Parking Slot Availability Check over IOT

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Abstract
In our day today life, the most problem is parking of vehicles mainly the car parking at a specific destination. Also this problem results in traffic jam. This paper proposes the essential concept of using Wi-Fi based smart car parking services in modern cities as a crucial application of the web of Things (IOT).This system are going to be launched through Smartphone provided and it are often used to monitor or find the empty slots therein area. this technique helps to enhance the utmost utilization of parking lot and reduces the users waiting time.

I Introduction

Recent research in metropolitan cities along side increase in population there's large scale of vehicles on roads. Hence this results in annoying issue for the drivers to park their vehicles because it is extremely difficult to seek out a parking slot quickly. The drivers usually waste time and energy for parking their vehicles and eventually finding an area on streets through luck. In worst case, people fail to seek out any parking lot especially during peak hours and festive seasons. The paper also introduces the usage of android application using Smartphone for the interaction between the smart parking system and therefore the user. Moving towards smart city application, smart parking may be a exemplar for a standard citizen of how the Internet-of-Things (IoT) are going to be effectively and efficiently utilized in our daily living environments to supply different services to different users. Any citizen may use his Smartphone and a computer having Internet to access the smart city application from anywhere within the world to seek out a free parking spot within the city and obtain to understand the which parking spot remains available.

This paper emphasis on efficient car parking management through remote parking spot localization and fast car retrieval. Currently, Car parking system is predicated on reservation basis, but this technique features a drawback in terms of your time and space. This system are often used into multi-parking management which may be to manage both outdoor and indoor parking lot and single-parking management which usually targets indoor parking slots. the most objective of this project work lies on mono-parking management architectural system which works on real-time basis.

II Existing methodology

Smart Routing: a completely unique application of collaborative path finding to smart parking systems
To avoid increasing parking issue, the smart parking system helps to seek out the available

1964

parking spaces to the guidance. In many metropolitan cities, the up-to-date information are provided by parking guidance and knowledge system .Driver can know the knowledge through internet. the situation of obtainable parking lot spaces provided by the system supported the driver's current location or his destination. After the parking lot is reserved, the driver's route to the destination is traced by the worldwide positioning system. These leads to traffic jam , due to multiple users are directed towards an equivalent parking lot at an equivalent time.

A replacement Smart Car Parking System supported Optimal Resource Allocation and Reservations

In this system, a replacement smart car parking system is implemented. supported the user's distance from the parking lot the system assigns and reserves a parking lot for users , at each node It solves a Mixed Integer Linear Program (MILP) Problem . MILP supports random events like new user request and parking lot availability. It gives an answer in optimal allocation supported user current state information. When the allocation is updated in next decision point which make sure that there's no parking slot reservation and no user is allocate a parking slot with higher cost .This paper ensures that a far better response from the system along side reservations. the most advantages are guaranteed reservations and may receive a fast response from the system. The disadvantage is efficient for urban environment only.

The Research and Implementation of the Intelligent Parking Reservation Management System supported Zigbee Technology

Development of economy and city modernization level, traffic jam and parking has become the main issue. so as to beat this issue a sensible parking system using zigbee system has

been proposed during this paper. It sends requested information from user to PC and updates the database. The parking information is provided to the appliance layer by using the web to form it convenient for the people. It consists of mobile client and server side parking slot. In the web-service interface, the client requests the server for parking information. Then the server searches within the available database for the requested information and send to the client by the web-service interface. the important time update status is out there to the client. the benefits are simple and supported android. The drawbacks during this paper are costlier.

B Limitations of Existing System
• Car Parking is checked manually.
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• It is expensive as the light is ON the complete night.
• The requirement of man power is more and also checking should be done continually.

III Proposed method block diagram

The proposed system is that the combination of both hardware and software to make the module. Smartphone's are used to communicate the information . The algorithm is to defined the parking slot allotment in an initially selection & checking for car parking is formed from Smartphone or computer using Wi-Fi. Checks for availability for parking slots S1, S2, S3, S4.If parking slot is free, the actual slot on website are going to be Green. If all parking is full, all the slots on website are going to be RED and a crop up are going to be generated „Parking full". For sensing the temperature of parking lot , if it's greater than threshold, then pop are going to be "Temperature to high". For Light of parking lot , if it's but threshold, then crop up message are going to be "Turn on Light".
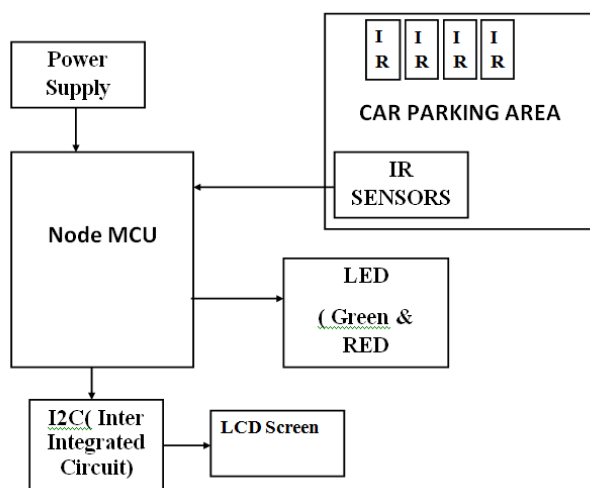
Fig 1: Block Diagram of Proposed System

