

## Smart Parking System using IOT

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**Abstract:** - Now a days growth of population are increasing very highly as that comparing numbers of car owner are also increasing. In our country many cities had developed and some of them will smart cities. In smart cities we require smart technology. As like smart parking system which gives information about parking slot availability on your android mobile phone. Because people waste most of time for chasing free parking space.so people face to traffic problem, sound and air pollution and for searching parking slot they waste fuel. So proposed system gives the solution on that problem. It gives real time information about free parking space on your android mobile before arrival your destination. From that system we can avoid traffic congestion, pollution, waste of time and fuel.

**Keywords:** - ATmega32A microcontroller, IR sensors, Android app, Wi-Fi, smart parking system

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### I. INTRODUCTION

Smart parking system are very important in smart cities because finding of free parking space is big challenges for car drivers or owner. Reason of this problem is large numbers of car owners in the country. It becomes create air, sound pollution and traffic congestion and waste of more fuel. So our project gives the solution of that problem. It will has informed to driver in advance about the free parking slot on your mobile app.

For implementation of project we have used microcontroller ATmega32 which is AVR family controller. It has 32 digital input and output ports Microcontroller having 40 pins. A 56 KHZ signal is generated by a microcontroller program. The microcontroller program is loaded on 40 pin ATmega32 microcontroller .We have used IR sensors (Infrared sensors). Here we have used 8 IR sensors pairs. IR sensor basically has one IR transmitter and one IR receiver. IR LED emits infrared light. Infrared LED which runs at a speed 56 KHZ. This system works on DC 5 volt input supply. These sensors are used for monitoring the vacancy of parking slot. Sensors are cheap in cost and it uses very less memory as compare to camera hence we used IR sensors. These IR sensors would sense light and give the notification to the controller about the slot are empty or full. Light is not received by receiver then it considered as slot is occupied. The android application simply designed to show the availability of parking slot before client arrival to the destination. Mobile app is connected to server using apache web server.

### II. LITERATURE SURVEY

Paper [1], proposes a navigation method that reduces traffic congestion time by using real time information about parking slot. This paper had used many algorithms for allocating vehicles to available parking slots simulation based evolution is done. Paper [2], Available parking slot detection and tracking system is proposed that fuses the sensors of an around view monitor (AVM) system and an ultrasonic sensor based automatic parking system. This helps drivers to select available parking slots and support the parking control by updating the information about parking slots.

In paper [3] real time monitoring system for parking space for parking space management services proposed a system which provides information to user about available parking slots and support the parking control by updating the information about parking slots.

In paper [4] Design and implementation of smart parking management system based on RFID and internet proposed a parking managements by using RFID tags and internet connection. Availability of parking space problem is solved by this paper.

### III. PROPOSED ARCHITECTURE

#### 1. System Overview

The smart parking system is a concept to provide the real time availability of parking slots, in which driver can see a slit few minutes ago or any time before arrival at the destination. This system consist of IR sensors to monitor the empty space for parking

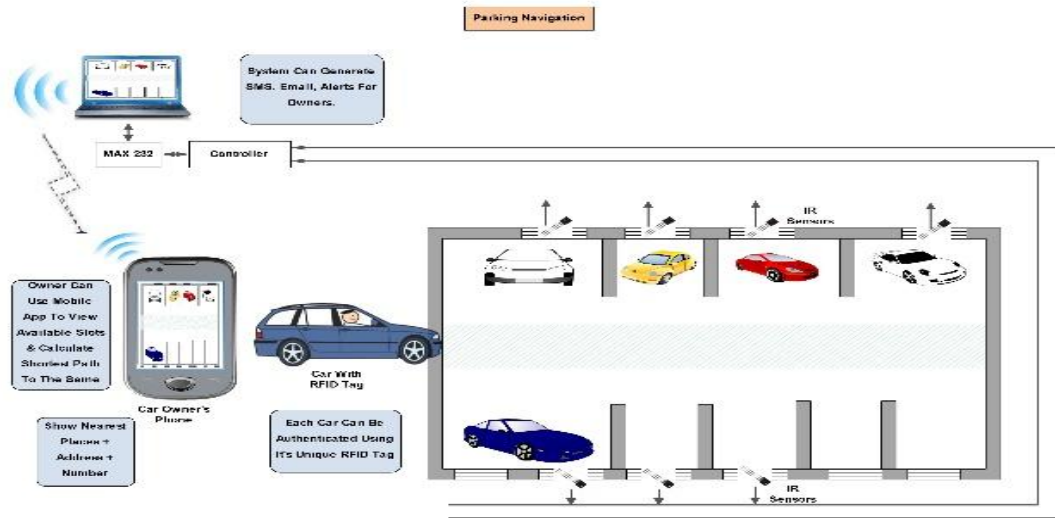


Fig 1 Parking Navigation

In this system the user could able to see on a android application which is already installed in his android mobile for the convenient and available space

After logging into system, the user will check the availability. Information regarding parking location will have given to the user via notification.

