Parking Guidance and E-Book System Based on IoT in Smart Cities

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Abstract— Vehicle parking system is the major problem in now a days and leads to traffic congestion in urban cities. ln this paper present on smart e-book car parking system based IoT using mobile application. If the user can check the parking place in nearest availability and reserve the park slot tracking using mobile application. The mobile application will act as the user and the system. If the vehicle is not arrival in parking place at apportioned time the system can be send warning message to mobile number. The user can't give any response to system means apportioned slot will be cancelled automatically.

Key words: PIC Controller, Infrared Sensor, Wi-Fi Module, GSM

I. INTRODUCTION

IOT is used to communicate with the entire device by using the device are organized and scrutinized through the internet. IOT are Internet and Things Internet means is a vast global network of connected waitpersons. Things is a term used to orientation deed or knowledge. If is consists of web facilitate expedient is such as accumulating the data from contiguous environments using processor, sensor and other communication strategies. These device can be monitor and track using computer connected through internet.

There are different types of car parking system accessible in this environments. It's is mostly used to shrink the period and evade the traffic congestion. The types used in day to day life are by using cameras, parking slot space is become aware of the camera is immovable at car parks space props then another method is by using laser beams it identifies the crook and edict car parks situation. Then another method is by using dainty recognition and stretching sensors. Another method is based on the 3D reestablishment.

With the persisted proliferation of the vehicle accessibility verdicts the parking slot space accessibility is supplementary problematic. Car parking is the main problematic in Environments because of increasing the number of vehicles accessibility. Searching of parking interplanetary aperture from one place to another the cities is the predictable work. In smart car parks system the car parks aperture planetary statistics is accessible at the genuine period. It consists of genuine period statistics crew, low budget sensors and mobile phone empowered organizations. The suggested smart car parks system is realized using mobile application and the system by installing car application on their mobile phones.

In this tabloid Infrared sensor is used in every parking slot. The basic standard of Infrared sensor is the waves emitted by the transducer is reproduced hind from the article and received by the transducer. Therefore by using this sensor the user can able to comprehend whether the parking space slot is engaged or not. The infrared sensor is connected with the PIC Controller board. The obtained details are send to the server using Global System For Mobile Communication (GSM) from the PIC Controller board.wifi module is used to communicate counsel accessibility of the system from side to side mobile phone.

II. RELATED WORK

Zhou(18)searches for detection of parking space using laser line scanners. In this supervised learning technique is used to identify vehicle bumpers from laser range scans that the topological graph is created and them the parking space is identified.

Franke in 2002(14) proposed a 3D data based car parking place detection. In this iterative closet algorithm is used. by using this algorithm the vehicle pose and the number of vehicle parked in that parking area will be easily analyzed.

Ungerin 2014 (13) based on the image processing technique. In this video camera is used to find the vehicle and it's updated to the server then the infrared sensor is also attached to the parking area to detect the vehicle.

Vestri in 2005(11) has proposed a vision based point tracker algorithm also used. By using this technology reference set of 3D points is tracked and then monitor the tracked points. The average value is used for evaluation another process group 3D points to textured polygonal obstacles.

Alois knoll(9)proposed the parking space based on LIDAR sensor. In this system RANSAC algorithm and Kalman filter allows localization and tracking. LIDAR sensor is mounted on the moving object for tracking and detection of relevant object. LIDAR sensor measures distances between the sensor and its environment using laser rays.

Kepler in 2007 (22) uses 3D range camera for measuring spatial point. PMD sensor is used for detecting free space of a parking slot and also used to determine the optical clues about the distance of objects. A camera is used which scans the orthogonally scene to lateral axis of the car.

III. PROPOSED SYSTEM

The proposed system is to find the car parks space and reserve the park slot tracking using mobile application particular slot using modern technogies. If the vechile is not arrival in parking place at apportioned time the any response to system means apportioned slot will be cancelled automatically.

The block illustration of the proposed system. The system consists of PIC controller unit for the governing progression which has been interfaced through the Infrared sensor, power supply, mobile application and a GSM element. Infrared sensor is used to perceive the car parks aperture and regulate whether the car parks slot is available or not.

In this Infrared sensor is coupled to the PIC microcontroller nourishment. The sensor is connected to 5v supply. This substantiation is rationalized to attendant using

Global system for mobile application. The mobile application is act as a periphery in the middle of the system and the consumer.

The purpose of mobile application is to be responsible for statistics about the car parks astronomical obtainability and the user will book the car parks slot affording. Once the user book the aperture then the car is parked there that car details are referred to the proprietor mobile application along with the car plate number. If the vechile is not appearance in car parks place at assigned period the a few reaction to organization means apportioned slot will be cancelled automatically.

