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Parking Detection System Using IoT

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ABSTRACT: Now a days parking problems could be a massive challenge to facilitate traffic network and guarantee urban life quality. Checking out parking zone in most metropolitan areas, particularly throughout the frenzy hours, is troublesome for drivers. The issue arises from not knowing wherever the obtainable areas is also at that point. Therefore to beat this issue we want to develop AN IoT framework that targets Parking Management, however it's biggest challenges in trendy cities to develop on software package frame work. Therefore victimization embedded systems, there's an opportunity to develop AN application which might solve these issues. The planned sensible parking answer offers AN on-site preparation during which, IoT application monitors and indicate the provision of every parking zone. This method helps in improvising the management of parking system by following rules of the govt., for instance handling totally different parking areas within the town. Yet we tend with success detected the vacant parking zone within the static location. The info is change the knowledge concerning the vehicle. The intuition of presenting this paper is to cut back sensible town issue like the traffic on road and reduces the pollution within the town and therefore the parking.

KEYWORDS: Internet of Things; Raspberry pi;Wireless sensor network (WSN);AndroidSmart phones;Cloud;

I. INTRODUCTION

Currently, the IoT applications in our way of life square measure blooming, and there's additionally a growing trend within the applications of sensible cities which may facilitate in rising to cut back sensible cities problems. In sensible town we have a tendency to faces several difficulties whereas developing, to unravel sensible town problems we've to develop such system that is combination of the new technology additionally of low price and supported the various network combination of the web, like a telecommunications, broadcast, wireless and sensing element networks wherever net of Things (IoT) is base technology. One in all the main problems in a sensible town is that the Parking. A automobile parking space ought to give customers enough areas to park their automobile since automobile plays a large role in transportation, there's want of searching for car park to park the vehicles. By making a brand new system, it will facilitate manage and reducing the road traffic. a brand new system helps customers to save lots of time find a parking spot. the web of Things is concerning putting in totally different sensors like inaudible sensors; active and passive RFID, IR, etc. hook up with the web through totally different protocols for exchanging info and to speak, so as to attain observation, management. Using IoT, sensible town will be established by group action these options for IoT development. The web of Things (IoT) uses devices that square measure connected to every alternative and systems to gather the information by victimization embedding sensors, actuators and alternative physical objects.

RELATED WORK

Now a day's all the presently running application provides associate interface through a mobile, and desktops applications. They principally concentrate on finding the most cost effective and nearest automobile parking space through Google maps and that they don't give data regarding spot convenience [1]There area unit completely different models for parking management developed annually, largely they accommodates RFID-based, and wireless device primarily based ways. Improvement perform uses the individual node's battery energy; if node has low energy then improvement perform won't use that node. The cloud system accustomed store the info from every device on a usual, so cloud provides unlimited storage capability, that is low in price and it's on-demand storage capability [3]. Raspberry pi is flexible; it will use for general purpose computing[4]. During this paper, they need created parking system supported the

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wireless communication network that with efficiency manages time to search out parking lot in less time [5]. During this paper, they need created zone space management to manage over every parking lane and every one zones area unit connected through a central control unit [6]. during this paper, they need projected parking system victimization magnetic sensors [7] during a ancient means we've got to put in wired infrastructure for vehicle detection, however currently a day's victimization wireless device network through Zigbee networks we are able to install associate infrastructure. Zigbee network wirelessly communicates with a central server that has all data regarding the sensor's data[8]. During this paper, they implement a parking guidance device victimization RTOS and PIC32 controller. In this one microcontroller controls the 3 sensors at a time [9] they need used Free RTOS and RS485 communication protocol for sending and receiving information. Raspberry pi board contains System on a Chip (SoC) it means that it's a way of grouping all the helpful physics to run on the individual chip and it conjointly uses processor Broadcom BCM2837 for varied interfaces.

II. PROPOSED SYSTEM

We are using ultrasonic sensor algorithm is basically used for detection of an obstacle. If any obstacle comes in between the sensors that detects displays as result. We are going to set the distance, if the distance increases beyond particular range message will be displayed. This way the algorithm works.

