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SMART CAR PARKING SYSTEM USING THE WIFI MODULE

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I. *Abstract*

The project is entitled SMART CAR PARKING SYSTEM USING WIFI MODULE using IoT. The major motivation of this project is to reduce the traffic congestion on roads, multistoried buildings, and malls due to the unavailability of parking spaces. Our project aims to make efficient use of parking spaces. We track vacant slots in the parking space and assign that to the user. Smart parking systems as described above can lead to an error-free, reliable, secure, and fast management system. In recent times the concept of smart cities has gained great popularity. Thanks to the evolution of the Internet of things the idea of a smart city now seems to be achievable. Consistent efforts are being made in the field of IoT to maximize the productivity and reliability of urban infrastructure. Problems such as traffic congestion, limited car parking facilities, and road safety are being addressed by IoT. The proposed Smart Parking system consists of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of each single parking space. The paper also describes a high-level view of the system architecture. Towards the end, the paper discusses the working of the system in form of a use case that proves the correctness of the proposed model.

II. *INTRODUCTION*

The system automatically detects whether the parking slot is empty or not. If the slot is empty in the Smart car parking System the new vehicles are allowed to enter else the entrance is blocked by the servo barrier in case the parking is full.

The visitors can see the status of the availability of the free space outside the parking on a 16×2 LCD. They can also see on the LCD how many parking slots are free. The data keeps updating as the vehicles move in and out of the parking.

It also shows on the computer if the slot is empty or not to allow the vehicles.

III. *EASE OF USE*

Nowadays congestion of traffic level increases with the increasing development of population rapidly. Concerning the amount of population, the utilization of personal vehicles also increased.
Due to more use of cars traffic congestion occurred on the road. Most people choose personal vehicles over public transportation. It is very difficult and time-consuming to find parking space in most metropolitan areas, and commercial areas, especially during rush hours. It is often costly in almost every big city all over the world to find proper and secure parking spaces. The proposed project is a smart parking system that delivers information to people finding a parking space online. It overcomes unnecessary time consuming for finding the problem of parking space in parking areas. Hence, the website is provided by this project-based system where users can view various parking areas and choose thespace from available slots.

IV. REVIEW OF LITERATURE

DEVELOPING A SMART PARKING MANAGEMENT SYSTEM USING THE WIFI MODULE THE INTERNET OFTHINGS:

Searching for parking wastes significant amounts of time and effort and leads to substantial financial costs. This is particularly the case for people who are always pressured to be on time. Smart cities employ all kinds of modern technologies to manage and enhance resources effectively. Urban parking facilities are one of the essential assets that must be managed. We developed a smart parking management system (SPMS) as a modern solution to manage parking and save users time, effort, and cost. In the context of today's modern life, it has become necessary to improve search methods for available parking and minimize the congestion that occurs at the parking entrance. Searching or booking available parking online earlier is a better substitute than searching at a parking lot where there is a possibility of not being able to find parking.
Our smart parking management system was developed to:

- Manage to park and solve problems efficiently using technology
- Apply technical solutions to improve the smart cities concept the proposed system uses a variety of technologies that help manage to park. It provides essential services for users, including searching for parking, reservations, and payment. It is extended to cover more advanced services such as receiving notifications, statistics, and monitoring the parking state. The system is connected to a smart car parking system.

V. OBJECTIVE OF THE STUDIES

- To develop a user-friendly automated car parking system that reduces manpower and time savings.
- To offer safe and secure parking slots within the limited area.
- To reduce traffic mess caused by an unplanned parking system.

VI. RESEARCH METHODOLOGY

- The methodology is a model to explain the methods or techniques used to design, develop or plan a project.
- This chapter explains about software and hardware that will be used for developing this projectfurther. The results are going to be analyzed to achieve the objective of this project.

VII. FUTURE SCOPE

- In the future, we'll study to include a further component and field to implement the pay and park system. Making a database for everyone's entering and leaving the parking lot is an important step that serves security.
- In future works, this framework can be enhanced by including different applications, For Example, Internet booking by utilizing GSM. The driver or client can book their parking area at home or while in transit to the shopping center.
- This can diminish the season of the client to seek the empty parking area. As a further review, distinctive sensor frameworks can be added to enhance this framework to distinguish the question and guide the driver or client's speediest.
- We will attempt to decrease the mechanical structure and attempt make it eco-friendly.

