End Semester

Project Report on "Smart Car Parking System"

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY

ALLAHABAD

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Certificate

This is to certify that this project report on the project titled “Smart Car Parking System” is an authentic record of our work done during, the July –Dec 2017 session semester V under the supervision of Dr. Sonali Agarwal.

Acknowledgement

We would like to express our special thanks of gratitude towards our mentor Dr. Sonali Agarwal for her supervision and support during this project titled “Smart Car Parking System”. We are very thankful to you for giving us your precious time and support.

Abstract

With the help of sensors and other components we have made a prototype of a car parking which is itself smart in many ways. It can tell you where are the empty spaces, what are the total number of available spaces and the occupied spaces and the information about these can be accessed by any smartphone or pc.

We have used some basic sensors which are easily available and hence this model can be replicated on a large level to making parking facility smart in actual way.

Introduction

With the increasing population and accessibility of cars, a problem which is rising its head is of parking. People find it very hard to find the parking space in malls, public places etc. and if it is there it is more hard to find the space and many times it happens that we spent a lot of time find the space in the big parking lots of cities and at last we get to know that there is no parking space there.

This results in wastage of time and wastage of money. According to a study a person having a car spends 17 hours on average in a year to find parking spaces. And when we talk about the money wasted in this, we might think it should be or will be negligible but it is not , it is huge almost 73 billion Dollars only in America where only and when talking about India it is not less as we have 220 million vehicles on road. So, what should be done in this regards, is there any solution to it. Yes, there is a solution Smart Parking, which can save money, fuel, and time by making minimal changes in the parking and using technology.

Motivation

Internet of Things , which has truly changed the way of living in 21st century by making things accessible at any place in the world either it be controlling your home appliances or any other thing, IoT has a vital role in making of the upcoming smart cities.

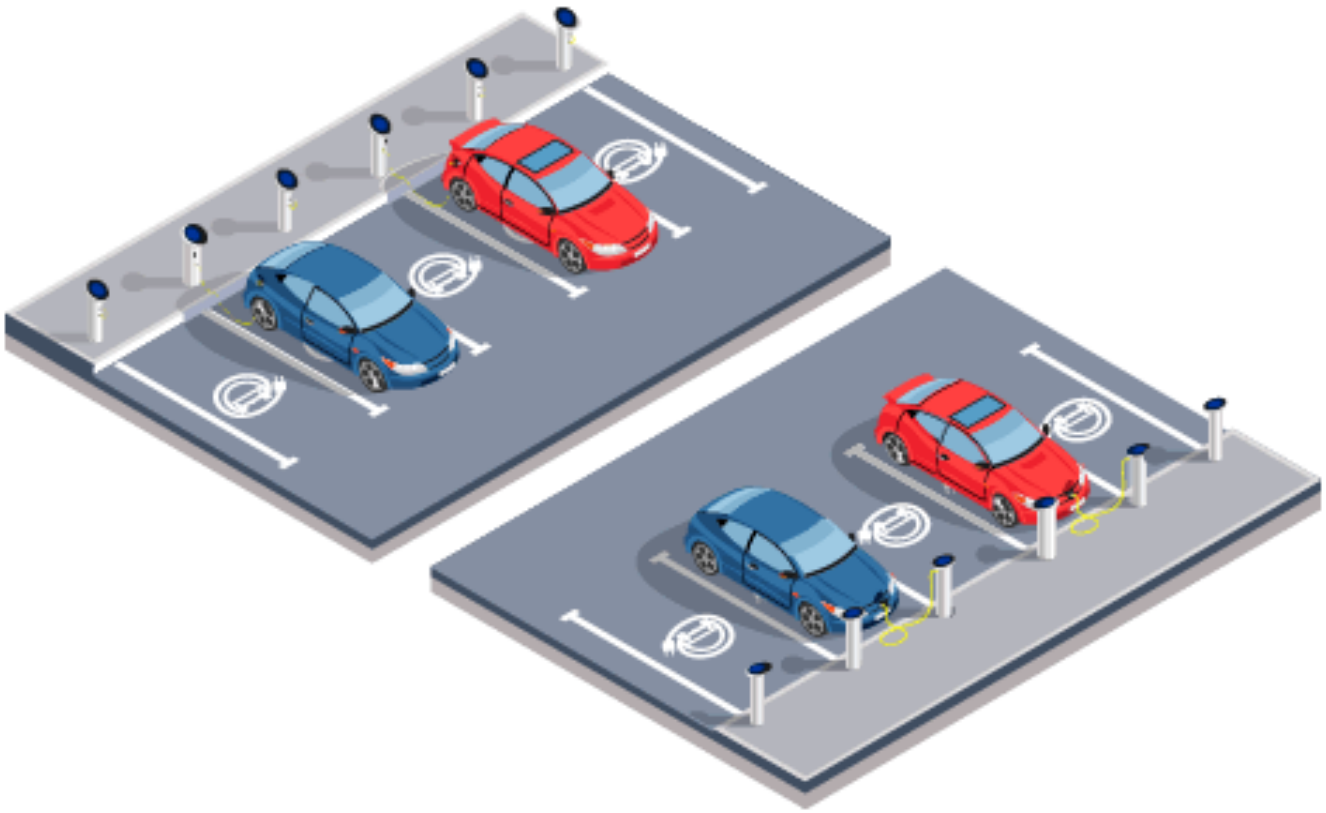
Parking needs space and of course, needs patience to find the right place to park your vehicle, which results in more money and more fuel. But now this can be stopped with the use of Smart Car Parking System,

