

Auto Parking System

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Abstract— Now a day’s problem of car parking is occurring in big cities. Sometimes we have to pay for parking or want to give a key to guard to park the car and sometimes people avoid bringing their own car with them because of car parking issue. To overcome this problem, our proposed prototype system of “Auto parking system” will be useful to eliminate unnecessary time conception to find empty slot in car parking field and also it will park the car automatically. We are planning to use different advanced techniques like IoT and Google etc. By using advanced techniques a voice command is giving to car then it will park itself to the nearest parking slot. We are planning to implement the system with minimum time and moderate efficiency.

Keywords: Arduino, Google, Internet of Things (IoT), self-driving car, Controlled parking, sensors, Auto parking system (APS)

I. INTRODUCTION

Internet of things was first introduced in 1999 at auto ID center and first used by Kevin Ashton. Shortly IOT defined as things present in the physical world or in an environment are attached with sensors or with any embedded system and made connection to network via wired or wireless connection[4]. Currently, the common method of finding parking space is manual where the driver usually finds a space in a street through luck and experience and due to that traffic problem issues are created. The motivation for this project is provided by the need to reduce traffic in urban cities carried by vehicle for parking. By considering impact of advanced vehicle system on environment the wastage fuel energy issue has to be optimized for the betterment of living things.

In development of traffic management system an auto parking system is going to be created to reduce the cost of hiring people and for optimal use of resources for car park owners [3]. It is consisting of smart machine which communicate interfacing with other machine, environment object. And also it incorporates to connect any two machines, machine to machine and vice versa etc. We can do better, because the car can move without human intervention [6].

This will lead to improved utilization of parking space and would minimize the time to move car in and out of the parking space. A few existing parking systems which use sensor to collect information like video sensor in parking system are expensive [2]. So our aim is to develop a cost effective system with better performance.

II. BASIC METHODOLOGY

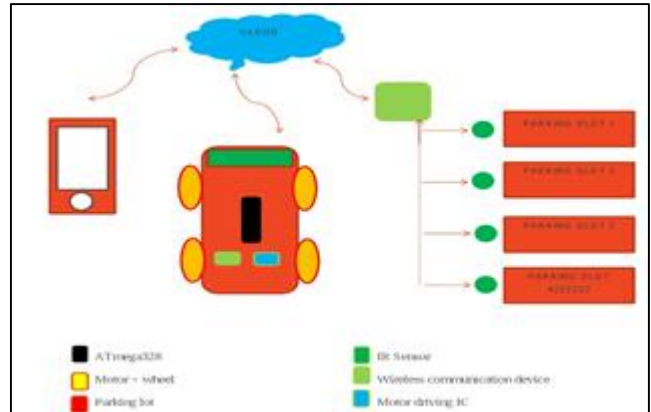


Fig. 1: General Block Diagram of Auto Parking System
The methodology adopted is illustrated in above block diagram. It has major components namely Wi-Fi, Arduino, sensor and L293D motor driving DC motor etc.

In this work we proposed to develop the Auto parking system in which, with the help of Google voice search technology we are giving a voice command through a smart phone to a car. Then it will broadcast the request over the cloud and then towards the parking system.

