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A Survey on Smart Car Parking System Using Wireless Sensor Network

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ABSTRACT: Now a days car parking, a major problem being faced in metropolitan cities, dealing with issue of car parking space choice in parking lot of any mall or public space is need of the time. Widespread use of wireless technologies paired with the recent advances in wireless applications for parking, manifests that digital data dissemination could be the key to solve emerging parking problems. Wireless Sensor Network (WSN) technology has attracted increased attention and are rapidly emerging due to their enormous application potential in diverse fields. This field is expected to provide an e□cient and cost e□ective solution to the e□uent car parking problems. In this proposed system, the status of available each parking lot will be detected by its corresponding sensor node, and reported periodically to a database using raspberry Pi microcontroller. This later converts the collected data into meaningful information which can be viewed via a LED screen at the entrance of the parking place and an android phone application.

KEYWORDS: WSN, LED, Raspberry Pi B+2, Raspbian Operating System

I. INTRODUCTION

The increasing number of cars in big cities makes it hard for cars drivers to find a free spot to park their cars. To overcome this problem, many applications have been introduced to satisfy drivers needs. Indeed, the drivers spend much time going around the parking, which not only causes a tra□c jam, but also results in wasting time and so the air pollution. It is estimated that more than 5 percent of heart disease deaths are linked to air pollution. Several wireless sensors have been used in this field. Thus, introducing Precision IR Sensor will help decrease energy consumption. In addition, Precision IR sensor is very e□cient in detecting vehicles which contain metallic parts. The movement of the car causes a distortion in earth's magnetic field due to its metallic parts and the same can be detected using IR Sensor.Use of microcontroller in IOT is emerging technology now a days.One of the key learning platforms for IOT is the Raspberry Pi. The Raspberry Pi is a popular platform because it o□ers a complete Linux server in a tiny platform for a very low cost. The Raspberry Pi also allows interfacing services and actuators through the general purpose I/O pins.The combination of Raspberry Pi and IoT becomes a new innovation technology in Smart Car Parking System.

MOTIVATION

1. The main motivation of the project is to help people who find problem in car parking in most crowded area, huge parking places as well as metropolitan cities.
2. This project is having that potential to reduce unnecessary traffic issues cased in metropolitan cities.
3. It can control car parking issues cased in huge parking blocks.
4. In this project identification and solution of real time problem faced by car owners and parking lot management system is provided with use of trending technology.
5. A clear report is generated by the system which gives a complete idea about parking lot, availability of parking slot, real time tracking of parking slot with booking facility.

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6. The admin looks prominently after booking facility provided by this system to car owners and management of parking lots available in smarter way using wireless sensor networks and Raspberry Pi.

OBJECTIVE

1. The main objective of this project is to reduce extra time consumption and headache of car owners for parking.
2. This project involves major problem solving modules like availability of parking lot, real time tracking of parking slot, parking by using mobile application.
3. To access a complete project user need to register with an application so that user can use all the facilities provided.

II. LITERATURE SURVEY

1. **"Car Parking Management System using AMR-Sensor Technology" by SoukainaElaouad, SalimaBenmakhlouf, NaoufelTobaji, Mohamed Amine Dmini and YassineSalihAlj. (2015)**

In this paper, the management system for car parking was suggested. This system considered an AMR-based approach that involves the driver in the process. The driver is kept up-to-date with detailed information via an application. With the suggested system, drivers would park their vehicles in a short amount of time which would promise a decreased traffic.

2. **"An Intelligent Car Park Management System based on Wireless Sensor Networks" by Vanessa W.S. Tang, Yuan Zheng, Jiannong Cao.**

This paper, describes an intelligent car park management system based on a wireless sensor network, analysis of the requirements of real car park management systems. Based on the analysis, this paper the main system functions and designed the 2006 1st International Symposium on Pervasive Computing and Applications system architecture. It also implemented a prototype system to realize the designed functions using the crossbow products of motes.

EXISTING SYSTEM APPROACH

In earlier existing systems, user needs to wait for the parking slot to get available for parking which used to consume much time. Due to unavailability of real time tracking of huge parking lots it was always hectic situation for working staff at the venue. There are few systems developed for user friendly car parking but due to high costs are not affordable to everyone.

Since, the problem of car parking is growing day by day in metropolitan cities. It is need of time to find out a solution for the same. Also, a proper system is necessary to carry out a complete execution.

Existing system disadvantage

1. The main disadvantage of existing system is very high cost for installation and execution.
2. No Proper system exists for smart car parking which will enable user for real time tracking.
3. No integration of recent technologies and trends in car parking system as weel as management.

III. PROPOSED SYSTEM APPROACH

The proposed system create an android phone app and real time tracking of parking slots which enables user to check availability of parking slot and to book parking slot distantly with real time presence of digital electric board (LCD Board) at entrance of parking space.

