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Car Parking Space Identifying System Using Python

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Abstract: *Nowadays, in India the concept of smart cites are gaining great popularity. The smart cities are incomplete without smart car parking system. The traffic congestion caused by vehicles is an alarming problem at global scale and it has been growing exponentially, also it increases pollution and wastage of time. A good solution this problem could use of python based smart car parking system to decrease pollution as well as parking time. In this project we propose a system to find the parking area. It also avoids congestions. The objective of this project is to smart car parking system using python. This project is used to Smart Parking system consists of an on-site deployment of a python technology that is used to monitor and signalize the state of availability of each single parking space using IR Sensor*

Key Word: *LCD, Python, Raspberry pi, Fire sensor, Gas sensor.*

I.INTRODUCTION

Smart parking enables better and real time monitoring and managing of available parking space resulting insignificant revenue generation, better urban environment and reduces fuel consumption. Present days getting a parking space in urban areas are very difficult in peak hours due to lack of parking spaces. Due to this driver stuck in traffic or looking for parking spaces around the location makes traffic congestion. This causes waste of money and time. Our system proposes a Smart city car Parking System on Streets which enables the user to park his vehicles in a systematic way and it reduces congestion in parking area. For user convenience our system includes finding vacant space through LCD display is done on the basis of period of parking.

II.LITERATURE SURVEY

The Arduino and hub MCU is utilized to foster the exceptionally safe and quick stopping framework ,Through this we can without much of a stretch observe the stopping spaces in the stopping region ,Arduino is utilized to see the stopping openings by utilization of IR sensors, Infrared sensor is utilized to detect assuming the article is stopped In space or not, Node MCU is the part is utilized to screen the general framework in the versatile application, Node MCU is an open-source based firmware and advancement load up uniquely focused on for IoT based Applications, LCD show is utilized to show the data about the spaces, through this thought we can handle the stopping mishap and save time[1].The system is working 24/7 throughout the year. Data from sensors are collected and by using Node MCU we are uploading it to Wise3 IoT server. When the user wants to park, first the RFID swiped should be validated, upon valid user confirmation he can park the vehicle in the dedicated parking space provided/selected [2].In this paper, we will make of micro-controller and this is used to process the instructions continuously in a loop. The user will first scan the RFID card using the RFID reader and the webpage will update the user details and even before the user scans the RFID card, the web page will display is there any available parking slot or not. After updating the user details on web page, a DC motor is used to open the gate for the user. Now the web page displays the available parking slots as well as the nearest parking slot to the user. IR sensors are used for the object detection in the paper and by object in this is the vehicle. As soon as the user parks the vehicle in the parking slot, the IR sensor will detect the object and forwards the information to the micro controller and the micro controller will process this information and update on the page [3].

Trouble to find Vacant Spaces, quickly finding an empty space during a multilevel parking garage is troublesome if not unthinkable, particularly on ends of the week or open occasions. Searching space to park the cars during weekends or open occasions can take over 10-15 minutes for around 14 66% of guests. Stadiums or shopping mall are swarmed at pinnacle periods, and trouble to find empty openings at these spots may be a noteworthy issue for clients. Inadequate car parking lot prompt activity blockage and driver disappointment. Our system solves all issue stated above [4].In this proposed system, the mobile application consists the register and login page for the security purpose and to provide a particular slot to the user. It also displays the petrol bunks and the shopping malls that are available in the parking areas. In this traffic also reduce in the parking slots by using IR sensors to allocate the slots for the users who are register in the application [5].