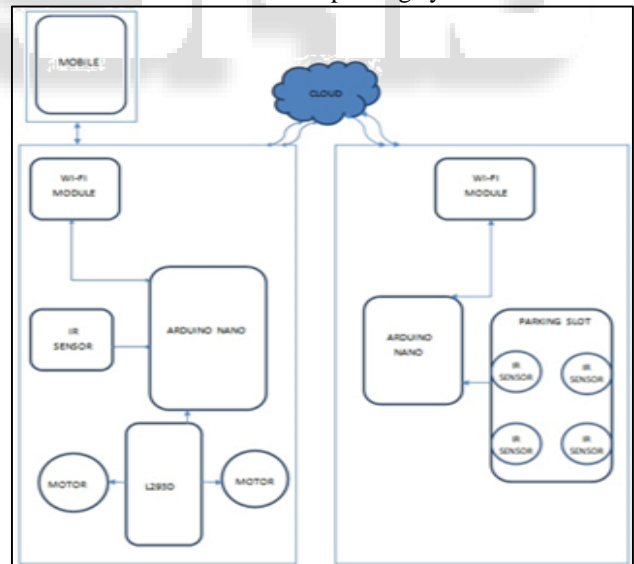


Fig. 2: Hardware Block Diagram of Auto Parking System
Cloud is nothing but server which store information data. It receives and delivers data to car and parking slot. The communication between cloud and parking slot or car takes place with the help of wireless communication device (WIFI module). For processing data Arduino can be used. Arduino is a controller and it can sense the environment by receiving input from a different sensor and can affect its surrounding by controlling lights, motors and other actuator. Parking system will give acknowledgement that how many free slots available and this can be done by different sensors available

at parking slot like IR sensor, so the car will get automatically park over there.

After all working stage of project it is necessary to known the hardware and software technique:

A. Hardware Based Technique

1) L293D:

The motor driver IC which boosts the current for the motor from the external power source, the L293D has C-MOS logic which rotates motor either in clock wise or in anti-clock wise manner.

2) IR module:

The IR module consists of LED and photo diode. Basically IR sensor gives analog output but we have less number of analog pins in Arduino Nano therefore we need to convert it into digital form, so here we have used op-amp in open loop gain state. Op-amp simply compare 2 inputs if photo diode has greater voltage than the pre-set voltage then op-amp gives output as logic one else logic zero. So this module we used in parking system to detect the car and make output as digital signal.

3) PCB design:

PCB design is used to save complexity happening due to bunch of wires. Due to PCB fault finding get easier and there are some drawbacks of PCB that we have to take care while designing. Make sufficient distance between track to avoid capacitance, avoid sharp angles or it will act as antenna and emit radiations.

B. Software Based Technique

1) IR sensor array:

IR sensor array is used to sense the line and follow the path. Basically accord to the phenomena of the reflection of light, that is white body reflect all the light and opposite of that black body absorb all the light, since because of this concept we came to know that where the line is present and where to go.

2) Wi-Fi module:

Wi-Fi module works on AT commands which are globally adopted by all wireless communication devices. It has different modes that is station, access & both since this is the only device in our project used to make hand shaking communication between other devices.

3) Arduino Nano:

Arduino Nano is smaller, tiny and faster controller which control all over the applications as per our program. It is programed like it will self-learn the entire environment and execute according to conditions.

4) Blynk:

Blynk provide the free source or open source platform to make a mind blowing IoT projects they have their own server and other stuff which provide faster communication between real time changes and hardware.

III. CONTROLLING ACTION

The controlling action for robot is done by the devices which are mostly used:

A. Using Arduino:

Ardino is known as open source platform for electronic projects. It contains a physical circuit board which is known

as microcontroller and software that will interact with programmer or integrated development environment (IDE) which runs on our computers and use for writing and uploading the computer code to the board. The Arduino Duemilanove board comes with either 1 of 2 microcontroller chips, the Atmega328. Of these 2, the Atmega328 is the upgrade, more advanced chip. Unlike the Atmega168 which has 16k of flash memory and 512 bytes of internal SRAM, the Atmega has 32k of flash program memory And 2k of internal SRAM.

B. Arduino for Car:

Firstly it receives data from Google assistance of user's mobile, according to that it request to cloud for finding parking slot. It collects data from IR sensor and helps to moving the car as per line follower.

C. Arduino for Parking Slot:

It takes request from cloud and collect data from IR sensors which are available in parking slot and respond to the cloud.

IV. COMMUNICATION TECHNIQUE

A. Wi-Fi:

Wi-Fi is a wireless local area networking technology used in devices based on the IEEE802.11 standard. Wi-Fi can be accessed or used by the devices like desktop, laptops, video games consoles, smartphones, tablets, smart TVs, digital audio player, modern printers etc. These connect to internet through WLANs or wireless access point i.e. hotspots (It has range of about 20 meters indoors and greater range outdoors.). Hotspot coverage small as single room whose walls are blocked by the radio waves. Wi-Fi mostly operates on 2.4 GHz (12cm) UHF and 5.8 GHz (5cm) SHF ISM radio bands.

