of decades. This has definitely helped experience the taste of what modern world feels like but, with a cost to pay. Even though the driving has experience has become so much better with time, the parking procedures have not been dealt within the same way. There has always been a drag in hows the vehicle parking techniques have been implemented throughout the world. This has always led to a wide variety of problems we come across every day but, ignore it considering it to be quite common.

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This project is mainly chosen on a basis of inspiration or motivation to revolutionise the parking system in our country, India. Firstly, India has been an ever growing market for the automotive industry and it still remains so

- Then comes the fact that it is also the 6th amoung countries, who buys cars.
- Another shocking fact was that India is the 4th in the list of countries that use up fossil fuels the most.
- The building structures in India has been evolving over time. A skyscraper or a huge shopping mall is a common sight in the devoloping parts of the country these days. With more number of people using these buildings, their parking system has to be more efficient and easily accessible to people using it.
- With the advancement of structural modernisation, there is always a scope for dedicated parking spaces in cities, in the near future. Keeping this in mind, this parking space procedure holds its importance in times to come.

II. LITERATURE REVIEW

The main objective of smart parking system, as name suggests is to find a smart solution to the parking problem across the globe. As much as the driving on-road experience important to us, so is the easiness of parking the same vehicle. But this has never been as easy as we thought. Specially in a country like India where there is no definite solution to parking outside and people tend to park wherever they find a space (which causes even more trouble for the rest), a clear cut solution is required to fix the same. What is yet to follow is a simple but effective way of how to park your own vehicle without much confusion and fuss. In India, there is nothing called an existing method for parking. Usually the public parking is controlled by officials from the traffic and road control department. But in general, we don't see much order and discipline in this activity. The highest level of parking standards are found in shopping malls and other building of premium quality where there are individuals assigned to show us the way to available slots and even help us park our vehicle; which has its own disadvantages too.

First of all, the mindset of the car user should be changed so as to bring about any revolution in parking mechanisms. With a regular driver getting over the idea of parking his/her vehicle at any place he/she desires, would help implement this proposed system. In India, the traffic rules are not followed seriously which causes a lot of accidents resulting in injuries and deaths. The general crowd should be made vigilant of the rules that exist and how to taught to abide by them. Even in shopping malls, the individuals responsible for helping the customers to park end up making mistakes and thus ass to the loss of the customer's time and fuel.

Considering all the limiting factors, we arrived at a design solution, in which the parking of vehicles can be achieved efficiently using the following proposed technique. The system consists of the following components:

- Arduino UNO: A microcontroller that helps coordinate the sensing and what follows next.
- IR sensor: Sensor that senses the presence of an object here, a car, in front of it.
- LCD display: Displays the availability of slots for the user coming from outside.
- Led lights: Shows whether the slot is available or not

III. SYSTEM DESIGN

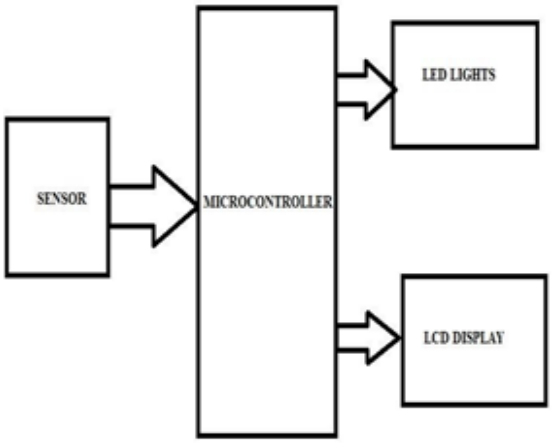
This system works on the principle of sensing a vehicle by a certain distance. Here the system has one green and one red LED that is affixed on top of the parking lot. An IR sensor is kept on the pillar of each parking lot. So when a vehicle comes in front of the sensor, it senses the vehicle(when the vehicle comes at a certain range of the IR sensor) and it gives a signal to the Arduino (Microcontroller), which further gives the signal to the LED lights to change from green tob red and this happens viceversa. Also an LCD display is kept at the entrance to the parking area which tells which parking lot is empty and which is not.

To do this project, to control the sensor which controls both the LCD display and the LED lights, a program must be used to control the sensor. For this Arduino is used and program is uploaded into the Arduino using a software called Arduino Nightly Angel.

A. Tools Used

- Arduino UNO: This is the Microcontroller that has been used to control the LCD display and the LED lights.
- LCD display: This is a display system in which the customers can find out how many parking spaces are left inside the parking lot so that the customers can know how many spaces are available in the lot.
- IR sensor: This is the main sensor which is used for detecting whether a vehicle has been placed in front of it or not and gives the appropriate signals to the Microcontroller.
- Led lights: these are used to show the customers that whether that particular slot is vacant or not.

The proposed block diagram is given below:



IV. RESULT

The product worked as expected. Smart parking system aided an available parking slot recognition and parking at a faster rate than conventional methods. It is estimated that the parking process will be completed in just 3-4 minutes. The system showed proper working 90% of the time with slight sensing issues of the IR due to external light intervention. But the actual implementation of the system is in darker areas like parking lots, the success rates would increase even further. Chances of the drivern identifying a slot after entering the lot was further increased by adding the already prevalent balloon parking technique to each slot. But here, we used LED lit balloons instead of regular ones.

V. CONCLUSION AND FUTURE SCOPE

The Smart Parking System is an automated product made with an objective of easy and efficient parking system in building. The system was made with intention to save time and fuel consumption of car users by providing an easy and automated system for easily parking ones car in building. The main idea of the project started with identification of product in transportation area. All four of us identified the product and briefly studied about their characteristic features. On the basis of various parameters, the products were analysed. Then, various problems in transportation sector was identified and we sorted out the best problem. The problem identified was inefficiency in the conventional methods of building car parking areas. Conventional method or processes of parking under manual human assistance was studied in detail. Different electronics techniques were taken into consideration. The right choice of components and right allocation of them according to the requirement led to the successful completion of the project

The future scope for this project is that to add cameras and security gates to each parking slot so that only the owners of that particular car can access it.the gate will be controlled by the camera which will capture the image of the driver and when the driver of that car comes the gate will open otherwise it will not.

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