VIII. SWOC ANALYSIS

S- STRENGHT

- Optimized parking
- Reduced traffic
- Reduced pollution
- Enhanced User Experience
- Increased Safety
- Low Costs System, providing maximum automation
- Parking Slot Sensors for Empty Slot Detection
- Easy to Use System

W- WEAKNESS

- Cost of implementation is high.
- No driver guidance systems to guide towards the parking lot.
- No guidance is provided in the parking lot.
- Smart car parking sensors are rapidly decreasing battery life with increasing accuracy requirements.

O - OPPORTUNITIES

- According to ITS America's Market Analysis, the parking industry is worth $24-25 billion dollars, including parking facility management, billing and collection, enforcement, and other additional services. Almost 3000 companies are providing services to thecommercial parking lots and garages industry, with a combined annual revenue of more than $8 billion. However, this method comeswith its own set of Challenges.

C-Challenges

The major challenge in Parking Systems is system integration due to the wide variety of hardware and software platforms involved and hencePossess a great threat or concern to the system scalability.
The technology platform supporting P&E, PARC, and PUCRS systems comprises a myriad of hardware sensors, dynamic messaging systems, traffic control devices, wireless and wireline telecommunications systems, computer clients and servers, and hardware drivers and applicationinterfaces.
Enabling all these devices from thousands of different vendors to communicate and tying them together into one platform is the greatest challenge in reducing the cost and complexity of smart parking. The variety of infrastructure hardware and software systems that need to beintegrated is enormous and adds to it the conventional older hardware making an investment in Smart Parking solution highly risky and fragmented.
Another major pain point comes from the electronic payment vendors. These payment processors provide permit-based electronic payment, typically for a convenience fee. The key to many of these hosted solutions is scalability, the ability of the transaction processor to support widegeographical, market, and service areas, with minimal cost.