V. LITERATURE REVIEW

Followings are some reference papers-

In 2010, L. Atzori, A. Iera, and G. Morabito, "The Internet of things:

In this paper, starting from the idea that "growing nations demands advanced technology of an Internet of Things (IOT) that could, like the presence of Internet will contributes economic development" [7]

In March 2012 T. Taleb and A. Kunz, "Machine Type Communications in 3GPP Networks: Potential

In this paper, it will connect a number of MTC devices to the Internet and other networks, forming the so-called Internet of Things (or Internet of Objects) MTC services that require immediate and reliable delivery of data to distant MTC Servers [6].

In Sep 2013, Y. Geng and C. G. Cassandras, "New 'smart parking' system based on resource allocation and reservations,"

In this paper, system will be explicitly allocated and reserves optical parking space to drive, as opposed to the simply guiding them. The allocation of parking slot tells to user for ensuring nearest destination and parking cost will decrease that the overall parking capacity is utilize effectively [5].

In Dec.2015,Basavaraju S. R. “Automatic Smart Parking System by using of Internet of Things (IoT)”.

In this Paper, The parking system is designed in such a way that it is applicable for covered parks, open parks and street side parking .System contain cloud service provider which provides cloud storage to store information about status of parking slots in a parking area .They use Raspberry pi microcontroller to implement system and it is attached with raspberry pi camera which having more cost. System provides effective solution to reduce carbon footprints in the atmosphere. It is well managed to access and map the status of parking slot from any remote location through web browser [4].

In Aug 2015, D.-J. Deng A Cloud-Based Smart-Parking System Based on Internet-of-Things Technologies Received

In this paper a system is a prototype with wireless access in an open source physical computing platform based on Arduino with RFID technology using a smart phone. They

use GPS for location in system, but it has a limited operating range [3].

In Oct 2016, Shahrz Tariq, Hyunsoo Choi, C, N. Wasiq, Heemin Park “Controlled Parking for Self-Driving Cars”

In this paper car can communicate with each other make decision on their own so they have lot of more information to process and make more intelligent decision based on that information. The autonomous car will try to find the available parking slot just by moving through the parking lot and when it find an empty parking slot, it will itself there[2].

In June 2017,Amitha M.S,Arpitha A.M,Geetha S, Raviraj M,Chetana “IOT based Smart Parking System”

In this paper the IoT allows object to be sensed as well as remotely across existing infrastructure of network , creating more opportunities for direct integration of physical world into computer based systems [1].

Author & year	Paper title	Technique used	Advantages	Disadvantage
L. Atzori, A. Iera, and G. Morabito, 2010.	The Internet of things: a survey	IoT	IoT system has allowed a greater flow of information which in turn allows people to make better decision.	There are several opportunities for failure with complex system.
T. Taleb and A. Kunz	Machine Type Communications in 3GPP Networks	IoT	Billions of devices being connected to each other.	Only small amount of data exchanged.
Y. Geng and C. G. Cassandras, Sep. 2013.	New smart parking system based on resource allocation and reservations	GPS	System reduces the average time to find parking space and parking cost.	Bluetooth has limited range.
D.-J. Deng, September 23, 2015.	A Cloud-Based Smart-Parking System Based on Internet-of-Things	IoT,GPS	Cloud is used as a server.	GPS for location in system.
Basavaraju S. R. 12, December 2015.	Automatic Smart Parking System using Internet of Things (IoT).	IoT,GPS, Wi-Fi,RFID	It is well managed to access and map the status of parking slot from any remote location through web browser.	Pi camera is used which having more cost.
Shahrz Tariq, Hyunsoo Choi, C, N. Wasiq, Heemin Park October 9-12, 2016	Controlled Parking for Self-Driving Cars.	GPS	Car can communicate with each other make decision on their own.	In that they used the java and c language.

Table 1:

VI. CONCLUSION

In this paper an attempt to develop a proto type of IOT based Auto Parking System for making efficient parking manageable .It is well managing to access and map the status of parking slots from any mobile through Google assistant.

Thus it reduces the risk of finding the parking slot in parking area and also it eliminates unnecessary traveling of vehicles across the field parking slots in city. So this system may be useful for reducing energy, fuel and time.

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