VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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Synopsis

on

"Smart Car Parking Using IOT"

submitted in partial fulfillment of the requirements of the award of the degree

MASTER OF COMPUTER APPLICATIONS

by

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ABSTRACT

The project entitled SMART PARKING SYSTEM using Iot, the major motivation of this project is to reduce the traffic congestion in roads, multi-stored buildings and malls due to unavailability of parking spaces. The project displays the nearest empty slot if present with respect to user location. Our project aims to make efficient use of parking spaces. We track vacant slots in the parking space and assign that to the user. Smart parking system as described above can lead to an error-free, reliable, secure and fast management system. In recent times the concept of smart cities has gained great popularity. Thanks to the evolution of the Internet of things the idea of smart city now seems to be achievable. Consistent efforts are being made in the field of IoT in order to maximize the productivity and reliability of urban infrastructure. Problems such as, traffic congestion, limited car parking facilities and road safety are being addressed by IoT. The proposed 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 space. A mobile application is also provided that allows an end user to check the availability of parking space and book a parking slot accordingly. The paper also describes a high-level view of the system architecture. Towards the end, the paper discusses the working of the system in form of a use case that proves the correctness of the proposed model.

INTRODUCTION

The project entitled smart parking system is to manage all the parking facilities to a user. The recent growth in economy and due to the availability of low-price cars in the market, every average middle-class individual can afford a car, which is good thing, however the consequences of heavy traffic jams, pollution, less availability of roads and spot to drive the motor car. One of the important concerns, which is to be taken in accounting, is the problem of parking those vehicles. Though, if there is space for parking the vehicle but so much time is squandered in finding that exact parking slot resulting in more fuel intake and not also environment friendly. It will be a great deal if in some way we find out that the parking itself can provide the precise vacant position of a parking slot then it'll be helpful not limited to the drivers also for the environment

. Initially when the user is about to enter the location the LCD displays the number of empty and filled spots and when the user is with its vehicle near to the parking detect sensor, he/she would be thrown with a notification on their mobile app of the parking slot number, where they should park their vehicle.

1.1 Relevance of the project

The main important benefit of a smart parking system is its advanced technology. It follows the latest technologies and concepts to assure profitable outcomes. The design and implementation of smart parking is very easy to supervise and manage. This system can be easily handled by the staff members because of its well-organized structure.
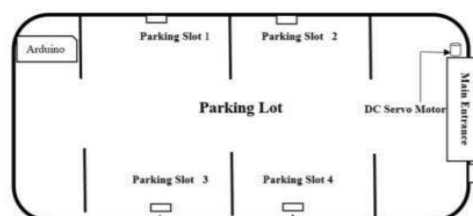
1.2 Problem Statement

In recent research in metropolitan cities the parking management problem can be viewed from various angles such as high vehicle density on roads. This results in annoying issues for the drivers to park their vehicles as it is very difficult to find a parking slot.

The drivers usually waste time and effort in finding parking space and end up parking their vehicles finding a space on the street which further leads to space congestion. In worst case, people fail to find any parking space especially during peak hours and festive season.

1.3 Objective

Smart Parking involves the use of low-cost sensors, real-time data and applications that allow users to monitor available and unavailable parking spots. The goal is to automate and decrease time spent manually searching for the optimal parking floor, spot and even lot. Some solutions will encompass a complete suite of services such as online payments, parking time notifications and even car searching functionalities for very large lots. A parking solution can greatly benefit both the user and the lot owner.

Optimized parking – Users find the best spot available, saving time, resources and effort. The parking lot fills up efficiently and space can be utilized properly by commercial and corporate entities.

Reduced traffic – Traffic flow increases as fewer cars are required to drive around in search of an open parking space.

Reduced pollution – Searching for parking burns around one million barrels of oil a day. An optimal parking solution will significantly decrease driving time, thus lowering the amount of daily vehicle

Increased Safety – Parking lot employees and security guards contain real-time lot data that can help prevent parking violations and suspicious activity. License plate recognition cameras can gather pertinent footage. Also, decreased spot-searching traffic on the streets can reduce accidents caused by the distraction of searching for parking.