a. Algorithm For Proposed Method

The parking lot is provided with digital infrared sensor and is permitted to sense the parking lot continuously. Whenever it detects the presence of vehicles in parking lot, it will generate event on presence of vehicles to the LCD that parking slot is full. When the Sensor detects that there is no vehicle at parking slot is it will generate event on absence of vehicles to the LCD that parking slot is Empty.. The Node MCU is Connected to the Near Hotspot, from their the data is send to the Cloud. The User Can check the Parking slot status in Mobile. The flow chart of master module is as shown in Fig 2
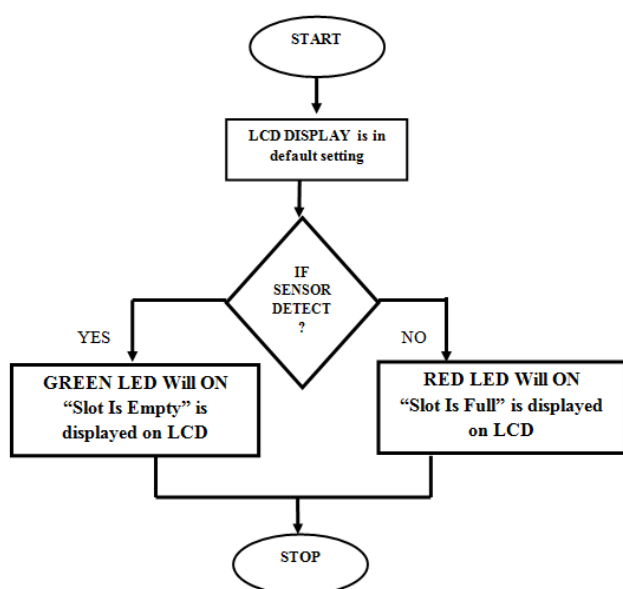

Fig 2 : Algorithm Of the Systems

IV Hardware Design Overview

The Monitoring Parking Space Vacancy System consists of IR sensor module, Node MCU, GUI display (Mobile) and LCD Every parking lot is installed with digital infrared sensor which is function to monitor the parking area. The digital infrared sensor and Node MCU are interfaced. The parking lot status is updated and transmitted continuously to the master module. There is UART communication happened between Zigbee and microcontroller. Consequently, master module will have Zigbee module interfaced with it function is to receive the transmitted parking lot status from Parking Lot Vacancy Monitoring Module.

a. NODE MCU

Fig 3: Node MCU ESP8266 Wi-fi Development Board

Node MCU is an open source development board and firmware based in the widely used ESP8266 - 12E Wi-Fi module. It allows you to program the ESP8266 Wi-Fi module with the simple and powerful LUA programming language or Arduino IDE.

With just a few lines of code you can establish a Wi-Fi connection and define input/output pins according to your needs exactly like arduino, turning your ESP8266 into a web server and a lot more. It is the Wi-Fi equivalent of ethernet module. Now you have internet of things (iot) real tool.

With its USB-TTL , the node MCU Dev board supports directly flashing from USB port. It combines features of WIFI access point and station + microcontroller. These features make the Node MCU extremely powerful tool for Wi-Fi networking. It can be used as access point and/or station, host a web server or connect to internet to fetch or upload data.

Features

1966

a) Finally, programmable Wi-Fi module.

b) Arduino-like (software defined) hardware IO.

c) Can be programmed with the simple and powerful Lua programming language or Arduino IDE.

d) USB-TTL included, plug & play.

e) 10 GPIOs D0-D10, PWM functionality, IIC and SPI communication, 1-Wire and ADC A0 etc. all in one board.

f) Wi-Fi networking (can be used as access point and/or station, host a web server), connect to internet to fetch or upload data.

g) Event-driven API for network applications.

h) PCB antenna.

b. I2C Module for 16x2 (1602) Character LCD

Fig 4: I2C Module

I2C Module has a inbuilt PCF8574 I2C chip that converts I2C serial data to parallel data for the LCD display.

These modules are currently supplied with a default I2C address of either 0x27 or 0x3F. To determine which version you have check the black I2C adaptor board on the underside of the module. If there a 3 sets of pads labelled A0, A1, & A2 then the default address will be 0x3F. If there are no pads the default address will be 0x27. The module has a contrast adjustment pot on the underside of the display. This may require adjusting for the screen to display text correctly.

