IoT based Smart Car Parking System

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Abstract: **One of the main problems in many cities is to finding parking spaces for the vehicles. With IoT technology and mobile applications, we propose a design and development of a real smart parking system that can provide more than just information about vacant spaces but also help the user to locate the space where the vehicle can be parked in order to Reduce traffics in the parking area. Moreover, we use computer vision to detect vehicle parking number in order to monitor the vehicles in the parking area. The proposed model provides real-time information for detecting parking slots and information about filling of parking slots in regular basis for advance parking in the parking slots. Then the free spaces are displayed on the matrix display if there are available free spaces. If all the slots are filled, then its indicated on the matrix display and also through to IOT.**

Keywords: **Arduino UNO, an Ultrasound sensor, LCD Display.**

1. Introduction

This project is entitled as "Implementing Internet of things for advanced Smart Car Parking" is developed using IOT hardware kit as the transmitter and cloud server as the receiver. The hyper terminal tool has been used for PC interface. The main objective of this project is to develop a web-based application to communicate over the internet server in a secured manner for advanced accident detection. IOT involves in various departments like Medical industries, Automobile industries, Manufacturing industries, and etc. Now a day's utility components everyday objects are being combined with Internet connectivity and powerful data analytic capabilities that promise to transform the way we work, live, and play. And we have used a Reddit Ranking Algorithm.

- To show the slot filling in regular basis information
- To the user in the mobile as an intimation

A. RR – algorithm

- Step 1: Begin the process.
- Step 2: Read the training data from a file.
- Step 3: Read the testing data from a file.
- Step 4: Set K to some value.
- Step 5: Normalize the attribute values in the range 0 to 1.
- Step 6: Value = Value / (1+Value);
- Step 7: OLEDB.4.0;Data Source=" + Excel + "; Extended Properties=Excel 8.0;"
- Step 8: Find the K nearest neighbors in the training data set based on the Euclidean distance
- Step 9: Predict the class value by finding the maximum class represented in the K nearest neighbors.
- Step 10 : Comparing the dataset value and range value for calculating occurrence percentage
- Step 11: Convert. ToDouble(red1[1]. ToString())
- Step 12: The above process continued for all test and finally the percentage of occurrence is calculated.
- Step 13: Ranking and Hierarchical model will be displayed. Eg (A1-100%, A2-50%, A3 – 75%)

2. Literature survey

The Internet of Things: A survey L. Atzori, A. Iera, and G. Morabito, "The Internet of Things: A survey," Comput. Netw., vol. 54, no. 15, pp. 2787–2805, 2010. The main problem IoT is facing in the scenario is of security, as there are enough potential hackers who are always eager to attack. Other problem includes the standardization problem, addressing the problem, scalability problem, etc. New research is needed to resolve these issues. The RFID system is composed of one or more reader(s) and several RFID tags. Tags use radio-frequency electromagnetic fields to transfer data attached to an object. RFID allows monitoring objects in real-time, without the need of being in line-of-sight. The tag's antenna picks up signals from an RFID reader and then returns the signal, usually with some additional information. Hitachi has developed a tag with dimensions 0.4*0.4*0.15 mm. The RFID tags come in three configurations, the first one is Passive Reader Active Tag (PRAT) in which the reader is passive and receives the signal from the battery operated active tags. The transmission range for the RFID tag and the reader is from 1-2000 feet depending upon the architecture. The second one is Active Reader Passive Tag (ARPT). This tag does not have onboard power supplies, so it gets the energy required to send data from the query signal sent by the RFID reader. The last one is an Active Reader Active Tag (ARAT).

Real-time location and inpatient care systems based on passive RFID P. Najera, J. Lopez, and R. Roman, "Real-time location and inpatient care systems based on passive RFID, "J. Netw. Comput. Appl., vol. 34, no. 3, pp. 980–989, 2011. To create standards-based secure access to patient's personal data and medical records by using RFID tags and Web Service with the help of the hardware kit. Customers can view and update their personal medical information via the web site, which

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-2, February-2019
www.ijresm.com | ISSN (Online): 2581-5792

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seamlessly syncs with one another. Because the system is built with Web services, so it is easy to update, adapt and grow. This project uses the sensor to get the patient id. The sensor will send the patient id to the serial port of the system. Hence tracking and monitoring of patients, their case sheets and medical equipment can be efficiently carried out. However, the reality of RFID adoption is far behind earlier expectation acceptance and proper use of RFID in healthcare.

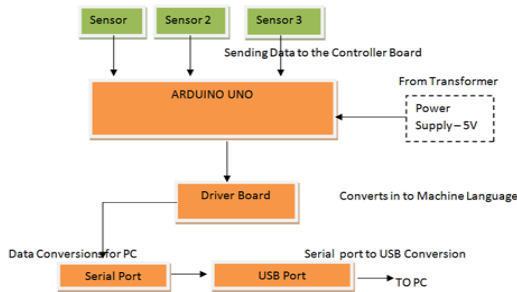*Project Framework:* The block diagram for the smart car parking system,

Fig. 1. Block diagram

3. Implementation setup

A. Components required

- Arduino UNO
- Ultra Sound Sensor
- LCD Display
- Power Supply Unit
- Transformer

1) Arduino UNO

A microcontroller is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/ output peripherals and etc., The important part for us is that a microcontroller contains the processor and memory, and some input/output pins that you can control on the Arduino. (Often called GPIO - General Purpose Input Output Pins).The hardware consists of a simple open source hardware board designed around an 8-bit Atmel AVR Microcontroller.

Fig. 2. Arduino

The UNO board is the first series of USB Arduino boards and the reference model for the Arduino platform. An important aspect of the Arduino is the standard way that connectors are exposed to allow the CPU to be connected to a variety of interchangeable.

2) UltraSound Sensor

Ultrasonic switch Circuit of a new type of remote control switch is described here. Sound of frequency up to 20 kHz is audible to human beings. The sound of frequency above 20 kHz is called ultrasonic sound.

Fig. 3. Ultrasound sensor

The transmitter generates ultrasonic sound and the receiver senses ultrasonic sound from the transmitter and switches on a relay. It oscillates at a frequency of 40-50 kHz. An ultrasonic transmitter is used here to transmit ultrasonic sound very effectively. The ultrasonic receiver circuit uses an ultrasonic receiver to sense ultrasonic signals.

3) Power supply

A power supply is an electrical device which supplies electrical power to an electrical load. The function of the power supply is to convert electrical current from a source to the voltage, current, and frequency to power the load.

4) Transformer

Transformer is used to convert the AC electricity from one voltage to another with little loss of power. Transformer works only with AC.

5) LCD Display

An LCD display is used for displaying the parking slot available in the parking area.

Fig. 3. LCD Display

The LCD display is connected to the Microcontroller. Every pin is connected to an LCD display. A message is sent through commands via Serial Communication.

B. Application

- Smart meters track the occupancy of parking spaces.
- Users can access that occupancy data to determine the availability of spots.

C. Advantages

- To search for vacant parking spaces.
- To know the information of parking slot in advance.

4. Conclusion

IoT based smart parking system that can provide just information about vacant space but also help driver to locate an available parking slot in order to reduce traffic problem in the

parking area We design this smart parking system using hardware and software based on the IoT concept, and mobile application, the driver can easily check parking information and can know the slot filling regular basis information in advance. The goal of our study is to improve the parking process by reducing the time that is required to park a car.

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