DESIGN AND IMPLEMENTATION OF IOT BASED SMART CAR PARKING SYSTEM

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Abstract: In this current era population may increase daily. Due to growth of population a need of human becomes enlarge. The most important need of people is vehicle therefore the number of vehicle on the road side is increasing rapidly. Hence the traffic congestion occurs. So to find out the parking space for their vehicle we develop an IoT based smart car parking system. A URL is provided to the user to check the parking slot is available or not and book a parking slot if slot is available or not. This project will be implemented by placing a camera on barrier which would take images of number plate and upload it to the user's URL. And if a mismatch occurs then the vehicle would not enter into parking. Further for additional security facial recognition will be used and if mismatch occurs an alert message would be sent to the authorized user [3].

***Index Terms*- ESP8266. NodeMCU, IR Sensors, Servomotor, Arduino UNO**

I. INTRODUCTION

We are progressing in the direction of smart city application. This system is a good illustration for a common citizen of how the Internet-of-Things (IOT) will be used in our day-to-day life. By using a mobile having an internet a user can may know about a parking slot which is currently available or not. Car parking system is based on reservation basis which user have to book a parking slot to park their vehicle [1]. Due to booking of parking slot before reaching at destination you don't need to search any kind of parking space hence it is the fuel and searching time of parking space will be reduced. Therefore, driver can park their car safely and traffic congestion will have reduced [4]. The main motto and objective of this paper based on parking system which works on real-time basis and security.

INTERNET OF THINGS (IOT)

The idea of IOT started with things with communication devices such as Bluetooth, IR Sensor, Wi-Fi. The devices could be trailed, command using remote device connected through Internet [8]. Internet means a wide universal network which is connected to some PC's, servers and mobile using some network protocols. Internet is able to send and receive an information through server [8]. In IoT the meaning of thing is referred as physical object. In general, we can say that it consists of internet and physical object which collect some data at particular location and communicate to units leading, assembling and analyzing the data [2]. It gives a vision where things become smart and convenient and behave like an alive through detecting, commanding and monitoring by small devices which is connect with remote gadgets via a connectivity such as WI-FI, Bluetooth, IR sensors [7]. Here some of the real applications of the IoT which is smart home, Wearable gadgets, Smart cities. IoT has three main range of wireless technology are as below: Short-range wireless: - RFID, LI-FI, WI-FI, ZigBee, Bluetooth Medium-range wireless: - LTE-Advance for high speed communication Long-range wireless: - Very Small Aperture Terminal (VSAT) for Satellite Communication. The IOT can be explained in form of an equation as below:

Solid Object +Regulator, Detector + Internet = Internet of Things (IoT) [8]

REAL TIME SYSTEM

The real time response to input immediately, this is the main advantage of real time system [5]. In this system, the task will be completed by specified time and it is responses in a predictable and unpredictable way. According to real time system it has two types (1) Hard real time system (2) Soft real time system. So whenever response time is taking too long there may be a chance of failure in hard real time system [9].