Smart Car Parking System

Parking is stopping a vehicle in a car park or space which is assigned to it. And when we talk about Smart city, one of the most significant feature which comes to our minds is smart parking. Smart Parking involves sensors and real time data and applications by which the user can spot the vacant spaces in the parking by any interface device either it be phone or computer.

Smart Parking is not only useful for the users of it but also for the owner of the parking. Some of the benefits of the Smart parking are:

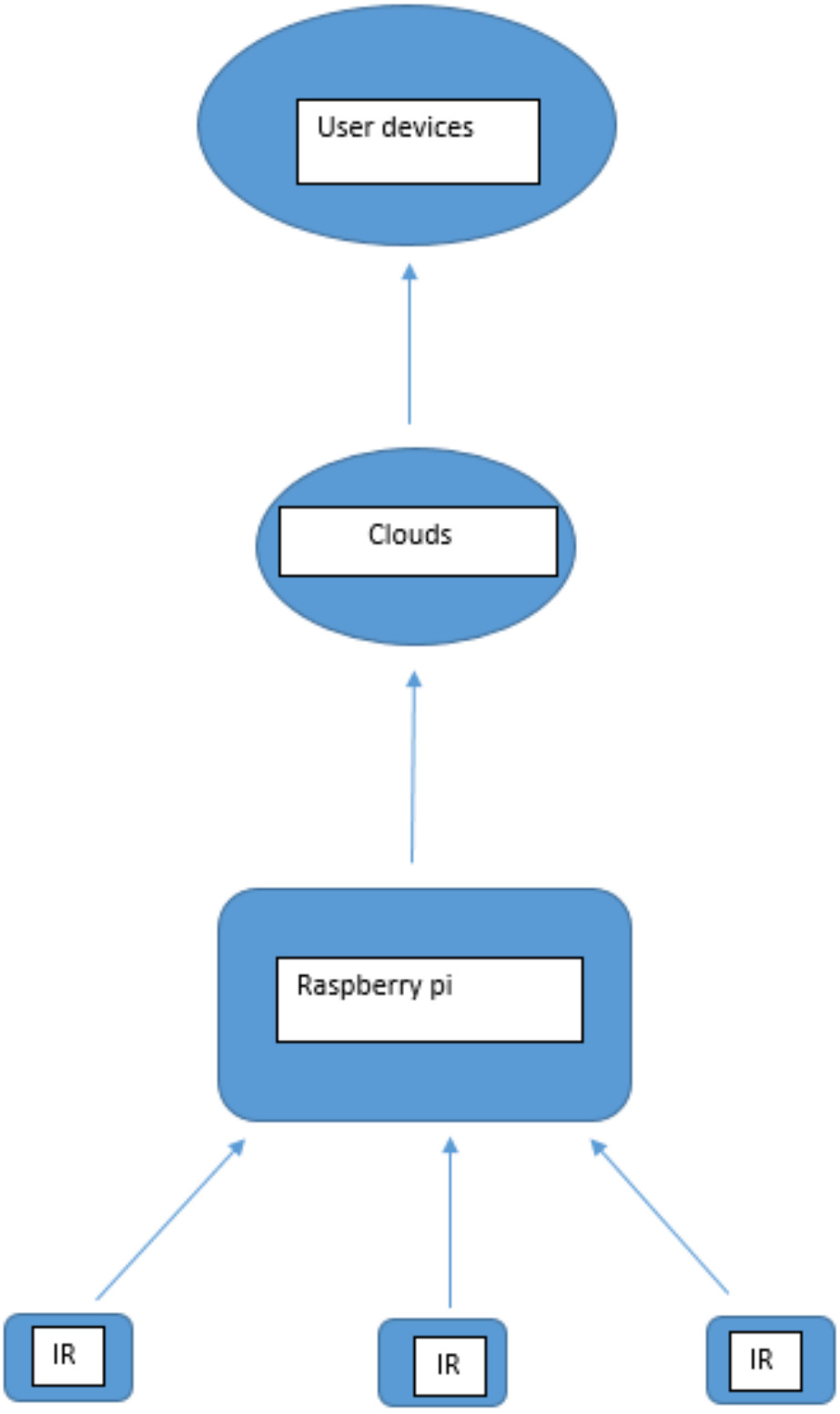
1. Less Time Consuming.
2. Saves fuel.
3. Saves money.
4. Quality Service.
5. Less traffic.
6. More safety.