IX. HARDWARE

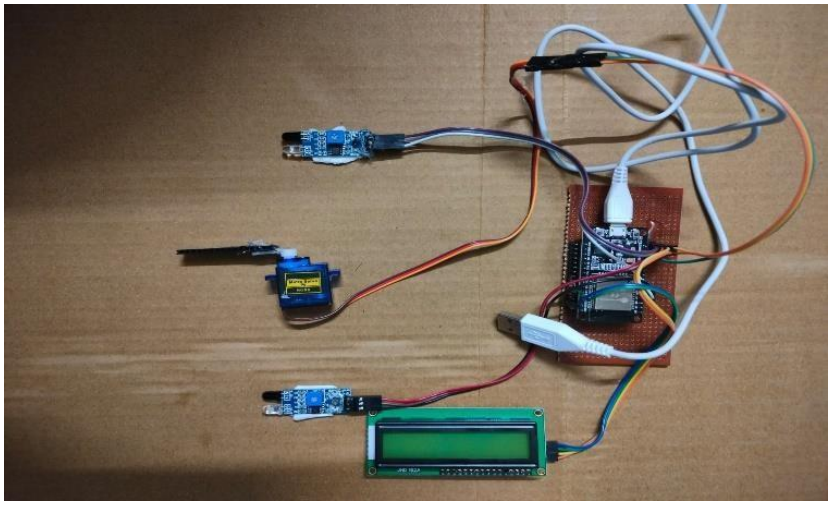

Fig. 9.1 Hardware in OFF condition

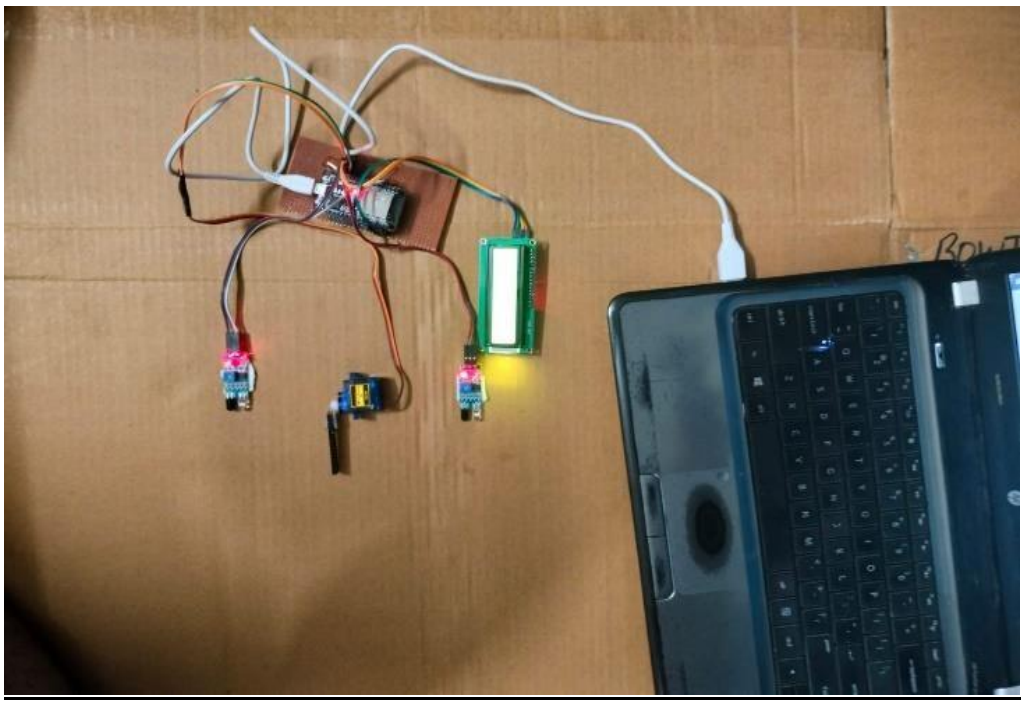

Fig. 9.2 Hardware in ON condition

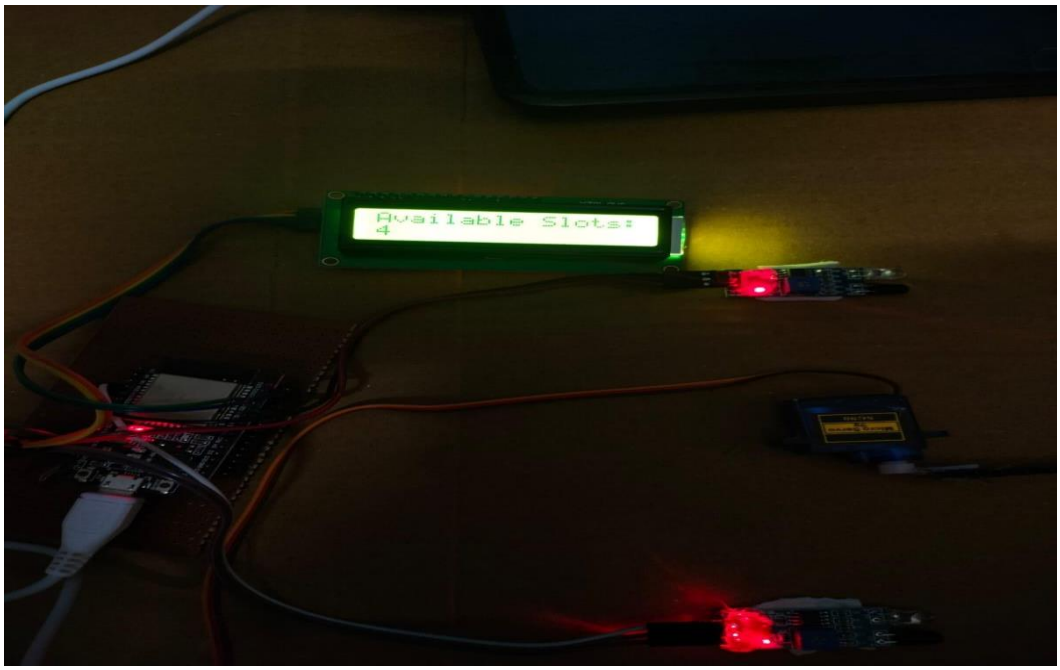