II. PROPOSED SOLUTION

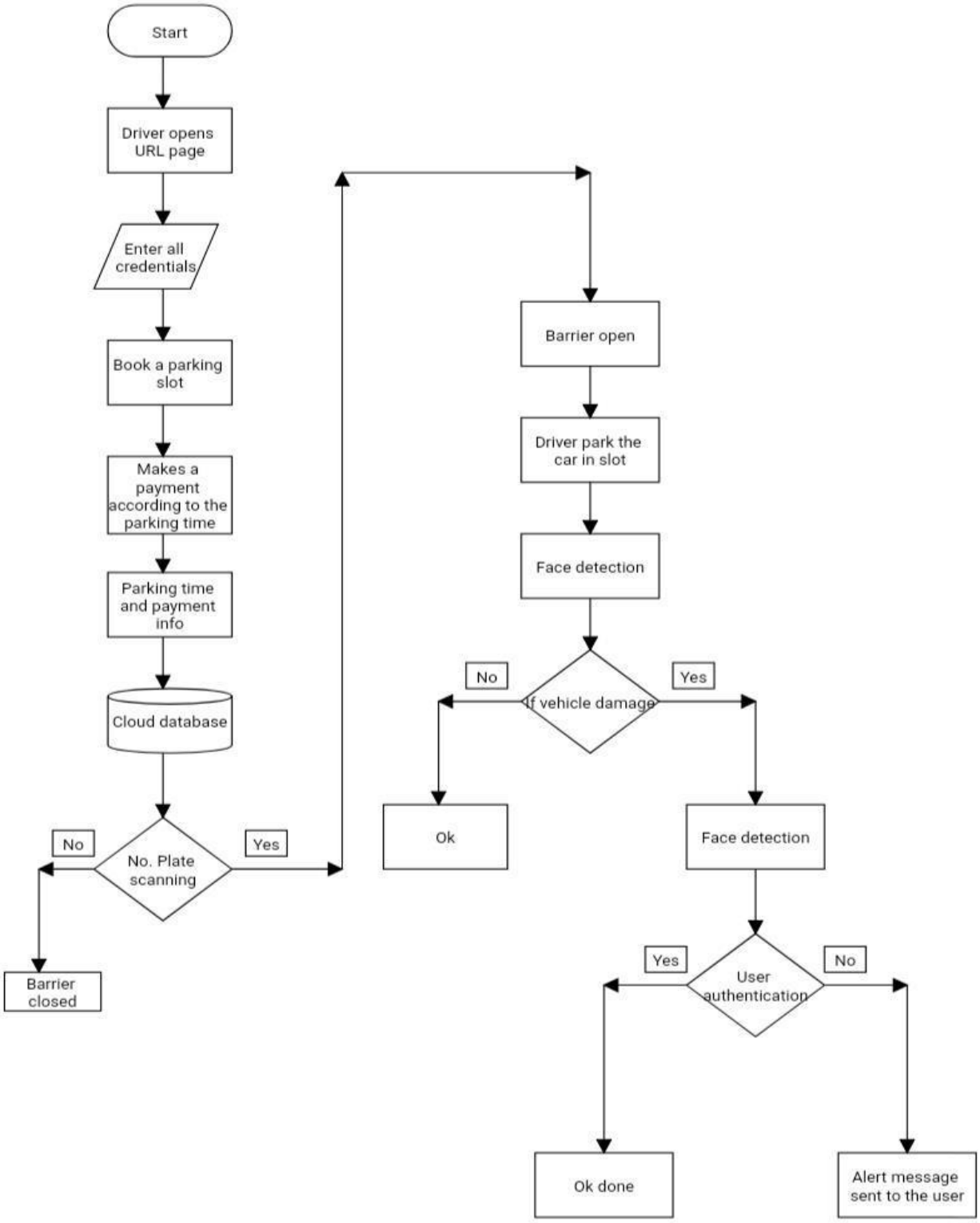

Figure 1: Flow Chart of Proposed System

In this proposed system first we create the URL. Which contain some information regarding user's personal information like vehicle number, licenses number, name, email.id, and password. First of all, user hast to register in this URL by adding some information like full name, email.id, and password. User has to put his all credentials into the given URL. After that a parking slot booking tab will be open and user has to be chosen gives parking slot. And the timing information will be there. Which show how much time user have to park his/her vehicle. And payment will be taken as per timing required. After coming at parking hall at barrier camera will scanning the number plate. If it is correct then barrier will be open otherwise barrier remains closed. Now consider the case barrier will be open. After the barrier opening the owner of the car has to park his/her vehicle to given parking slot. Here for additional purpose the face recognition system will be there [10]. In this system first of all it will scan the user face for security. If an unauthorized person is damaged the car than it will be scans the face again then if mismatch occurs, then the alert massage will be send to the owner of the car through GSM [6].