Software and Hardware requirement

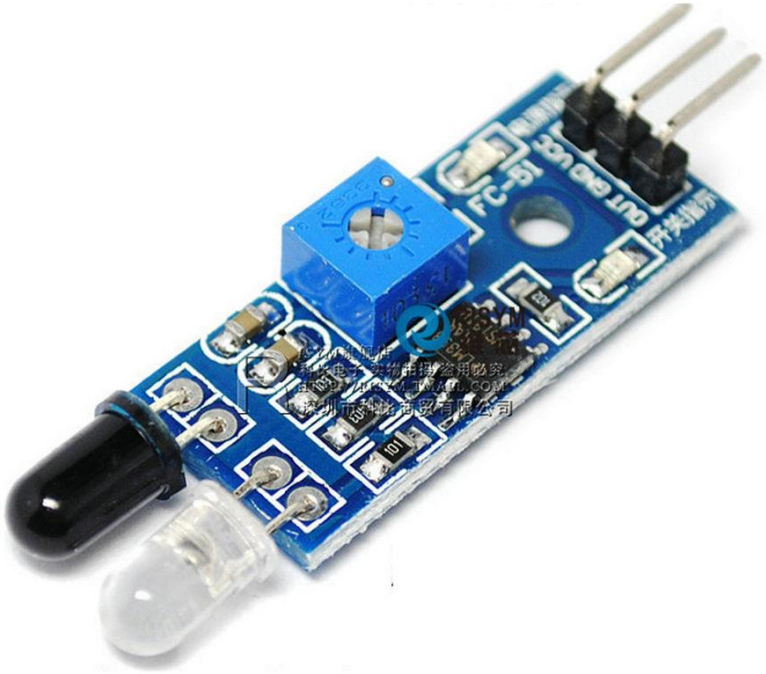
1. Arduino.
2. Raspberry pi.
3. Bread Board.
4. Female –male wire.
5. IR sensor.
6. 5 V power supply.
7. Interface (pc or mobile).
8. Internet.
9. Putty Software.