Decreased Management Costs – More automation and less manual activity saves on labor cost and resource exhaustion.

Enhanced User Experience – A smart parking solution will integrate the entire user experience into a unified action. Driver's payment, spot identification, location search and time notifications all seamlessly become part of the destination arrival process.

1.4 Scope of the project

At present some countries have portals which users can gain information about parking areas via the internet. This system can give users the information about parking space, but it won't be able to give which parking slot is vacant and occupied. Hence, such a system cannot smartly handle the issue. Car lifts along with an automated robotic system, which automatically takes the car to a particular parking spot as soon as the car enters on a platform. This system cannot be installed by medium scale shopping malls, movie theatres as it can cost them a huge amount. At many public places, the system only shows the availability but it cannot show the exact slot and path to the slot available. Hence, there is the need to smartly find the path to the vacant spot.

1.5 Methodology

In this project we are using Node MCU, IR sensors, and servo motors. One IR sensor is used at entry and exit gate to detect the car while two IR sensors are used to detect the parking slot availability. Servo motors are used to open and close the gates according to the sensor value. Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espresso Systems, and hardware, which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the dev kits. The firmware uses the Lua scripting language. The ESP8266 is a low-cost Wi-Fi enabled microchip with full TCP/IP stack and microcontroller capability. Node MCU includes CPU core, faster Wi-Fi, more GPIOs, and supports Bluetooth 4.2, and low power Bluetooth. The ESP8266 is a low-cost Wi-Fi enabled microchip with full TCP/IP stack and microcontroller capability. Node MCU includes CPU core, faster Wi-Fi, more GPIOs, and supports Bluetooth 4.2, and low power Bluetooth. As soon as the IR sensors get the presence of a car in front of the entrance, it will send signal to the Nod MCU to check if there is an empty slot inside the parking lot. When Node MCU acknowledges that there is an empty slot or more then it will send a signal to the dc servo motor which will open the main entrance. On the other hand, if a Node MCU encounters no empty slots at the time of a car trying to make an entrance, the gate will just not open. In addition, there will be a website linked with the Node MCU board to show the number of parking.