The proximity sensor is mounted on the ceiling of the parking lot which consists of an Infra-Red emitter and a receiver. The IR emitter emits infra-red rays and these rays generally bounce off objects. The IR receiver receives these rays and converts them into an electrical signal creating a potential difference. The resulting potential difference helps complete the circuit. The LEDs are placed along the driveway and switch on based on the input received by the sensor. A threshold distance is calibrated using the potentiometer to fix a particular distance based on the average height of vehicles for sending and receiving the radiations. Resistors are provided to ensure the safe working of LEDs and IR sensors. For this project based on size a 12V battery is used to power all the components [6].Driven by the need to expand parking inventories and the prospects of new business models for parking services, this work-in progress envisions to extend parking-systems' cloud architecture to house new opportunities offered by third-parties labelled parking service provides or PSP. PSP is a new business entity serving individual parking owners or intermediaries, which register their parking lot in the cloud directory of available parking spaces. This information is relayed to motorists who request parking spaces, after which the transaction is fulfilled directly between the service provider and seeker [7].Our project "IOT based Smart parking system" is mainly intended to monitor the status of the devices through server (Wi-Fi). The controlling device of the whole system is a Microcontroller. Wi-Fi module, IR sensors are interfaced to the Microcontroller. In achieving the task, the controller is loaded with a program written using Embedded „C" language. The user who wants to park the vehicle is connected to the Wi-Fi network of that particular parking lot through the password. The IR sensors send the status to the microcontroller where the data processing is done. The microcontroller sends information to the webpage about the status of the slot to the user using IOT. This way the user can easily find a parking slot without any congestion and in less time [8].A prototype is developed for making the car parking better, flexible and secured, for this we developed a frame work that is shown in Figure. This proposed architecture having a Raspberry pi board, this board is small sized but it works like a computer. The entire central processing unit replaced by this simple debit card sized board and it is available for lower prices in market. This will use rasping (tiny OS), similar to Linux based environment. It'll act as a server also for smaller applications. This system using IoT technology, we can access, control and communicate the things remotely [9].Two methods are used online preprocessing and initial configuration. In online preprocessing detail steps are followed firstly give input as a video. From video generate a different frame. We apply preprocessing on that frame. Detect how much car are present on that frame and calculate it. Using that calculation parking space extraction are done. After the classification parking space status are generated. Parking space extraction are done using car detection and parking space status. At the end parking Lot result are shown. In that parking area map extraction are done [10].Two methods are used online preprocessing and initial configuration. In online preprocessing detail steps are followed see in the figure firstly give input as a video. From video generate a different frames. We apply preprocessing on that frames. Detect how much car are present on that frame and calculate it. Using that calculation parking space extraction are done. We apply DNN algorithm for metrics measurement, history creation and classification. After the classification parking space status are generated. Parking space extraction are done using car detection and parking space status. At the end parking Lot result are shown. In Initial configuration Define space based on 4 coordinates. In that parking area map extraction are done [11].The number of vehicles is increasing along with population growth in urban areas. During the process of parking their vehicles, it causes various negative impacts such as congestion in the effect of inefficient from parking management. This impact has contributed to 30-40% of the congestion on the street. A solution to overcome this problem is to apply the advancement system of smart parking. The scientists in have advanced a lot of innovative methodologies smart parking any interdisciplinary of science. With the aim to address this parking problem, to support the increasing mobility in big cities [12]. A system that labels parking spaces as occupied or vacant is proposed. In situations where a camera is mounted at a lamp post view and parking spaces are visible, such a device is extremely useful. To discriminate between parked and vacant spaces, the system employs a mix of the Laplacian operator for edge detection, the HAAR classifier for object acknowledgement, and motion tracing. Background subtraction techniques, contours, and morphological processes are utilized to track motion [13]. In this paper, a smart parking management system using AI technique was presented. The implemented system recognizes the vehicle number and uses it as an object ID, and tracks the vehicle by applying YOLO technology. Training and learning algorithms based on CNN deep learning algorithm were applied to detect whether a vehicle was parked or an accident occurred. A number of experiments was conducted to check the detection accuracy and it was confirmed that the deep learning algorithm works effectively after training reasonable number of images. Experimental results show that the detection accuracy of parking and accident detection increases as the number of training images increases [14].A car enters the parking lot and the parking lot is checked for empty slots. If there exists any then the number plate of the car is scanned using the first camera and stored in cloud and let into the parking lot by displaying the slots available. If there are no empty slots available, then the same will be displayed. When the car exits then the number plate is scanned again using the second camera and compared with the time of its arrival. A bill is generated based on time of stay of the vehicle [15].