Flow Diagram



IR Sensor:

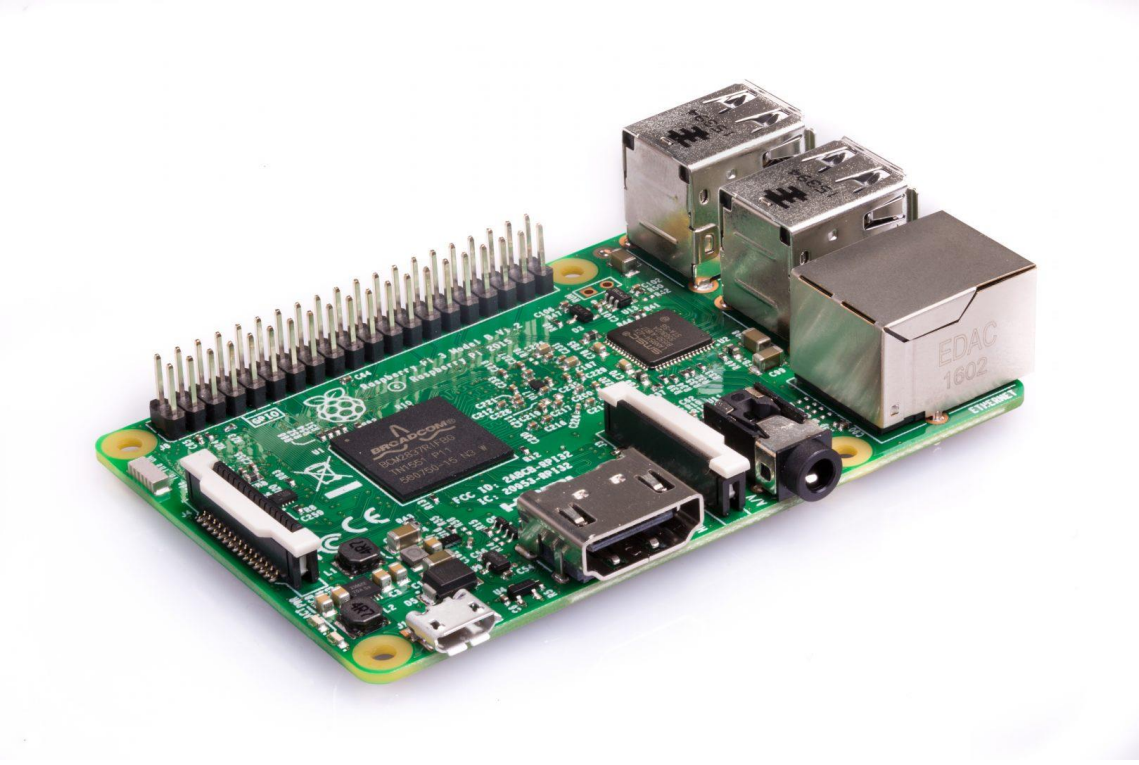
Infrared Sensor are the sensor which are used to sense the objects by emitting infrared radiations, the emitter which is IR light emitting diode emits the radiation and the receiver which is a photo diode and when the receiver receives a radiation it shows that some object is there. It conveys digital signals.



IR sensor

Raspberry pi

Raspberry pi is a small board computer, which is designed for educational purpose. It uses Raspbian which is a Debian-based Linux Operating system (highly recommended). It is used when we are dealing with most of the software part and we have to get the video output or the audio output or have to use the internet facility because it is easy to get those things working in this and the most important feature of this is that it can be programmed in any language we want not like Arduino which has limitation to C/C++ or Arduino.



Raspberry pi

Arduino

These are the single board microcontrollers which are used for making devices and the devices which interact so that they can sense and control the object of the physical word and because it has no video output, it has to be connected to make the output visible the output of the Arduino is in form of digital signal given by the sensors (IR) either zero or one.

As it is acting as a interface between the hardware device and it has no output in video format it cannot be solely used for making this, and that is the limitation of it , if we need to work with video , audio or the internet we have to use other devices like raspberry pi which have these features.

Arduino

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Cloud

Accessing the software and the applications of the computer through a network by accessing the centers of the data, either by the Local Area Network or Internet. Example, Pubnub.com (online cloud).