The proposed system consists of three main phases:
A. On-Field Network
B. Cloud Platform
C. User side Platform

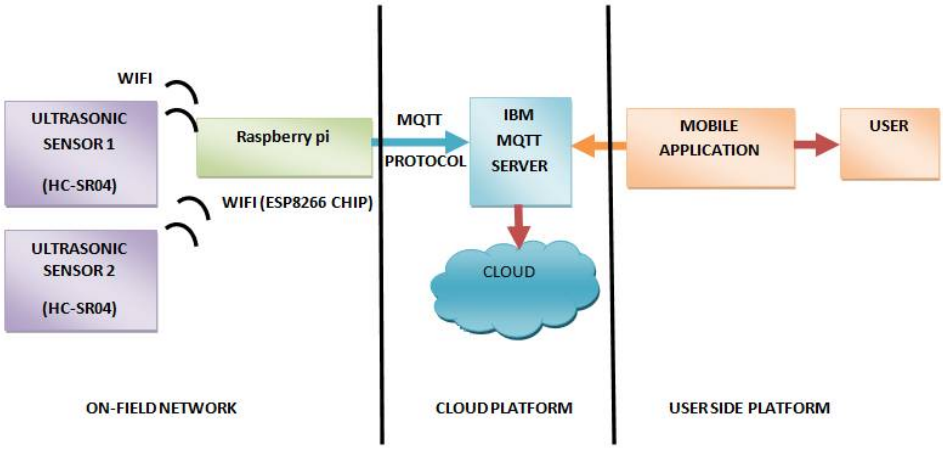

Fig1: Proposed System Architecture

A. On field network section

On field there will be one ultrasonic sensor for individual parking slot

1. Ultrasonic sensor:

A basic unhearable detector consists of 1 or a lot of unhearable transmitters, a receiver, and an impression circuit. The transmitters emit a high frequency unhearable sound, that bounce off any close solid objects. a number of that unhearable noise is mirrored and detected by the receiver on the sensor[5]. That come back signal is then processed by the feedback circuit to calculate the time distinction between the signal being transmitted and received.

2. ESP8266 WiFi chip

3. An ESP8266 chip is that the wireless fidelity chip, that are low in price. It's mall module that permits microcontrollers to attach to the wireless fidelity network.

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4. Raspberry Pi

Raspberry pi board is single board pc that is of MasterCard sized. It's many versions model A, A+, B, B+, zero. Raspberry pi board contains graphics chip and processor varied interface, program memory (RAM). Raspberry pi used as pc, needs keyboard for getting into commands, show further as power provide. The Raspberry pi three model B is best board.

B. Cloud Platform section:

MQTT MQ Telemetry Transport

MQTT represented as Machine to Machine (M2M)/ IoT property protocol. This protocol is light-weight weighted; it are often supported by smallest activity and display. MQTT is publish subscribe electronic messaging transport protocol that's optimized to attach physical devices and events with servers. MQTT is meant to beat the challenges of connecting the apace growing physical world of sensors, actuators, phones, and tablets with established computer code process technologies.