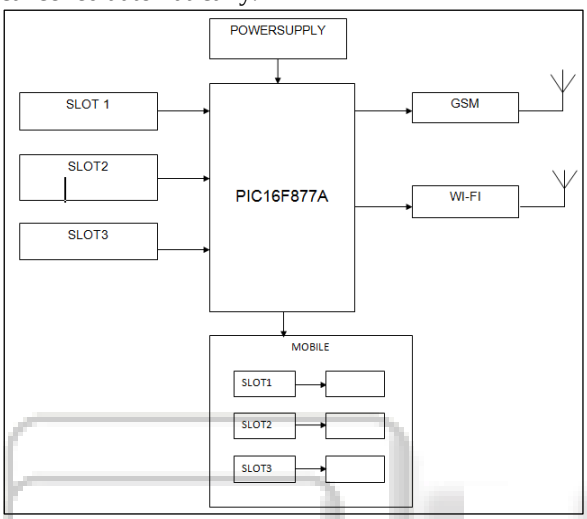

Fig. 1: Block diagram of smart parking system

Then at the termination the exploiter have to compensation the quantity based on the parking time by using mobile application. In haze database the user entry time and the going away time is recorded. Once the user will pay the amount then the owner will receive the notification about the amount paid and the number of car still in this parking area along with the car plate number. By using the mobile presentation the proprietor can able to recognize the car parks area statistics and the period the precise car using the vague car parks aperture based on the the aggregate paid by the user. The merits of shrewd car parks system is diminutive in the offing period at car parks place, protects fuel, conducted to adjoining car parks domicile, Carbon emission is concentrated.

IV. PIC MICROCONTROLLER

PIC Microcontroller is based on the statistics expanse. It has 14 digital input or output pins of which 6 can be used as Pulse width modulation as an output. 6 analog inputs, a 16 MHz quartz crystal, a USB connection, an ICSP legend and a rearranged button. The Microcontroller humbly connected to the computer with a USB cable or a power with an AC or DC supply .The PIC Microcontroller can be capable to communicate with the new microcontroller or PIC Mircro controller or with other computer. Its provisions Inter Integrated circuit and SPI communication.

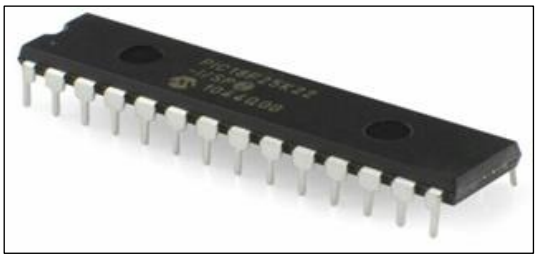

Fig. 2: PIC Microcontroller

V. INFRARED SENSOR

Infrared sensor diffuses Infrared waves obsessed by the air and detects the reproduced sprays from a commentary. The IR receiver can be a photodiode or phototransistor or several supplementary element to decode the signal. It is a non-touching base warmth measurement module essentials a power supply of 3.0v to 5.0 v and current ingesting is 23mA to 43mA, concealment assortment is 2cm to 30cm. It devours source and the receiver module.

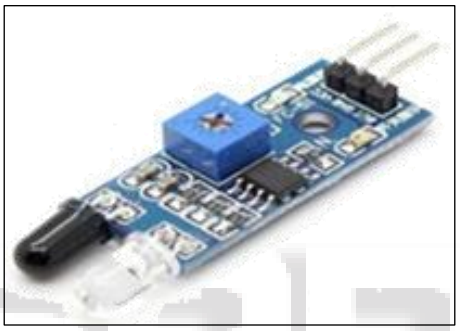

Fig. 3: IR Sensor

Infrared hurdle sensor is used in smart car parking system. It has three pins one pin is connected to 5v power supply, the second pin is connected to ground, and the third pin is connected to an output. It has on nourishment potentiometer that lets the user to regulate the revealing range. The sensor has very virtuous established reaction uniform in ample obscurity or in ambient light.

The infrared sensor module spontaneously distinguishes whether the signal is back if the signal is back at high level then sending Infrared signal.

VI. GSM MODULE

Global system for Mobile Communication provides wireless communication as well the authencation. The PIC controller is interfaced with the pic microcontroller board and allows GSM communicate over the network. GSM allows the user to send and receive the message. It consumes low power, high performance, small size and less weight. GSM SIM 900 operates at 4v to 4.5v.

It has configurable baud rate. For direct communication to the computer RS232 interface is used and it has inbuilt TCP/IP protocol. The GSM module is controlled by AT commands and low power consumption is 1.5mA then the operating temperature is -40c to 85c.The are eight pins in GSM module. First pins is the Rst it is used to reset module.