Fig. 9.3 Hardware showing data on LCD display

X. ***RESULT***

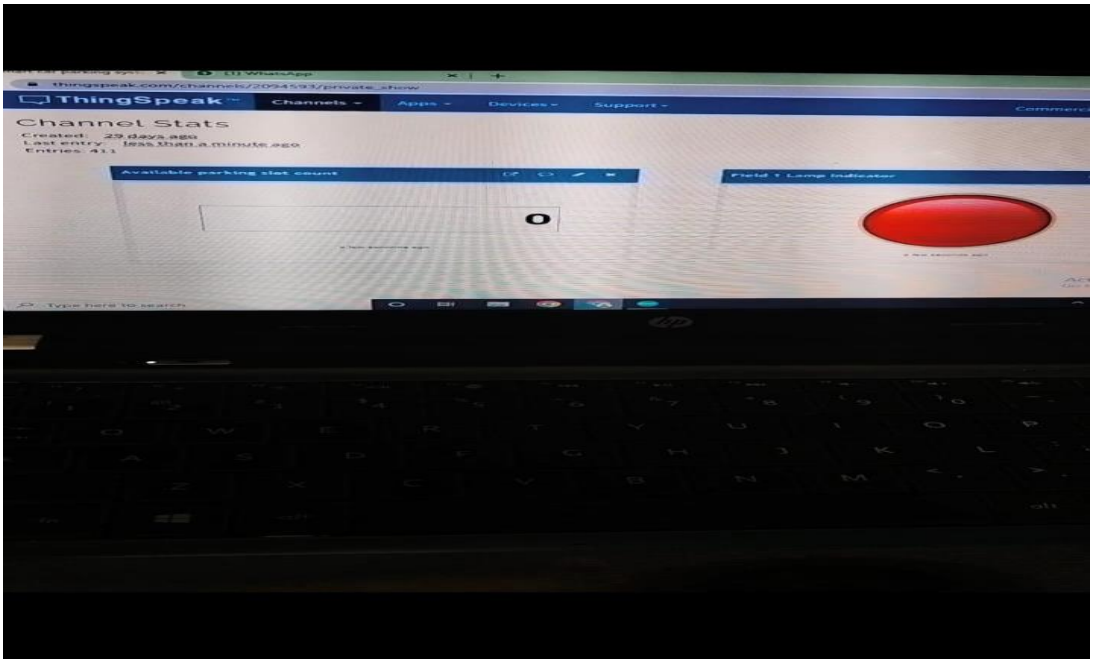

Fig 10.1 Result showing parking slot zero available with Red indication on the web site

