Smart Vehicle Parking Using IOT

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Abstract- *One of the principle issues in numerous enormous and swarmed urban areas is discovering parking spots for vehicles. With IoT innovation and portable applications, in this paper, we propose a structure and advancement of a genuine brilliant leaving framework that can give something beyond data about empty spaces yet additionally help client to find the space where the vehicle can be left so as to lessen deals in the leaving region. This paper provides a smart vehicle parking that help the user in finding the parking space and reduce time spent in searching for nearest available park. Likewise, it gives clients streets traffic blockage status. Also, the proposed framework gathers the crude information locally and removes includes by applying information sifting and combination procedures to decrease the transmitted information over the system. Then the transformed data is sent to cloud for processing and examine by using machine learning algorithm.*

Keywords- Internet of Things(IoT), Smart Parking, Distributed data analysis,Cloud data mining.

I. INTRODUCTION

The quick industrial development in the earth that directly effect in increase of vehicles. There is lack of places to park the vehicle. Nowadays we can see that there is a shortage of parking places in public places such as company, apartments, stadium, theater and many other places. Searching for vacant parking place is common problem during peak time like weekend, festivals,etc. It is common
that most of the individual has their own vehicle its resulting in increase of number of vehicle that directly effect in parking area. Additionally, in indoor vehicle leaves, more often than not is squandered on scanning for abandoned leaving place which likewise makes traffic jam. The circumstance turns out to be more awful when there are different leaving openings in each leaving path. Another issue is the air contamination brought about via vehicles in stop, be it in the open air or indoor vehicle leaves.

An important issue is considered is how to reduce data cost and how to save energy as well as provide real time information quickly. The idea of smart vehicle parking system is recently attracting more attention in many countries owing to the need for a new way of finding available parking places. The IoT provides the capacity to deal with such challenge, as it can be designed to capture sensors data for monitoring points of interest in smart cities.

Recently researchers have explored the potential use of the IoT in public transportation services and urban computing. Several models have been proposed to provide drivers with real-time information about available car parking bays nearby. Additionally, some of the, proposed solution to collect and send the data to the cloud processing center which determines the solutions and provides these back to the car parks. Only a few studies have been conducted where the data about available car parking on street parking was gathered more effectively.It was done by checking the road status if there was a traffic congestion or not and if the parking location was near the user. Adding on that someresearch papers proposed that, there is a need to develop a smart car parking that spaces in the nearest car parks to users while at the same time it makes users avoid the traffic congestion on user's way. The main contribution of this paper is as follows

(1).The data is collected from the different sensors in indoor parking and onstreet parking.
(2).The collected data from the sensor will be analysed and processed locally with the help of IoT devices.

It is proposed that a real time processing for the smart parking data is extracted from the sensors. The data will be evaluated by using machine learning algorithms, which in turn processes according to predefined conditions. In addition, the system includes mobile phone application that lets users easily check the nearest car parking with avoiding possible traffic congestion via Google API, which provides a real time reading of the traffic status. The cloud web service will collect the data from fog micro- controller distributed devices that are near users location to start analysing and processing data. Then the data will be transmitted to users to indicate the nearest available parking which offers the lowest traffic congestion. Therefore, the user will receive an immediate response from the cloud showing the number of available parking places represented in the map with the less crowded roads from users existing location

In Section 2 of the paper discuss the existing technology in the area of vehicle parking using IoT. Section 3 discuss about operation of the proposed system and the paper is concluded in Section 4.

II. THE LIETERATURE REVIEW

In previous works, there are several solution have been proposed in [1],[2],[3],[4] and [5] for improving parking process. Summary of each paper is discussed as follow.

In this paper [1] Kianpisheh et al. presented a smartparking system using ultrasonic sensors. For each individual car park, a sensor was fixed in the ceiling above each parking space. Ultrasonic sensors operate based on echolocation emits a sounds, which is reflected back to the sensor, the driver guided by LED display board.

In paper [2] a vehicle license plate method using neural network approaches are proposed. The propose schema utilizes a neural network chip name as CogniMem to detect vehicle license plate. The advantage of the system has high speed recognition time and stability than other systems. Processing of system, first it must collect car license plate images into the prototype store. When video stream captures car images, it will train data with calculate minimum distance to the influence field. If the system has not the prototype data store it can be misclassified and mistake license plate detection.

In [3] we reviewed a sensor based smart parking solution, described how it was deployed and its vehicle detection algorithm, and made a reliability analysis evaluating how many errors does the system has produced, the success and error rates and the most common kind of error produced in the long term. This effort to deal with external influence in the environment and wrong measurements. They tried to avoid increasing too much the amount of entries in the database by cloud does not store all readings or status determinations. We can use the result of the papers for avoiding increasing too much data in the cloud database, ultrasonic sensor it can detect other objects not just vehicle in range and the worst case ultrasonic sensor can also detect object that out of range for updating status states on each parking space.

In paper [4] the system integrate Cameras, AISEET IoT. Camera used to detect available parking slots,one camera can detect more than one parking slots. This conference, they tried to measure reliability detect available parking slots by using 3 different CNN models to analysis and detection.