III. RESULT AND DISCUSSION

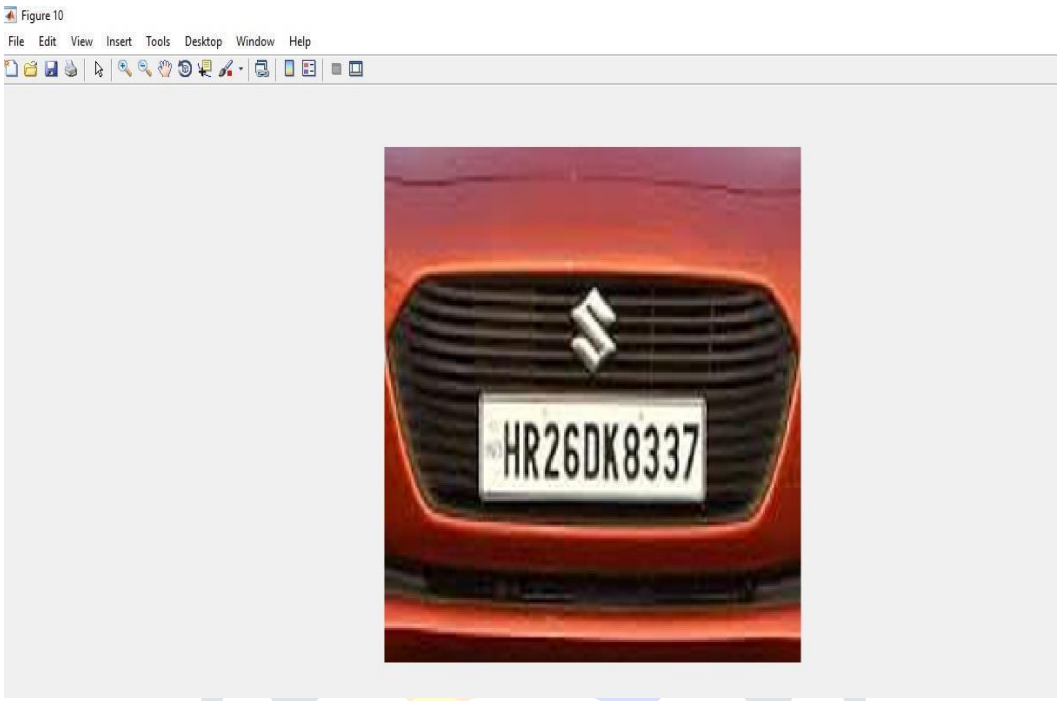

Figure 2: Original Image

This is the original image of number plate of car. First camera will take an image of the car, whenever car will enter in a parking entrance.

Figure 3: Gray Scale Image

After coming at barrier side of the parking entrance the camera will scan a number plate and MATLAB will convert the original image into the gray scale image.

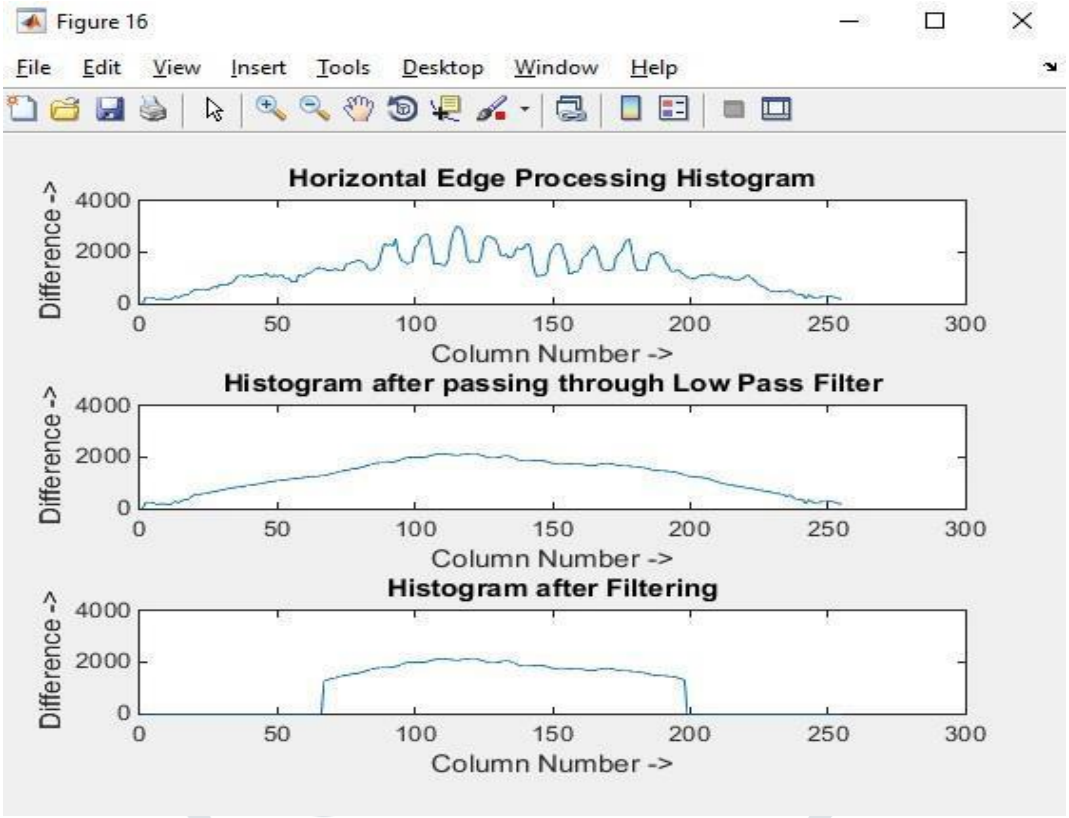

Figure 4: Horizontal Histogram

And the grey scale image will be scan as a horizontal image and histogram will be created because of horizontal scanning of number plate. Histogram is generally used to show the contrast of image. It will show where the contrast is high or low.