Features:

a) Operating Voltage: 5V

b) Backlight and Contrast is adjusted by potentiometer

c) Serial I2C control of LCD display using PCF8574

Come with 2 IIC interface, which can be connected by Dupont Line or IIC dedicated cable

d) Compatible for 16x2 LCD

e) This is another great IIC/I2C/TWI/SPI Serial Interface

f) With this I2C interface module, you will be able to realize data display via only 2 wires.

c. IR sensor module

IR sensor module has great adaptive capability of the ambient light, having a pair of infrared transmitter and the receiver tube, the infrared emitting tube to emit a certain frequency, encounters an obstacle detection direction (reflecting surface), infrared reflected back to the receiver tube receiving, after a comparator circuit processing, the green led lights up, while the signal output will output digital signal (a low-level signal), through the potentiometer knob to adjust the detection distance, the effective distance range 2 ~ 10cm working voltage of 3.3v-5v. the detection range of the sensor can be adjusted by the potentiometer, with little interference, easy to assemble, easy to use features, can be widely used robot obstacle avoidance, obstacle avoidance car assembly line count and black-and-white line tracking and many other occasions.
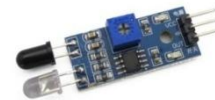

Fig 5: IR sensor module

Features of IR sensor module:

a) When the module detects obstacles in front of the signal, the circuit board green indicator light level, while the out port continuous output low-level signals, the module detects a distance of 2 ~ 10cm, detection angle 35 °, the detection distance can be potential adjustment with adjustment potentiometer clockwise, the increase in detection distance; counterclockwise adjustment potentiometer, the detection distance decreased.

b) Detection, target reflectivity and shape of the detection distance of the key. The black minimum detection range, white maximum; small area object distance is small, a large area from the large.

c) The sensor module output port out can be directly connected with the microcontroller io port can also be driven directly to a 5v relay; connection: vcc-vcc; gnd-gnd; out-io.

d) The comparator using lm393, stable.

e) 3-5v dc power supply module can be used. When the power is turned on, the red power led is lit.

f) With the screw holes of 3mm, easy to install.

g) Board size: 3.1cm * 1.5cm.

h) Each module in the delivery has threshold comparator voltage adjustable via potentiometer, special circumstances, please do not adjust the potentiometer.

Interface(3-wire):-

a) V_{cc} external 3.3v-5v

b) Gnd external gnd.

c) Out board digital output interface (0 and 1).

d. LCD Display

This is a basic 16 character by 2 line Alphanumeric display. Black text on Green background. Utilizes the extremely common HD44780 parallel interface chipset . Interface code is freely available. You will need Minimum 6 general I/O pins to interface to this LCD screen. Includes LED backlight. Works in 4bit and 8 bit Mode.
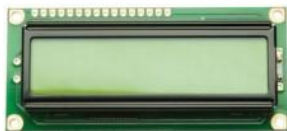

Fig 6: 16x2 (1602) Character Green Backlight LCD Display

Features:

a) 16 Characters x 2 Lines

b) Green Backlight

c) 5x7 Dot Matrix Character + Cursor

d) HD44780 Equivalent LCD Controller/driver Built-In

e) 4-bit or 8-bit MPU Interface

f) Standard Type

g) Works with almost any Microcontroller

Blynk

Blynk is implemented for the Internet of Things. It can determine hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things. There are three significant components in the platform.

Blynk App - It enables to exist amazing attachment for your projects using various widgets we provide.

Blynk Server – It provide the communications between the Smartphone and hardware. We can use our Blynk Cloud or run your private Blynk server is a open-source, can handle million of devices and it can be invented on a Raspberry Pi.

Blynk Libraries - It is used to survey the communication with the server and process all the incoming and out coming commands.

Blynk works over the Internet: The hardware you choose should be able to interlink to the internet. Few boards, like Arduino Uno will utilize an Ethernet or Wi-Fi safeguard to communicate; others are already Internet-enabled: like the ESP8266, Raspberry Pi with Wi-Fi dongle, Particle Photon or SparkFun Blynk Board. Adafruit server is used to connect directly to cloud platform and interlink a wireless connection to mobile phone it can notice LED lights are switched in a room. so that power consumption is reduced.

Advantages

Low cost

Easy installation in parking slot.

Full Automated

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IV Results

Fig : Initialization of the Kit

Fig : Messages showing both Slots are Full

Fig : Messages showing Slot 1 Full & Slot 2 Empty

V Conclusion

In this paper, smart parking system using Internet of Things (IOT) is discussed. the typical waiting of users for parking their vehicles is effectively reduced during this system. This study has proposed a parking system that performance for minimizes the prices of moving to the parking lot |car parking zone"> parking lot and reducing the amount of users that fail to a parking space. the typical waiting time of every car service becomes minimal, and therefore the total time of every vehicle in each parking lot is reduced. This smart parking system provides better performance and reduced traffic jam . Security measure to make sure that the user"s don't misuse the parking system are often implemented

VI References

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