In [5], focus smart phone based car searching for large parking IoT. They compare car searching method and determine easier method to implement and low cost. The system car-searching is searched QR code, integrates to identification the parking spots and smart phone built in sensor to navigate the path. The data format of QR code that included the parking lots, floor and parking location are pedometer based on smart phone .We can integrate the navigation system after on if we want to add navigation features. The advantage of the method are that is easy to implement. Cost is low.

III. PROPOSED SYSTEM

This section starts by describing the structure of smart parking. Parking slot includes sensor nodes in door parking or on street parking , microcontroller devices and smart car facilities. The second part includes cloud that act as mediator between car parking and user mobile application. The third part is the user side that is android application.

A. Overview

This system primarily collect the sensor data from all sensors ,ability to guide the user find the location of the parking spaces. This system that tell the user the nearest parking places from the current location. Another feature that gives information about free parking places if the user wants. The communication between sensors and the microcontroller is done through Bluetooth , its of lowest cost. The communication with cloud can be done through HTTP protocol. Here we included another feature that is user can do their payment by using mobile.

There are several steps to process the data in IoT including collection ,filter ,fuse, processing ,storing ,and delivering the data.The data filtrimng function filter the sensor data to reduce the amount of transmitted data. In addition, data fusion function aggregates and integrate the sensor data to provide with more comprehensive information and thus produce more accurate and meaningful information to users. Researchers have shown an increased interest in data fusion and filtering in the field of IoT.

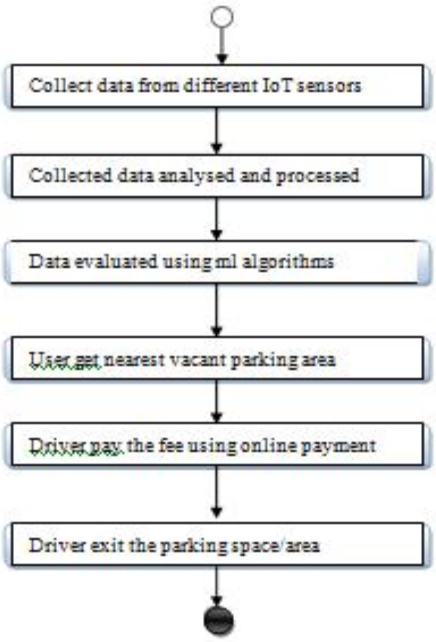

Figure 1. Flow diagram of the system

we use sensor to collect the data. The IR sensor that are used to find the obstacles. The output of the sensor are get passed to middle-wear microcontroller by using wireless communication. Then the collected data is get filtered and process the data locally. The cloud will receive the processed data from the microcontroller. By using machine learning algorithm it will find the nearest parking area and send the notification to the user mobile..

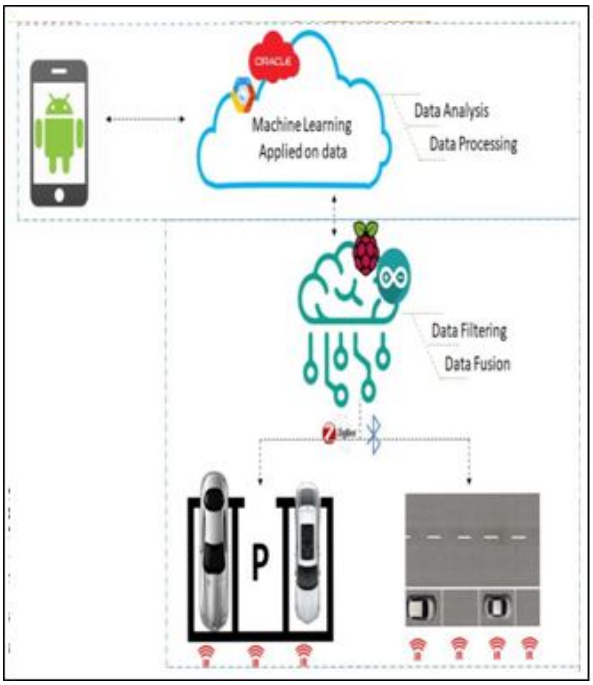

Figure. 2: Functionalities of Smart Car Parking System.

B. Architecture

a) The sensor : The IR sensor that will sense that whether any vehicle is parked in the parking slot. If any vehicle is parked then it will produce the red as the output and when there is no vehicle detected at that time yellow produced as output. The sensed data then passed to middle ware microcontroller.

b) *The microcontroller*: The microcontroller that receives the data from the sensors. This collected data is filtered and process the data locally. This step is important to minimize transmitted data over the network and save the energy. Then further processed data is transmitted to cloud using HTTP protocol.

c) *The cloud node*: The main task of the cloud is to process the received data with the help of Google Map and mainly apply machine learning algorithm to process the data and store them. Next work is to pass the information to a users mobile.

IV. CONCLUSION AND FUTURE WORK

This study has proposed the smart parking of vehicle that improves the performance of the already existing system and help to find the vacant places more easily and efficiently. It removes the waiting time in searching of parking slot , which internally reduces the fuel loss. Further avoiding traffic congestion.

Future work will involve implementing the prposed system in larger scale in the real world and test the real output. Finally the future step would be developing a mobile application for user to find available parking slots and guide them through application.

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