Park-A-Lot: Design and Implementation of Parking

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***Abstract:-*The Internet of Things is addressing certain issues such as traffic congestion, limited vehicle parking facilities, fuel consumption, and road safety. The use of smart parking applications has grown more essential, particularly in urban areas. In this article, we present the Park-A-Lot parking management programme, which identifies parking spots throughout the city. Using a crowd-sourcing method, this app finds parking spaces locally and across the city. This app uses the user's phone's GPS data to locate the optimal parking space. This application allows users to look for parking spaces in various locations by utilizing GPS and an ultrasonic sensor to measure the distance between vehicles parked inside. The application that we have suggested is a mobile application that is linked to the cloud for locating a parking space in various locations. This software allows users to check the availability of .parking spaces in real time**

***Keywords:* Parking System, IoT, GPS, Ultra-sonic.**

INTRODUCTION

The concept of the internet of things began with the invention of objects that could communicate with one another. Remote computers that are linked to the internet were used to collect, handle, and monitor the various devices The Internet of Things (IoT) expands the usage of the internet as a means of communication. The terms "internet of things" and "things" are the two most important terms in this field. The term "internet" refers to a vast worldwide network that connects servers, computers, tablets, and smartphones via the use of protocols and connecting systems that are widely used throughout the world. The Internet allows for the transmission, reception, and communication of information [1].

It is possible to use a variety of methods to monitor and maintain parking lot occupancy. A variety of technologies, including ultrasonic distance sensors [2], magnetic sensors [3,], image processing [5, 6], and hybrid devices [7], have been investigated by a variety of academics. For this reason, we developed a new parking management system programme called Park a Lot, which has a mobile application interface that is readily accessed using any device such as an Android or iPhone and can be used from any location where there is internet connection. It is based on ultrasonic sensors and GPS technology for collecting position data and calculating the distance travelled by the vehicle. It informs car park visitors on the availability of parking spaces and directs them on where to park their vehicle.

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Parking lot occupancy monitoring in real time has recently received a great deal of interest. Because of the growing number of vehicles on the road, the likelihood of obtaining the best parking space diminishes. During peak hours, finding a parking space becomes much more difficult. There are certain issues to deal with, such as traffic congestion, a lack of vehicle parking spaces, and high fuel usage.

LITERATURE REVIEW

In this paper we discuss a problem about "Vehicle Parking", finding a parking spot in real time is difficult for vehicle user's now days especially in urban areas. There are many problems occurred it might be an increase in automobiles or a huge traffic. Due to which the possibilities of finding a parking spot in anywhere in the city is decreased and also during the peak hours, it becomes even harder to find a parking spot.

Several papers discuss the issue in different techniques, they proposed a system that detect the parking lot for different vehicle, the main reason behind this system is that they want to minimize the time of finding parking spot which cause fuel consumption, they proposed a system in which they implement a system for parking lot which detect a parking spot through wireless camera and sensor through wireless sensor network (WSN). A network of wireless camera nodes running a parking lot occupancy detection algorithm, using this algorithm they find a green spot for available parking, if they indicate a red color that means parking space not available[8].

Another paper proposed a system a cloud based parking system that user can find a parking lot for their vehicle using mobile application through this application a user also book their parking space. Data will be gather by multiple objects at remote location and communicate to units managing, acquiring, organizing and analyzing the data in the processes and services of the system. This application is connected to the cloud that shows the real time parking availability. Parking system they made use of sensors like Infrared, Passive Infrared (PIR) and Ultrasonic Sensors, to sense the parking area and determine whether a parking space is vacant or not[1].

when traveling on wheels started difficulties created ongoing problem to park vehicles into parking area. In Karachi city as population is increasing day by day, the numbers of vehicle are increasing very fast, as parking space is going very congested especially on any occasion or fest .Peoples face lots of problem to park their vehicles in parking slot. Finding available space which consumes lots of energy, wastage of precious time as well also cause frustration specially to find parking space. In order to reduce frustration, saving fuel,

time, energy we are introducing Car Parking System. This is going to help to manage cars in parking area in allocated position. It was introduced in 1999. As evolving this technology, to connect all the surrounding things over a network. There are no boundaries or limitation to define Internet of Things. It is defined to assume in an environment, connected with sensor or any system and connected to the network. Network may be wired or wireless. The Smart Car Parking System which is going to connect with other sub system in interacts with other machine. Smart Car Per g System based on three categories such as sensing, processing, and connectivity.

METHODOLOGY

We have proposed a park-a-lot management system application that detects a parking spot for vehicle in nearby and different location. This application uses user location and finds their parking spot by gathers GPS data of user phone to find their best parking spot in user given location.

A) SOA Based Model

Sensing layer
Sensing layer will be mobile GPS to detect location status of vehicle parking.

Network layer
Network layer will contain main cloud server that will update location and update predicted values to mobile members via Application, a mobile to social network is created.

Service layer
Service layer will include GPS fetching, estimation of parking places, estimation of blank spot that will be service divisions after this an integration model will integrate between module like GPS and estimation of parking places will fuse together to prepare layer for estimation of blank spots.