III.MATERIALS AND METHODS

A. Methodology

The working of our proposed system is to design smart car parking system using raspberrypi-python technology. This project is used to Smart Parking system consists of an on-site deployment is used to monitor and signalize the state of availability of each single parking space. Initially four IR sensors detecting free space for car parking.IR sensor detects the car in it will automatically check another area for car parking. Four IR sensors are used for finding different free space for car parking. All these free space and IR sensors are detected car parking area slotsare full it will intimate message and notification for LCD display. Raspberry Pi continuously monitoring the status IR sensor it will monitored by Car parking space using LCD.

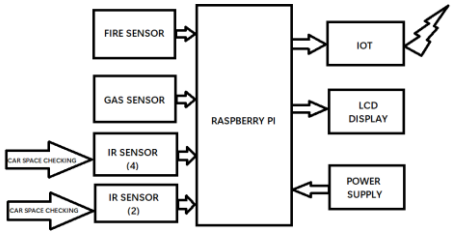

Figure 1 Block Diagram of Methodology

B. Components used

- Raspberry pi
- LCD Display
- IR Sensor
- Fire Sensor
- Gas Sensor
- Python

a. Raspberry pi

The Raspberry Pi is a credit card-sized computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. The Raspberry Pi is manufactured in three board configurations through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Ego man. These companies sell the Raspberry Pi online. Ego man produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardware is the same across all manufacturers. The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It does not include a built-in hard disk or solid-state drive, but it uses an SD card for booting and persistent storage, with the Model B+ using a Micro SD.

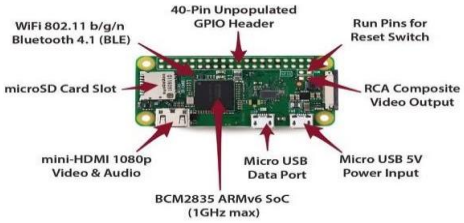

Figure 2 Raspberry Pi

b. LCD Display

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs does not emit light directly.

They are used in a wide range of applications including: computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have displaced cathode ray tube (CRT) displays in most applications. They are usually more compact, lightweight, portable, less expensive, more reliable, and easier on the eyes.

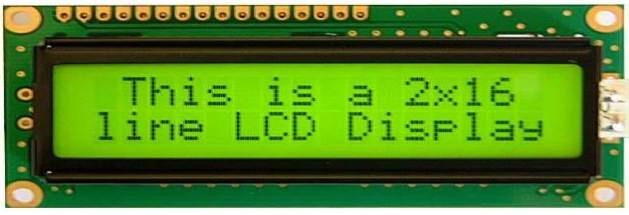

Figure 3 LCD Display

c. IR sensor

An InfraRed sensor (IR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of

an infrared source with another temperature, such as a wall. Infrared transmitter is one type of LED which emits infrared rays generally called as IR Transmitter. Similarly, IR Receiver is used to receive the IR rays transmitted by the IR transmitter. One important point is both IR transmitter and receiver should be placed straight line to each other. The transmitted signal is given to IR transmitter whenever the signal is high, the IR transmitter LED is conducting it passes the IR rays to the receiver. When receiver receives the signal from the transmitter its resistance value is low. it resistance value become high when the signal was cut.