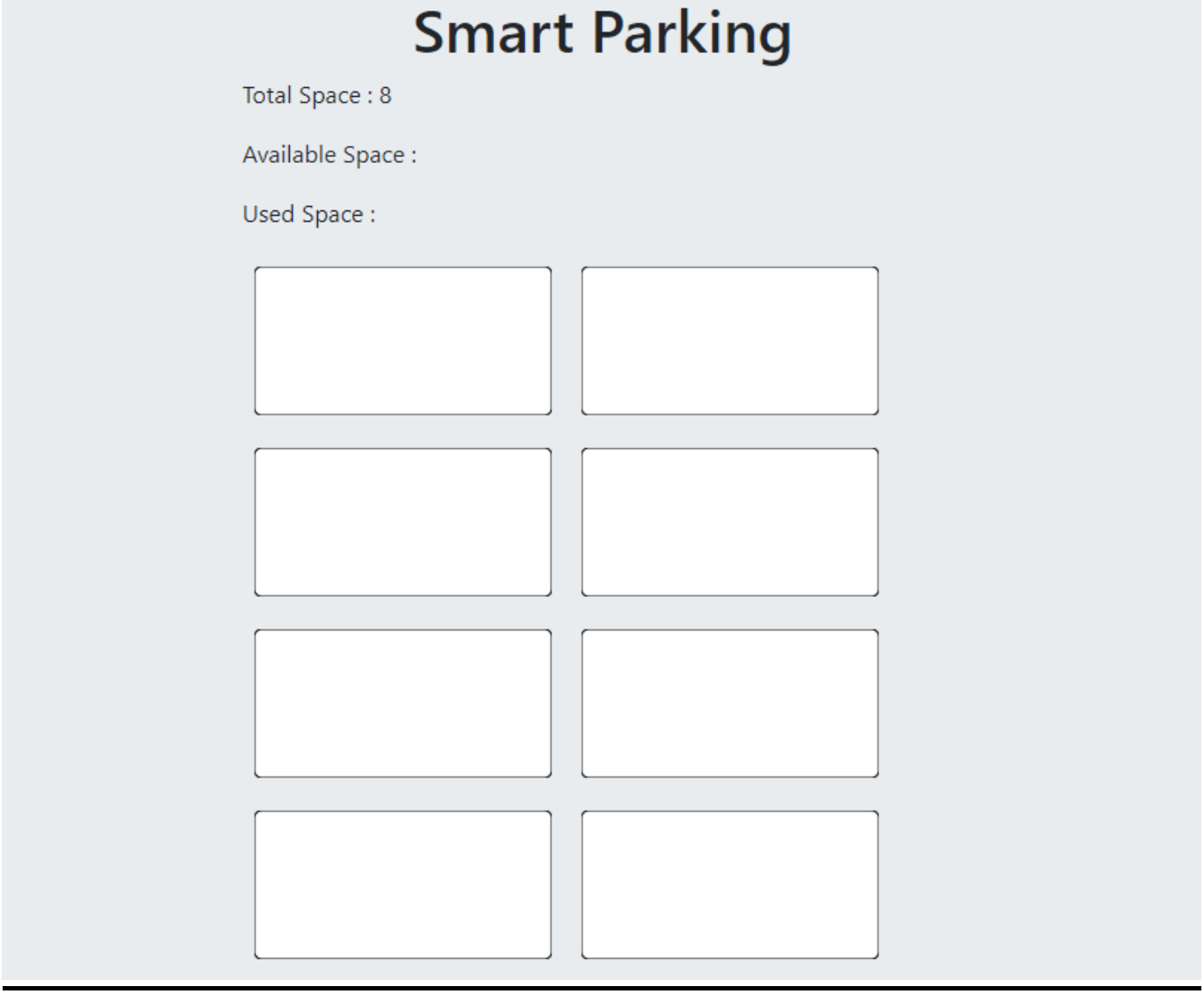
Working

When all components are installed correctly and power supply is given to the Raspberry pi, the Arduino starts to give the status of the parking by taking the input form the IR sensors and giving it in digital signal form (either 0 or 1).

The frequency of the IR sensors is 2 microseconds, hence after each 2 microsecond it again send infrared radiations to detect the presence of some object near it.

Then the input is send to the raspberry pi and then to the cloud and one can see on the interface either from the mobile or the pc whether the parking have a vacant space or not.

Result



Here, the boxes show the parking and when all the components are connected the one which are occupied start to show red color while the one vacant shows green color.

Future Scope

In future this project can be extended to the slot booking facility of the car parking in which the user will be able to know the vacant place in the respective and book his/ her slot for parking which will in return save the time.

References

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https://learn.sparkfun.com/tutorials.

https://en.wikipedia.org/wiki/Raspberry_Pi.