Fig 10.2 Result Parking slots are full showing on LCD display

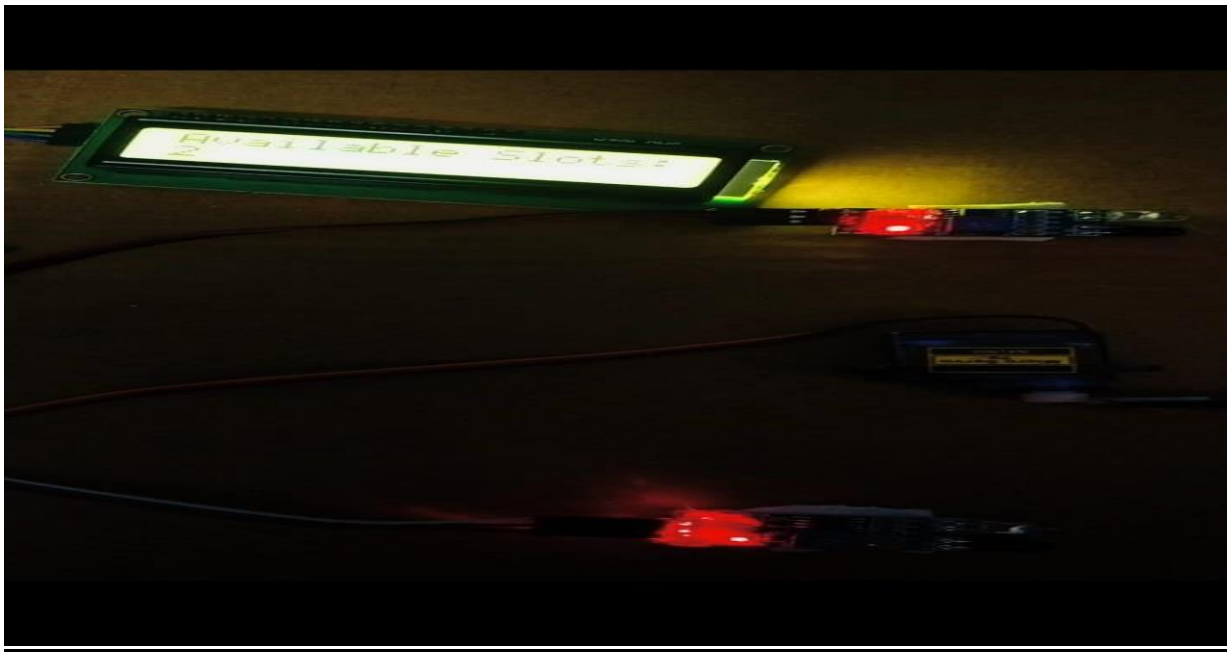

Fig 11.3 Result showing available two slot on LCD display

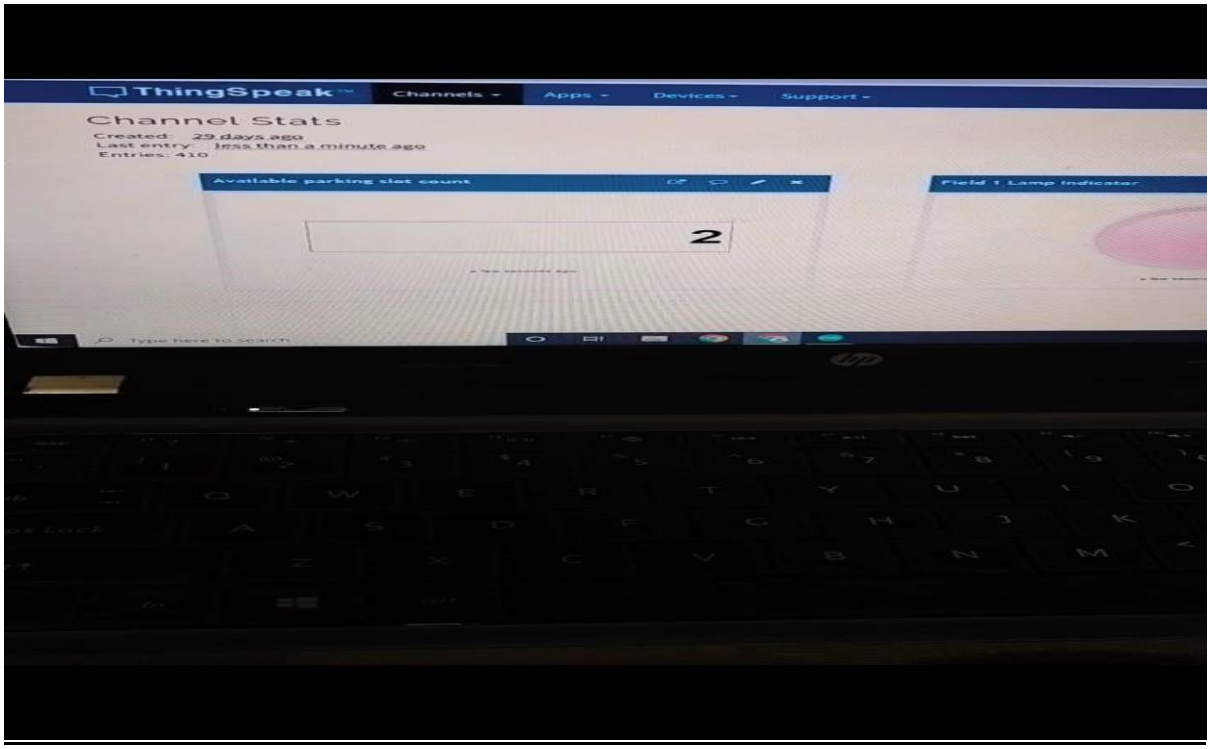

Fig 10.4 Result showing parking slot two available on the web site