The system include precision IR wireless sensors which sense the objects and then communicates with microcontroller having raspberry pi as an operating system periodically and then database is stored on cloud server. The server in Raspberry Pi stores all the information on cloud and the same is fetched into mobile app through a website.

This will, reduce the chaos at entrance and exits of parking places with real time digital electric display embedded with WSN.

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IV. PROPOSED SYSTEM ARCHITECTURE

Diagram (A) represents the connection components on site with all the necessary requirements. At this end LCD Display, Precision IR Sensor, Raspberry Pi and Router communicate with each other to get desired output. Diagram (B) represents communication between android mobile app and cloud server of system established, which helps user for real time tracking and booking of parking slots.

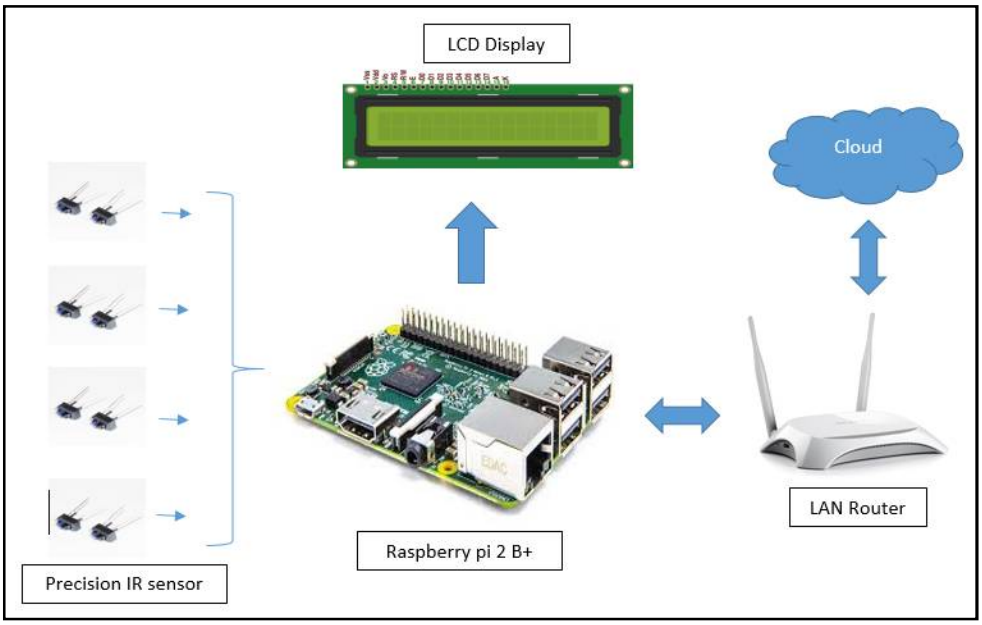

Figure A: Block diagram of field circuit for Smart Car Parking System using WSN

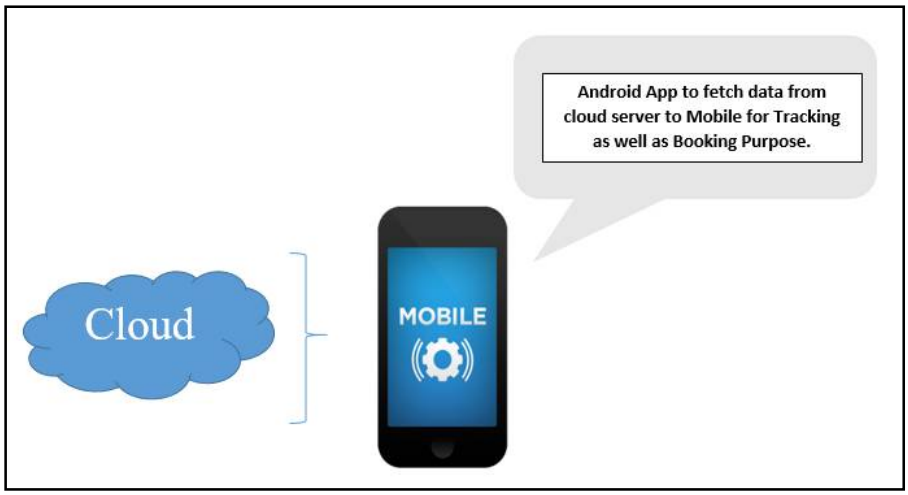

Figure B: Block diagram of user side for Smart Car Parking System using WSN

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V. CONCLUSION

This paper explains about the real time problems faced by car owners for parking systems. On the basis of same, a system is proposed for real time parking management with tracking of parking slot and the same will be accessed by user with a mobile application. This enables user to book a particular parking slot in advance which reduces a time consumption for car parking.
Also, system uses precision wireless sensor which are available at lower costs with great performance. This makes system cost efficient and best in performance.

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