#### 2. System Architecture

The architecture of smart parking system consist of various elements , ATmega32 A microcontroller, IR sensors, connectivity through Wi-Fi , android mobile application , step down transformer for power supply, personal computer(pc) which act as server

### IV. ARCHITECTURE BUILDING BLOCK AND WORKING PRINCIPLE

#### 1. IR sensors [Infrared sensor]

IR sensor are consisting IR transmitter and IR receiver which is used to detect the objects and obstacle in between transmitter and receiver , when the car comes on the parking slot, sensors read and check threshold and detect the vehicle .IR sensors are connected to ADC channel of microcontroller and microcontroller reads values from it and send via serial communication.

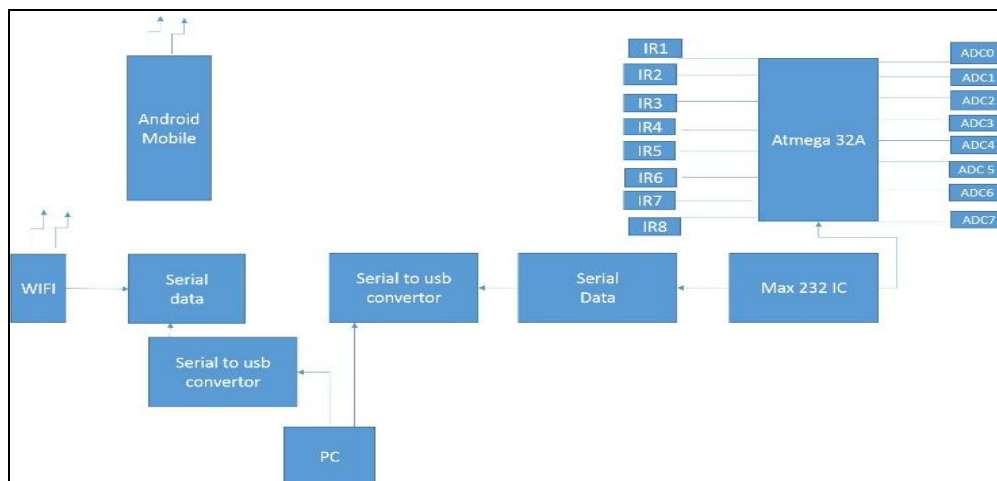


Fig 2 Block Diagram of smart parking system

## 2. Power Supply

In power supply section here we used step down transformer which input has 230 V/AC from main. It gives output 0-15 volt step down voltage which is apply on microcontroller PCB here we use bridge rectifier which is convert AC voltage in to DC voltage. This project is work on DC 5 voltages.

## 3. ATmega32A

This is AVR family microcontroller for this system. We used ATmega32 microcontroller because in this microcontroller has built-in ADC port A 8 channel 10 bit. So microcontroller gives the state of parking slot from IR sensor signal and send information through the computer via serial communication.[8]

This is high performance low power AVR-8 bit microcontroller

Advanced RISC Architecture

- 131 powerful instruction
- 32 x 8 general purpose working register.

Nonvolatile program and data memory

- 16bytes of Zn-system self-programmable flash
- 512 bytes EEPROM

Endurance 10,000 write / Erase cycle 1k byte Internal SRAM

Peripheral features

- Two 8 bit 1mer counter
- One 16 bit Timer counter with separate pre scalers
- O- 8 MHZ speed for ATmega 16L
- O- 16 MHZ for ATmega 16
- 32 programmable I/O liner

## 4. Personal Computer

Personal computer work as admin which is take input data for microcontroller via serial communication which inform parking slot empty or full how many and provide the information about availability to user

## 5. Android Mobile App

Android mobile app is the easy way to known about the parking space availability as user can check before reaching destination and save time and fuel. User need to have installed parking availability app on his android mobile.