Fig. 4: GSM Module

VII. WI-FI MODULE

Wifi module is a technology for wireless local area networking with the devices. It include personal devices etc. Wifi compatible devices can connected to the internet via a WLAN. Hotspot coverage can be small as a single room with walls the block radio waves, or as large as many square kilo metres achieved by using multiple overlapping access points.

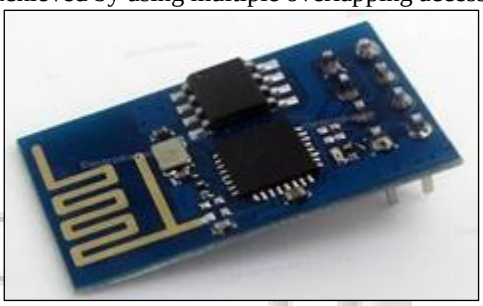

Fig. 4: wifi module

VIII. WORK FLOW

1) Install parking application on mobile device.
2) With the help of the application search for parking area around user destination.
3) Select the particular parking area.
4) Browse through various parking slot available in that parking area.
5) Select the particular parking area.
6) When the user leaves the parking are amount area will be paid by using the mobile application.
7) The payment information will be notified to the owner using the mobile application.

IX. RESULT AND DISCUSSION

The following images shows the result of the proposed system and the slot status details and booking status details and the ticket details.

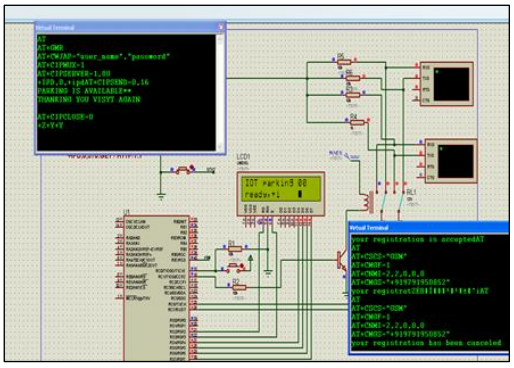

Fig. 5: Simulation result of the system

Fig 5 is the simulation result the parking place is detected by adjusting the potentiometer values .The output is viewed by using by the virtual terminal.

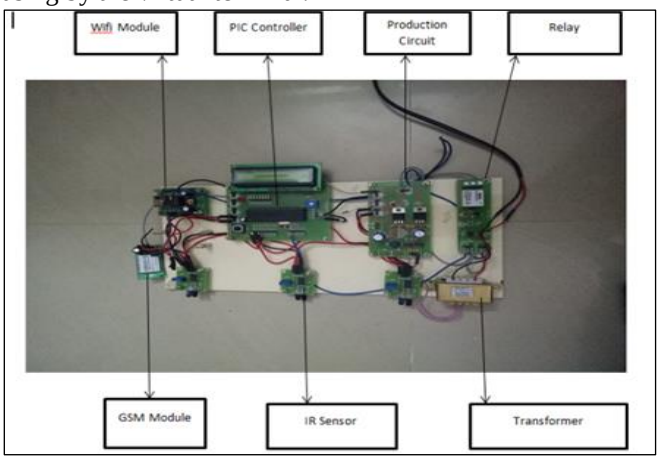

Fig. 6: Hardware setup in parking system

In hardware all the sensors are active when power supply is ON all the devices comes to exciting condition according to sensors information microcontroller acts and send details to control room via WIFI module and actions will be taken to control all thing.

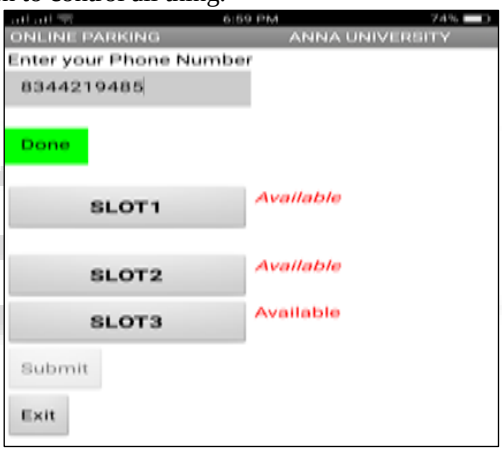

Fig. 7: Online Booking Status

X. CONCLUSION

The main intention of this prototype is to develop a car parking using internet of things. IOT is present trending area in internet used to access information remotely. Present days everybody uses smart phones and internet so online booking provide a solution to predicting the parking space issues and user can pay parking fee online the parking management provide a solution to perfect parking and reduces man power .This system is low cost low power consumption and more accurate and well suited for real time implementation.

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