C. User side platform:

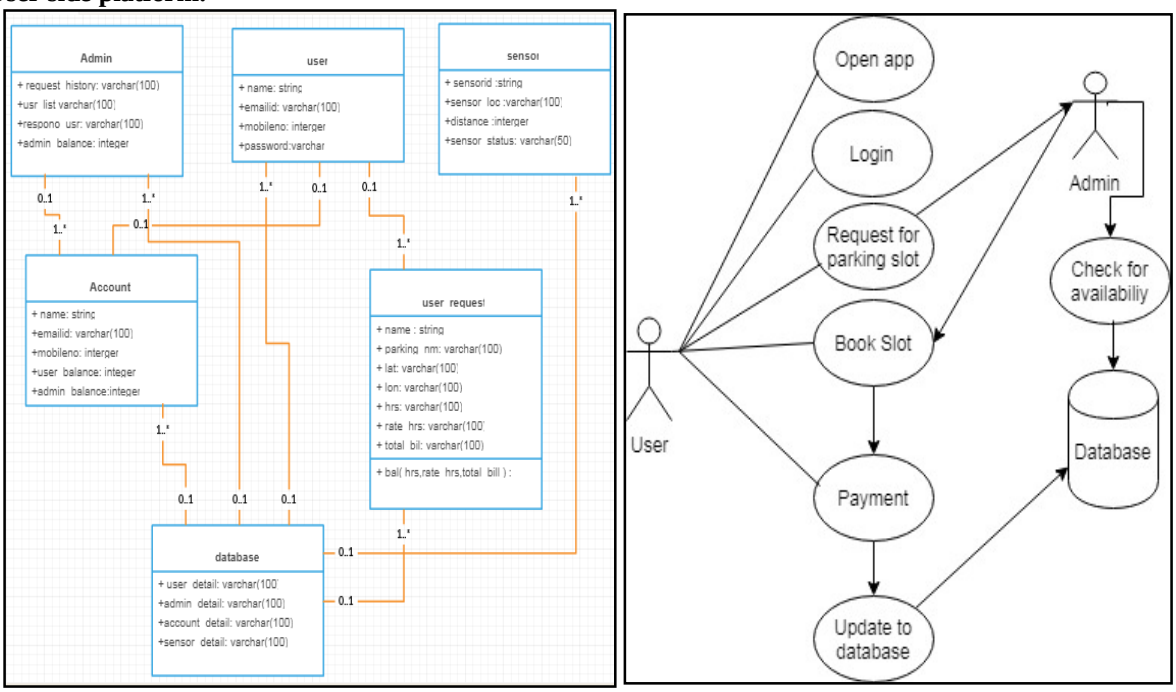

Fig2: User Side Flow Control

III. RESULTS

The system setup was implemented successfully in raspberry pi with ultrasonic sensors. The sensors were able to find out car detection by using HC-SR04 sensor. The data collected from sensors are wirelessly sent to the raspberry pi through ESP8266 chip. As raspberry pi connected to the internet so the data easily transfer to MySQL database.

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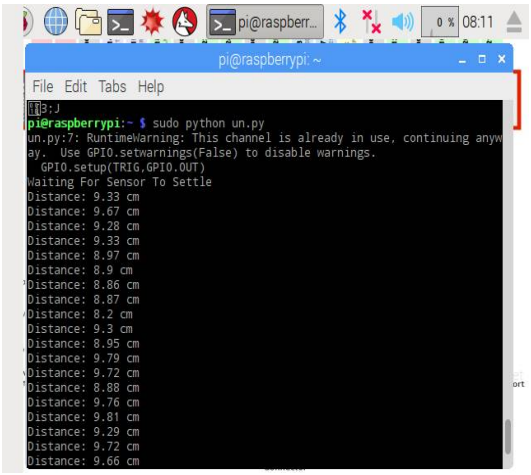