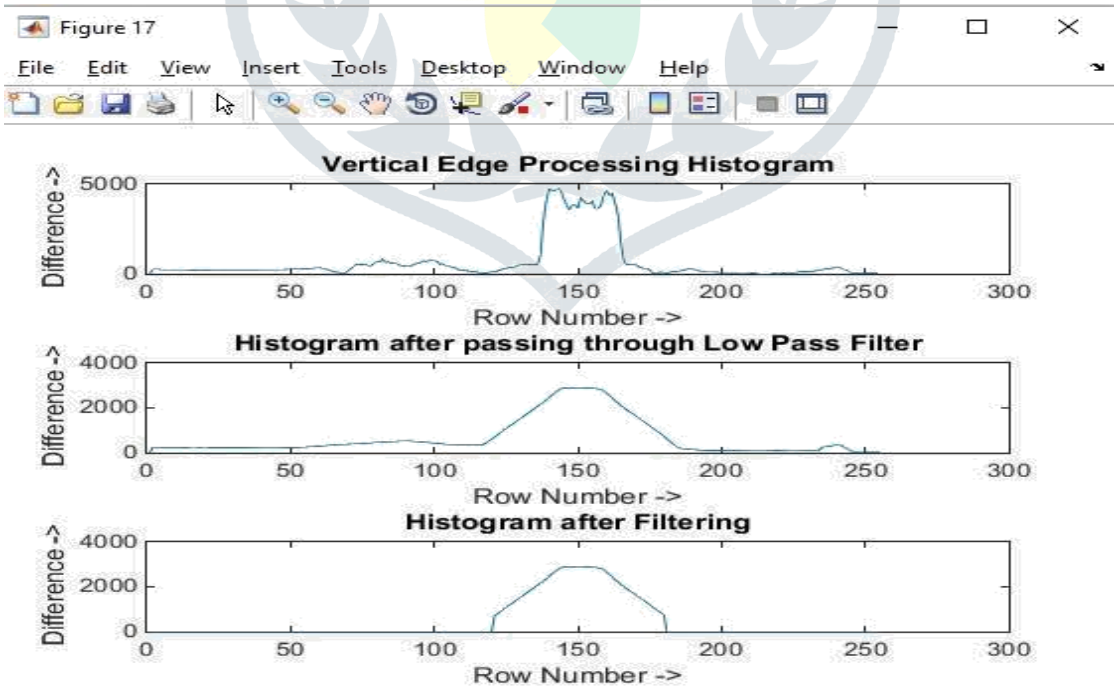

Figure 5: Vertical Histogram

The vertical scanning will be done after the horizontal scanning, and the vertical histogram will be created.