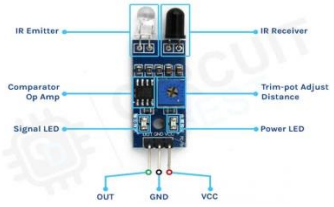

Figure 4 IR Sensor

d. Fire Sensor

Disclosed herein is a fire alarm system for connecting a plurality of fire sensors to sensor lines, and giving an alarm in response to fire information output from the fire sensor in a line unit. The fire alarm system includes a current modulation section and an address specification section. The current modulation section is used for maintaining a current flowing in the sensor line at a predetermined value for a predetermined time at the time of a fire, and modulating the current in accordance with the inherent address information of the fire sensor. The address specification section is used for sensing fire information by judging whether or not the current has been maintained at the predetermined value for the predetermined time, and also for specifying the inherent address of the fire sensor that issued the fire information, from the modulated state of the current.

Figure 5 Fire Sensor

e. Gas Sensor

Electrochemical gas sensors are gas detectors that measure the concentration of a target gas by oxidizing or reducing the target gas at an electrode and measuring the resulting current. The gas diffuses into the sensor, through the back of the porous membrane to the working electrode. This electrochemical reaction results in an electric current that passes through the external circuit. In addition to measuring, amplifying and performing other signal processing functions, the external circuit maintains the voltage across the sensor between the working and counter electrodes for a two-electrode sensor or between the working and reference electrodes for a three-electrode cell. At the counter electrode an equal and opposite reaction occurs, such that if the working electrode is an oxidation, then the counter electrode is a reduction.

Figure 6 Gas Sensor

f. Python

Python is a high-level, interpreted scripting language developed in the late 1980s by Guido van Rossum at the National Research Institute for Mathematics and Computer Science in the Netherlands. The initial version was published at the alt.sources newsgroup in 1991, and version 1.0 was released in 1994. Python 2.0 was released in 2000, and the 2.x versions were the prevalent releases until December 2008. At that time, the development team made the decision to release version 3.0, which contained a few relatively small but significant changes that were not backward compatible with the 2.x versions. Python 2 and 3 are very similar, and some features of Python 3 have been backported to Python 2. But in general, they remain not quite compatible. Both Python 2 and 3 have continued to be maintained and developed, with periodic release updates for both. As of this writing, the most recent versions available are 2.7.15 and 3.6.5. However, an official End Of Life date of January 1, 2020 has been established for Python 2, after which time it will no longer be maintained. If you are a newcomer to Python, it is recommended that you focus on Python 3, as this tutorial will do. Python is still maintained by a core development team at the Institute, and Guido is still in charge, having been given the title of BDFL (Benevolent Dictator for Life) by the Python community. The name Python, by the way, derives not from the snake, but from the British comedy troupe Monty Python's Flying Circus, of which Guido was, and presumably still is, a fan. It is common to find references to Monty Python sketches and movies scattered throughout the Python documentation.

C. Proposed Work

To design smart car parking using python technology. The deployment is used to monitor and signalize the state of availability of each single parking space.IR sensor detect the free space, and detects the car in it will automatically check another area for car parking. All the free space are detected by IR sensor, it detects car parking area slots are full, it will detect another area for parking. It will intimate message and notification for LCD display. Raspberry Pi continuously monitoring the states IR sensor it will identify by Car parking space using LCD.

IV.RESULT AND CONCLUSION

The smart car parking system has many greatest advantages. Here we can view all the free space and occupied parking slot in the parking area through the mobile application and more over we have added some kind of sensors which provide us the safety measure indications through the application. This system will be more reliable, low cost, low maintenance and easy to access and monitor. This project is very useful for all the vehicle drivers for parking their vehicle in time efficiency and It can be implemented in any kind of infrastructure which are in need of solution for parking space allotment.In conclusion we see that the system is working properly and the sensors are detecting the parking space and the status of the slots are shown in mobile applications from anywhere through by internet.

Figure 7 Result and Conclusion

V.FUTURE ENCHANCEMENT

We can make parking slots available for our vehicles online. the video cover status can be added to the application for the exact video surveillance for the vehicle owner.

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