Fig 3: python output for vehicle detection

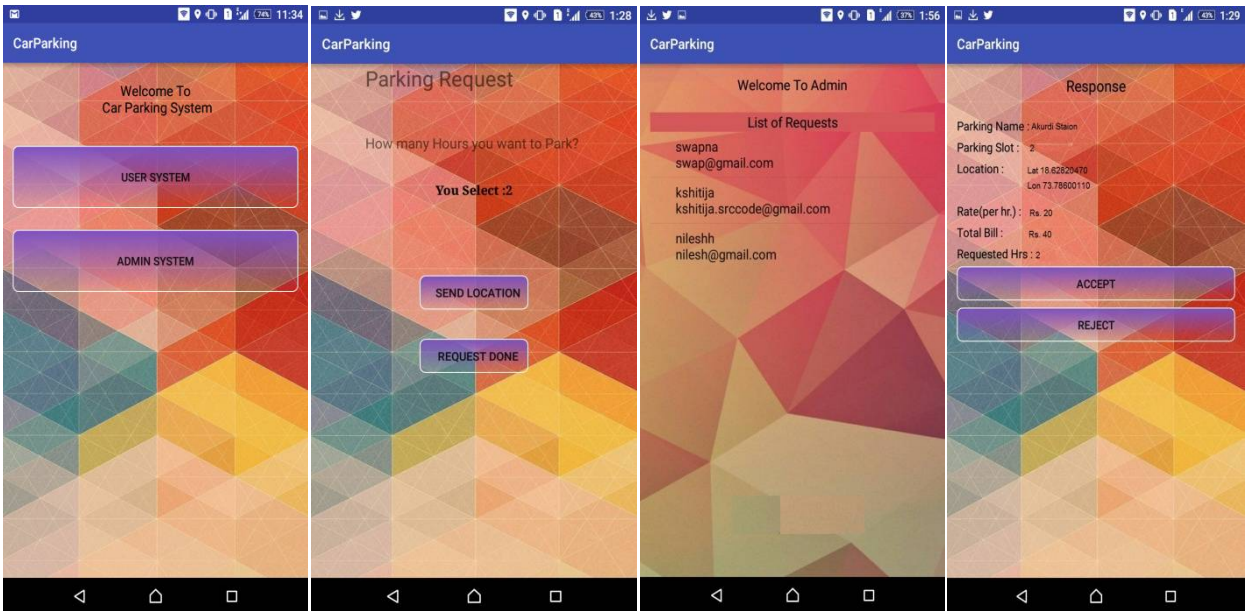

Fig 4: Car parking android app window

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Connectivity Steps:

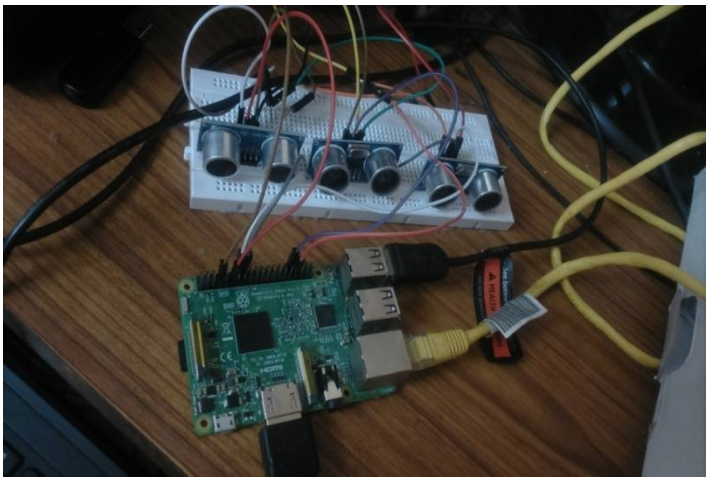

Fig 5: Experimental setup

Analysis:

Database tables:

Table 1:

Attributes:

Mobile no, Request history, Latitude, Longitude, Hours, allotted slot, parking id

Description:

This table contains user's parking information.

	Mobile	Request	Sname_id	Lat	Lon	Hours	Ekey	Book	alot_slot	pid	alot_park	Balance
	2147483647	1	*NULL*	18.64851234	73.65463600	4	b3a74477-b745-4481-ada0-523648	1	7	5	Pay Parking Chinchwad	40
	123456789	1	*NULL*	99.99999999	99.99999999	23343	8c2a5136-1ac3-4246-a71d-94759b	0	7			
com	9876543	1	*NULL*	12.00000000	45.00000000	5	a4077dbe-4e93-4a13-950c-e36003	0	*NULL*			
com	98765432	1	*NULL*	*NULL*	*NULL*	*NULL*	4c2e75e8-872a-	0	*NULL*			

Table 1: User's Parking Information

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Parking location information:

	id	name	lat	lon	tot_slots	avail_slots	rate
Edit Copy Delete	1	Akurdi Station	18.64859790	73.76463590	100	100	20
Edit Copy Delete	2	PCMC Akurdi	18.64899370	73.76499930	100	100	30
Edit Copy Delete	5	Pay Parking Chinchwad	14.64025670	78.65184500	100	100	30
Edit Copy Delete	6	Myles Parking	21.64025670	70.65184500	200	150	15

Table 2: Location Table

IV. CONCLUSION

This paper analyses different smart parking system available in literature and also proposes a solution based on the cloud. Using internet of things in a smart parking system it helps in reduction in consumption of fuel, it reduces traffic congestion in cities and cloud used for storing the information which is collected from the sensors.

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