The idea behind our methodology is very simple, usually users spend most of their time in looking for an empty slot where they can park their vehicle which increases fuel consumption and time wastage. We came-up with a new method where we provide the user an empty slot number where he can park his vehicle without wasting his time for finding one. Similarly, we try to display the start time and end time so that the user can know for what amount of time he has parked his vehicle.
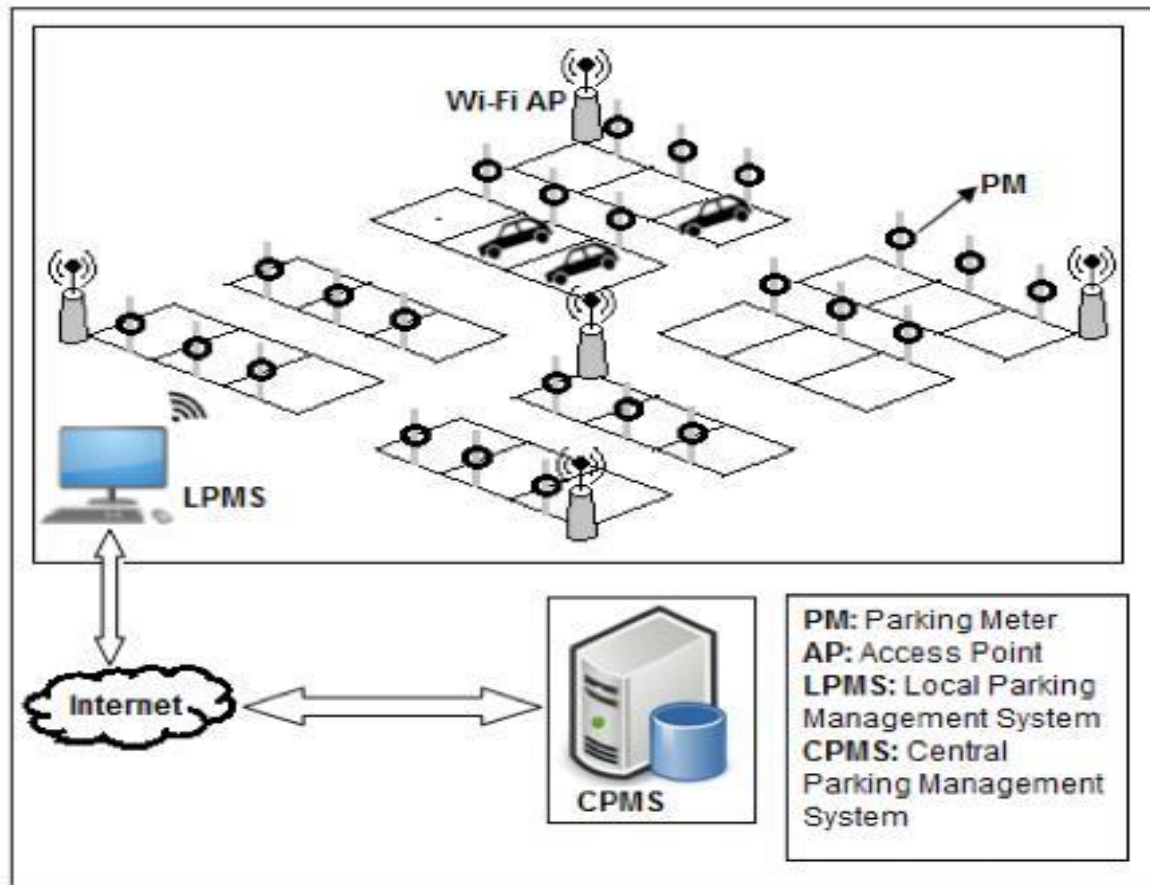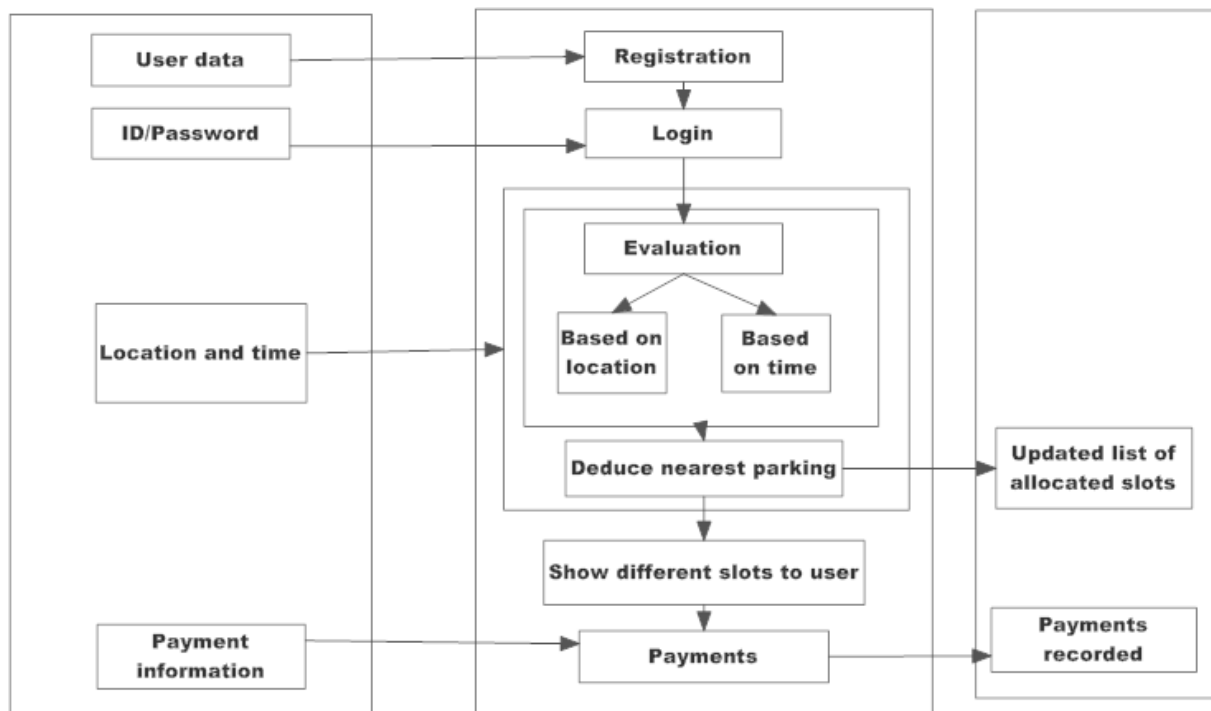
Fig1: - Network Architecture of proposed System