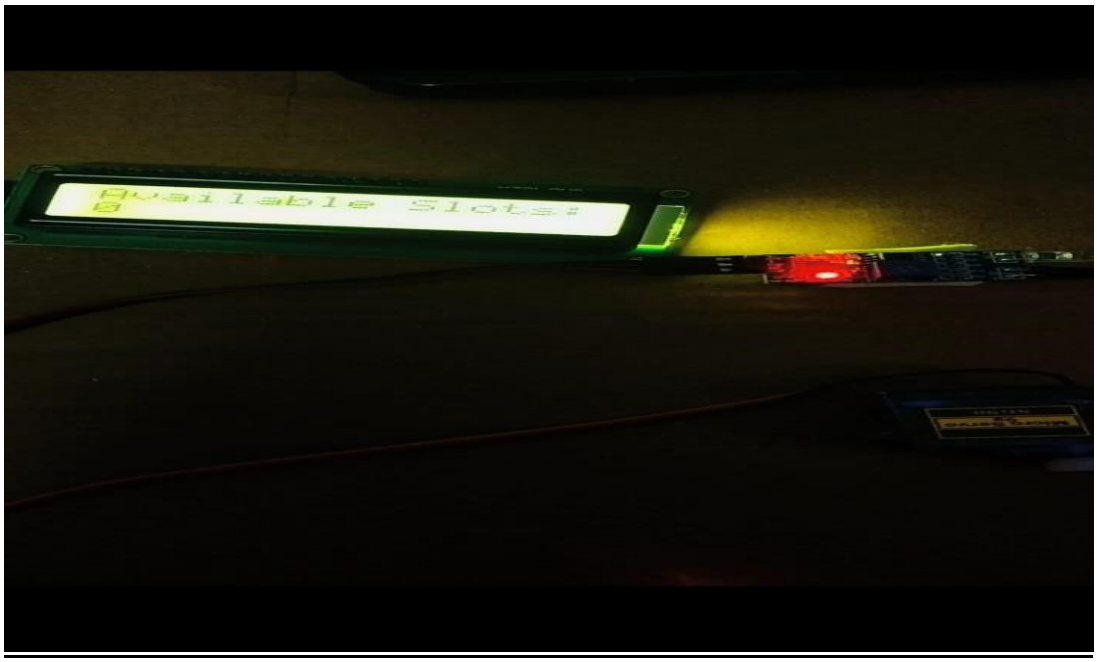

Fig 11.5 Result showing available Zero slot on LCD display

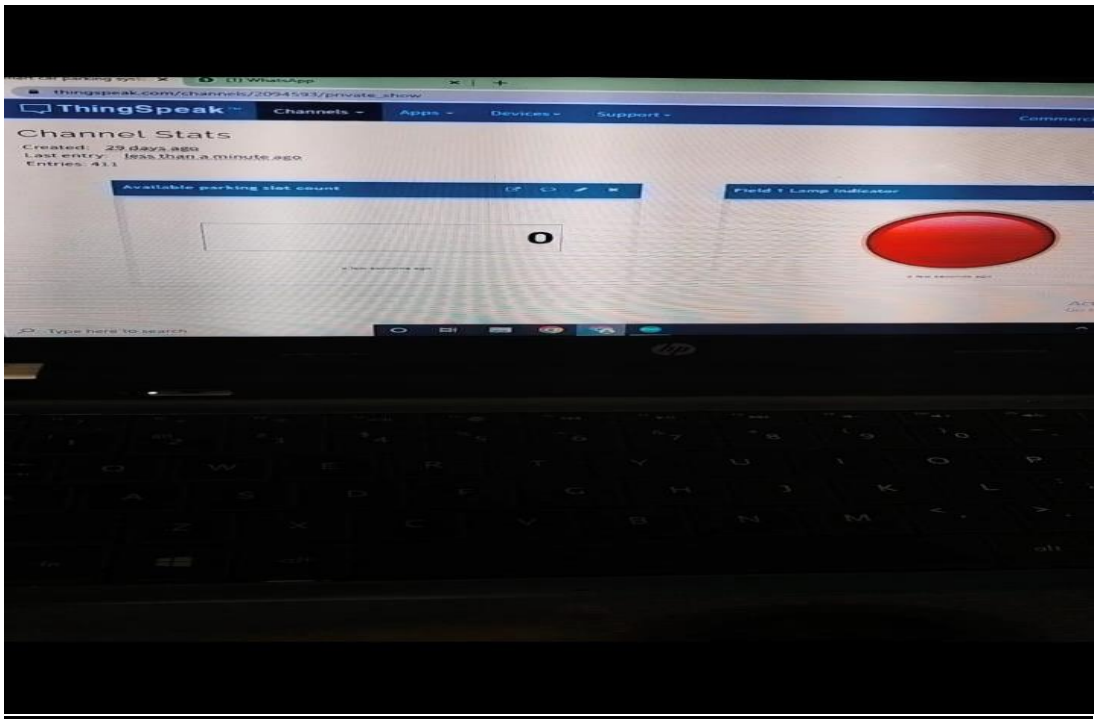

Fig 10.6 Result showing parking slot zero available with Red indication on the web site