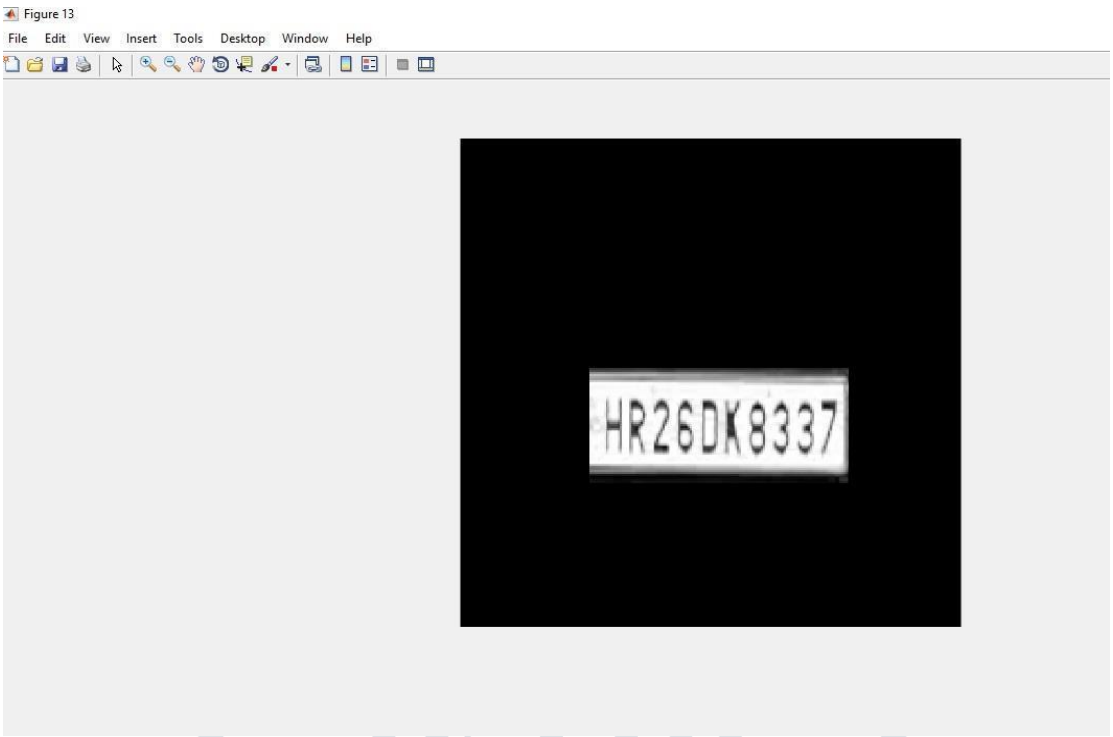

Figure 6: Focus on Number Plate

In this part only number plate will be scanned and the unwanted portion will be neglected. After completion of number plate scanning the barrier will be open if number plate is correct. Otherwise barrier remains closed.

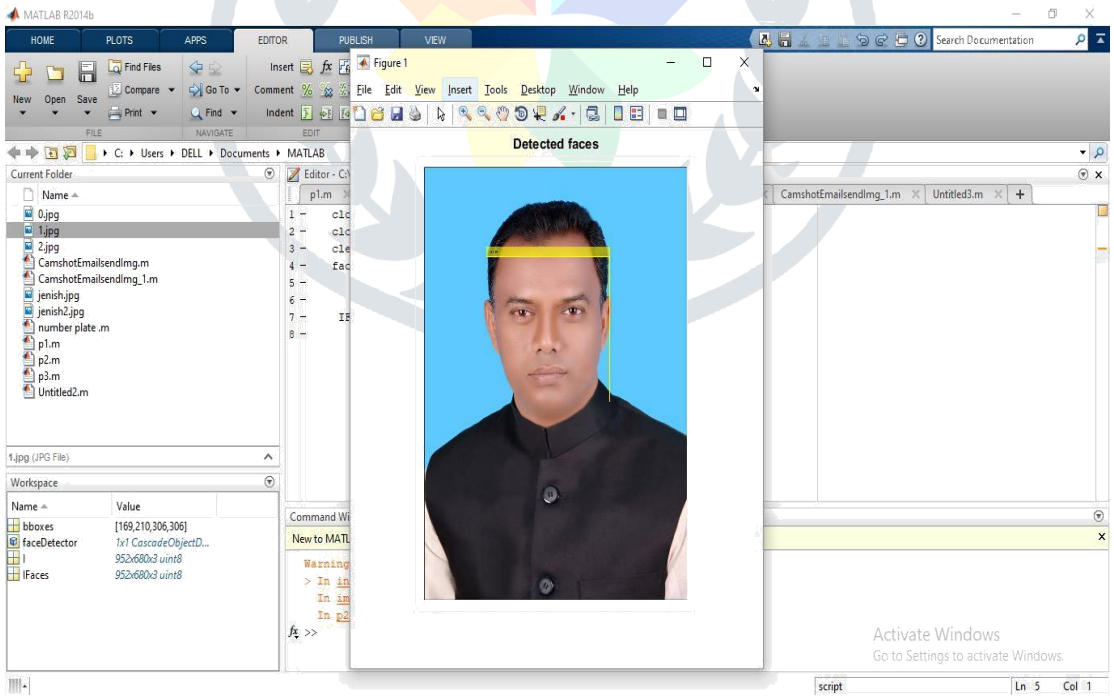

Figure 7: Face Detection

After the number plate detection, a face detection will be done and it scan a photo vertically and horizontally and if unauthorized person will try to access vehicle than system will send an alert message to authorized person.

IV. CONCLUSION

In the current generation smart car parking is very useful. Since past few years the use of smart car parking system increasing gradually. This is the main part of the smart cites because it is minimizing the congestion of traffic. In general, the use of parking system is very easy because it provides real time information which shows if the parking slot are available or not in the parking hall. We provide URL to the users which they can book their parking slot. In this paper our main motto is to create a smart city through the parking system. We can generate a QR code instead of URL. The phone will scan the QR code after that process of parking slot booking will be done.

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