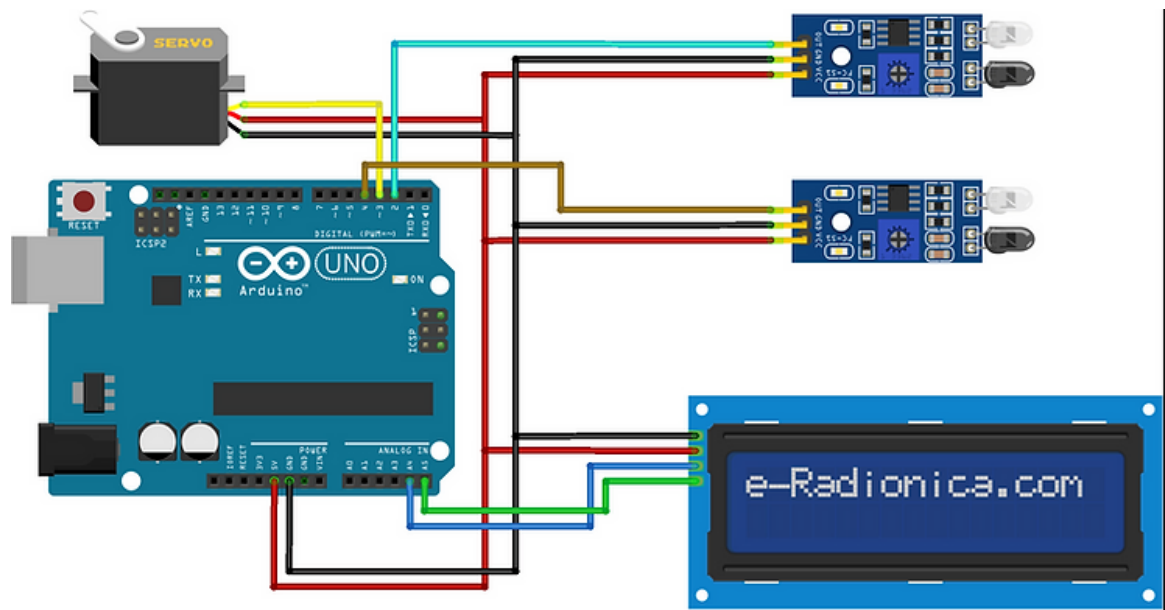Fig2: - Block Diagram of parking system

Hardware and Software Specification

3.1 Hardware Specifications

- ENODE MCU (ESP8266)

- JUMPER WIRES

- INFRARED SENSORS

- 16*2 LED DISPLAY

- DC MOTOR

3.2 Software Specification

ARDUINO IDE

CONCLUSION

The concept of Smart Cities has always been a dream for humanity. Since the past couple of years ago large advancements have been made in making smart cities a reality.

The growth of Internet of Things and Cloud technologies have given rise to new possibilities in terms of smart cities. Smart parking facilities and traffic management systems have always been at the core of constructing smart cities. In this project, we address the issue of parking and present an IoT based Cloud integrated smart parking system. The system that we propose provides real time information regarding availability of parking slots in a parking area. Users from remote locations could book a parking slot for them by the use of our mobile application.

The efforts made in this project are intended to improve the parking facilities of a city and thereby aiming to enhance the quality of life of its people.

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