Fig 10.7 Result showing parking slot four available on the LCD display

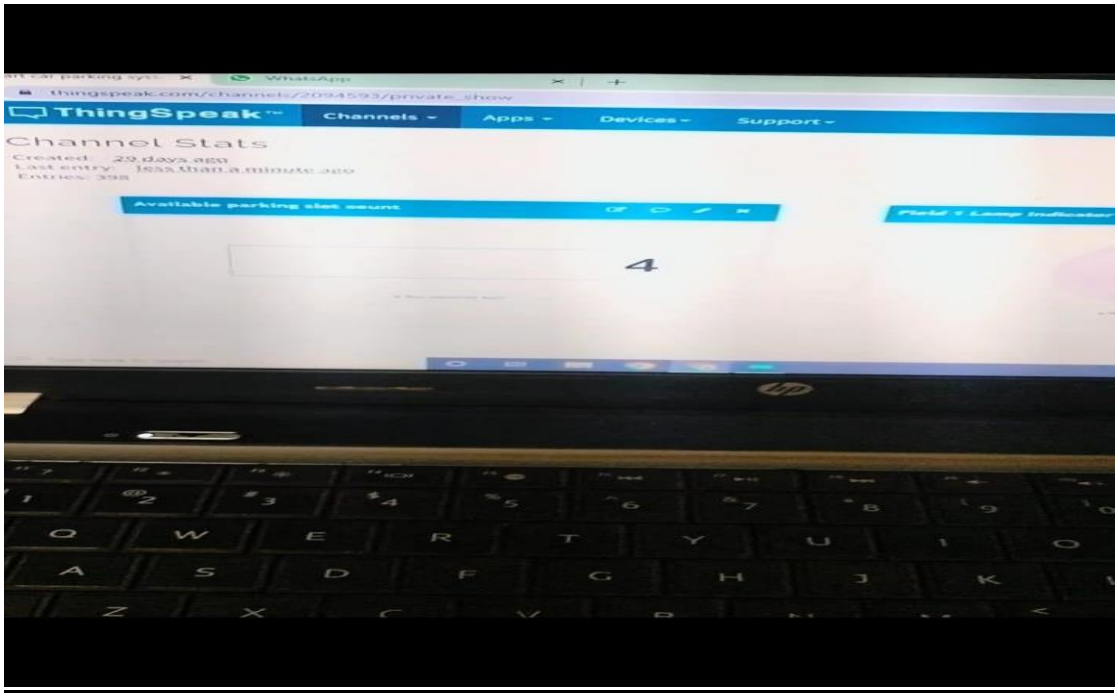

Fig 11.8 Result showing parking slot four available on the web site

XI. ***CONCLUSION***

- Smart car parking systems provided an efficient way of parking for drivers without any hesitation.
- Security of vehicles.
- Minimal effort framework, developing smart parking solutions within a city solves the traffic problem.
- Our project detects empty slots and helps drivers to find parking spaces in an unfamiliar city.
- The average waiting time of users for parking their vehicles is effectively reduced in this system.
- The optimal solution is provided by the proposed system, where most of the vehicles find a free parking space successfully.
- Our preliminary test results show that the performance of the Arduino UNO-based team can effectively satisfy the needs and requirements of existing car parking hassles thereby minimizing the time consumed to find the vacant parking lot and real-timeinformation rendering.
- This smart parking system provides better performance, low cost, and efficient large-scale parking system. When the car enters the parking area, the driver will park the car in the nearest empty slot when slot is the occupied the LED light glows, and when slot is the empty LED lights are turned off achromatically indicating that the parking slot is empty to be occupied. It also eliminates unnecessary traveling of vehicles across the filled parking slots in a city.

XII. ***REFERENCES***

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