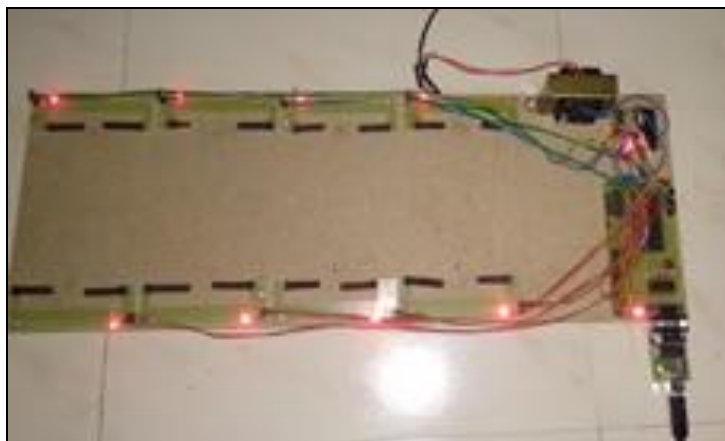
## 6. Connectivity

For connectivity we used Wi-Fi apache tomcat server for communication between mobile app and pc which work as admin server. So to see data on mobile app we have to enter the IP address of admin server

## V. RESULT AND DISCUSSION

Following figures shows the experimental demo setup of smart parking system for calculating real time availability. Figure 3 shows smart parking systems. After that figure 4 connection between hardware and pc by serial to USB wire and send continuous information update of hardware status (IR value) in database.

Example; slot available =0; Car parked=1;



**Fig 3.** Experimental setup car parking system

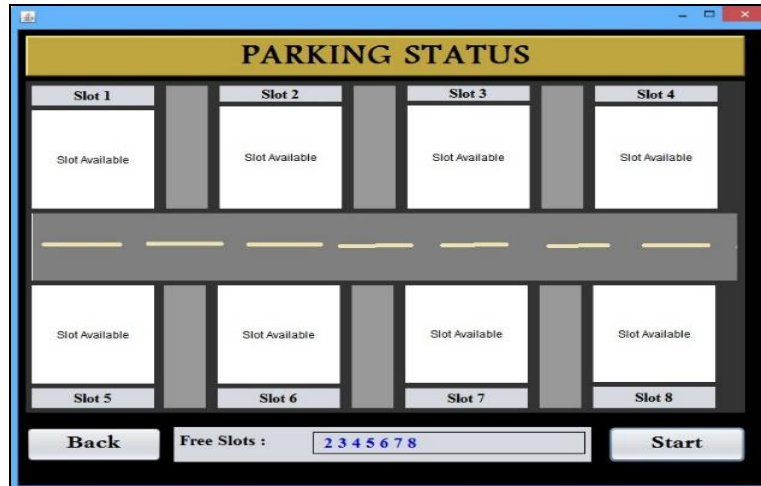


Fig 4 Real time status of car parking initial condition

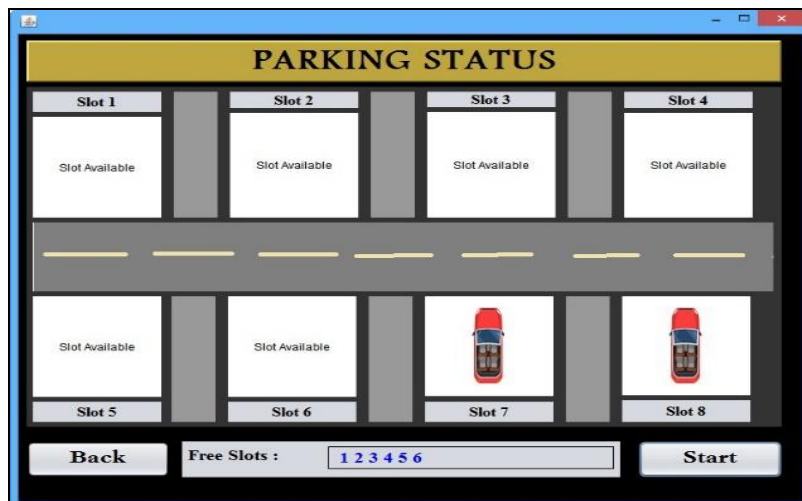


Fig 5 Praking status after 2 cars parked

## VI. CONCLUSION

Our system is based on IOT which takes real time values from sensor and pass it to server then server will pass data to mobile application. To provide the information of real time parking slot availability using ATmega32A microcontroller and also using Android mobile. Main aim of system is to give the real time information to user on his mobile app about available parking spaces before reach to destination or before few minutes and which also help to reduce pollution and traffic congestion which is created because of more time required to searching parking space. so advantages of this system is user friendly, easy to operate and it can save money, time, fuel future scope of this system to collect the real time data after implementing on real parking space and with help of that collected data we can predict the parking availability.

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