Composition layer
Composition layer makes it all fused to gather to provide a web service for android application that would be a sensor.

Interface layer
Interface layer will include mobile application and calling API services. In this application user can search the parking space in different location using GPS. Mobile crowd sensing (MCS) will help the user to track the live traffic updates using opportunistic sensing.

FLOW DIAGRAM OF PROPOSED MODEL

Fig.1. shows the proposed model where it gather the GPS data and calculating the travelling data.
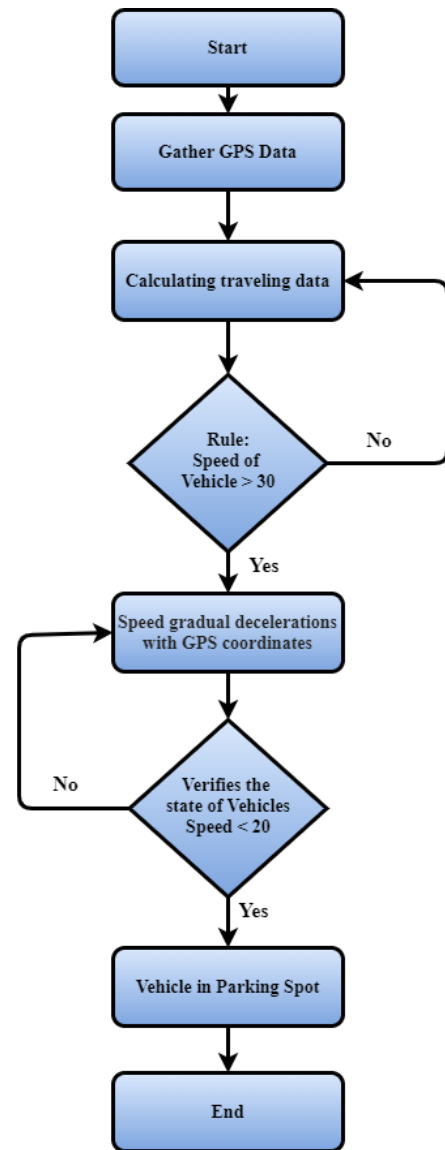

Fig.1. Proposed Model

ALGORITHM

Using approach of crowd sourcing, the application would gather GPS data of user phone and perform following steps:

see if data is traveling where rule = speed > 30 if moving and gradual decelerations, with GPS coordinates pointing at street or road. if step 2 verifies then it's a parking spot
This algorithm will mark all occupied spaces for parks, and thus new spots can also be discovered by daily use. Once these spots get again in moving status the other users who have asked to seek parking space in particular area can be alerted of possible empty space.

BLUETOOTH – IEEE 802.15.1

Roles and responsibilities implements when android phone communicate or interact with Bluetooth low energy device, in our situation parking lot application is play central role and parking location tracker play a peripheral role. Through this it will help the user to find the parking spot. It helps user to track their location and find the relevant device through application. In our application it will provide tracker of different location for vehicle parking and respond to the user if he founds any parking location available for user.

RADIO FREQUENCY IDENTIFICATION

RFID is an automatic data capture technology that uses radio frequency waves to read a moveable object to identify, categorize and track them accordingly.

Components in RFID

Tags/antennae

Reader

Tags have two types, with battery or without battery. Tags send data whenever it receive from reader, Reader read the data from write and sends it to the antennae for further action, In our system RFID installed to measure the distance of vehicle to parking slot which will be assign to the vehicle. After informing vehicle parking location for users, first check the available states of each slot in parking space are identified. It measures the spot area with car to be parked with ultrasonic sensors which is installed in parking area, if the parking space sufficient for car they assign a parking spot to the vehicle. After that the space of parking lot considers to be filled for other vehicle users.

COMPARATIVE ANALYSIS

Different papers discuss the same problem and they proposed different solutions. They proposed a system a cloud based parking system that user can find a parking lot for their vehicle using mobile application through this application a user also book their parking space. Data will be gathering by multiple objects at remote location and communicate to units managing, acquiring, organizing and analyzing the data in the processes and services of the system. Parking system they made use of sensors like Infrared, Passive Infrared (PIR) and Ultrasonic Sensors, to sense the parking area and determine whether a parking space is vacant or not[1]. Another paper discussing the same problem, they proposed a system in which they implement a system for parking lot which detects a parking spot through wireless camera and sensor through wireless sensor network (WSN). A network of wireless camera nodes running a parking lot occupancy detection algorithm, using this algorithm they find a green spot for available parking, if they indicate a red color that means parking space not available [8].

CONCLUSION

This paper discusses the problem of vehicle parking system. Finding a parking spot in real time is difficult for vehicle user's now days especially in urban areas. There are many problems occurred it might be an increase in automobiles or a huge traffic. Due to which the possibilities of finding a parking spot in anywhere in the city is decreased. So we proposed system, a smart application that find your parking spot in nearby and different location over the city. Application uses your GPS location to track your coordinates and according to your requirements they will suggest you a parking spot. This solution will resolve the issue of finding a parking lot in busy hours.

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