VALET ROBOT

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ABSTRACT

This paper proposes a valet robot that replaces human valets who spend too much time in the sun while greeting people and assigning parking spaces for their vehicles. This project uses an ultrasonic sensor to detect the vehicle on the highways and LCD to indicate the presence of a hotel to the people in the vehicle. The vehicle will be detected by an IR sensor at the hotel's entry, activating the valet robot, which will subsequently greet the visitor via an electronic speaker. The IR sensors, which are installed in each parking space, are used to determine whether the space is available so that the empty slot can be displayed in the LCD and the vehicle is allotted to park on the empty slot. This parking process enables the visitor to park their car safely and securely.
Keywords—IR Sensor, Ultrasonic Sensor, Electronic Speaker, LCD, Battery

1. INTRODUCTION

In the development of India, there are several things that need to be altered, improved, or created in order to save human life by replacing them with automation. Through this project, human suffering has been reduced in today's society. As a result, after collecting field data from several hotels in and around the cities of Virudhunagar and Madurai, we found that the valets suffer more when they stand outside in the sun for a prolonged period of time the presence of the valet is essential to the hotel's revenue. Only the hotel's movement with some illumination and the sound of the valet may be used to detect the hotel's presence on the roads. The night watchman/valet will then help you park your car.

According to the survey, running a hotel on highways without a valet is a difficult task, and finding a valet is also difficult nowadays. Most people are unwilling to work as valets, but by paying them well, they are persuaded to do so. Despite the fact that some hotels cannot afford the money they demand, they employ valets due to the need for them. Most highway hotels use valet to indicate the hotel, greet guests, guide them to park their vehicle, and guard.

The Valet is likely the most important contributor to a hotel's profit, so running a hotel without them would be extremely difficult. A hotel cannot function without a valet, but the valet can't suffer from excessive exposure to sunlight. We took a few steps to understand their difficulties because they are also human beings. As a result, we created the project valet robot in order to eliminate the difficulty of valet and meet the needs of hotels. We'll avoid the hassle of having a human valet with a project called valet robot.

2. LITERATURE REVIEW:

Abrar Fahim, Mehedi Hasan, Muhtasim Alam Chowdhury [1] In terms of technological approach, sensors used, networking technologies, user interface, techniques, and services offered. This paper seeks to provide a thorough study, comparison, and extensive analysis of SPSS. Additionally, the paper closes a research gap by offering a clear understanding of SPSS's suitability in different environmental conditions and highlighting their benefits and drawbacks. Researchers, designers, and policymakers would be able to choose the best SPS and comprehend the current trends in this industry thanks to the comprehensive comparison between various SPSS features. The

numerous sensors that can detect a vehicle's existence and movement were examined by the writers of this research paper. They looked at the sensor's accuracy for spotting moving objects on roads. They made recommendations and evaluated how well the sensor detected the car. This has led us to determine which sensor will provide the most precise vehicle detection possible.

Hemant Chaudhary, Prateek Bansal, Dr. B.Valarmathi[2] The architecture and design of an Arduino-based car parking system are described in this paper. The fundamental guideline for parking a car in a parking space is to have the user's or the driver's permission. Each user will receive an authorization card that contains the vehicle number or other information. The parking gate will open if the user is authorized and there is room in the parking lot; otherwise, even though the user is authorized, they are not permitted to park their vehicle there. A smartphone notification concerning parking will be sent to the user if the automobile is authorized to park. It eliminates the problem of urban parking, secures a vehicle, and prevents unauthorized users from using a parking space. The ability to see which floor has available parking makes it easier to park a car in a multi-story garage. This paper has shown us how to approve a vehicle to park in a designated space.

Mr. Amit A. Kamble, Mrs. A. V. Dehankar[3] This suggested solution is not appropriate for public parking areas because it is specifically intended for private parking spaces. AVM camera will be used to monitor the parking space. To give the vehicle on the lane precise direction, ultrasonic sensors are mounted in the road. As soon as a car pulls in, a large display board informs the motorist of the filled and empty slots. On a small display board in the inner lane, the driver will see information about the assigned parking space and directions for that space as he travels further. The phrase "No slots available" appears on the display board when all of the slots are taken. This paper explained us how to utilize a display board.

Mohmmed Ahmed[4] This paper explored the idea of an automatic parking system. Everything in the current world is becoming automatic. We have developed a system that can count the number of vehicles in the parking lot by automatically detecting when vehicles enter and exit the gate. By using infrared (IR) sensors located at the entry and exit, this automated car parking system shortens the time needed to verify the area for vehicles by showing the available parking spaces on an LCD display. This paper educated us how to utilise an IR sensor to recognize a vehicle and assign a parking space.

Yanhua Mu , YiXin Yin[5] In this study this system was designed for a humanoid robot that was made to assist people with many daily chores in a workplace. A frame-based representation and reasoning method is used to establish all the requirements that must be met in order for a task to be completed once its type has been determined using a naive Bayes classifier for a given task that has been assigned via user discourse. This paper taught us how to code the robot to speak.

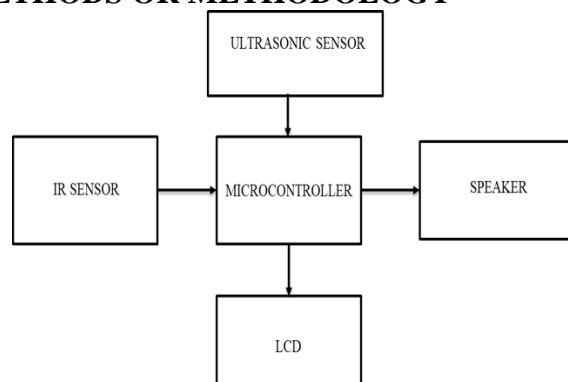## 3. EXPERIMENTAL METHODS OR METHODOLOGY

FIGURE 1. PROPOSED METHODOLOGY

The primary objective of our project is to replace the human valet with a valet robot. The system inputs and outputs are controlled by an Arduino Mega. The slot number is shown on the Liquid Crystal Display (LCD - 16*2) so that the car can be parked in the designated spot. The fundamental methodology of this research is to detect the presence of vehicles and indicate the hotel. As soon as

the ultrasonic sensor detects the movement of the vehicle a 100 m before the hotel, it signals the presence of the hotel to the passengers or guests through a digital display, and an IR sensor is positioned at the hotel entrance to detect the entrance of a car. The valet robot is engaged when the vehicle is found, and it greets the visitor with an audio announcement. The audio announcement is heard through an electronic speaker. In each parking space, the IR sensor is positioned there to determine whether the parking slot is empty. So that the visitor can park their car on the designated slot number, the vacant slot number is shown in the 16*2 display as it is fixed in the valet robot. Each parking spot has a slot number displayed for the convenience of the drivers. With this method of parking the disruption between vehicles will be reduced and traffic congestion will be avoided. Using this procedure, the vehicles are parked on the slot safely and securely.
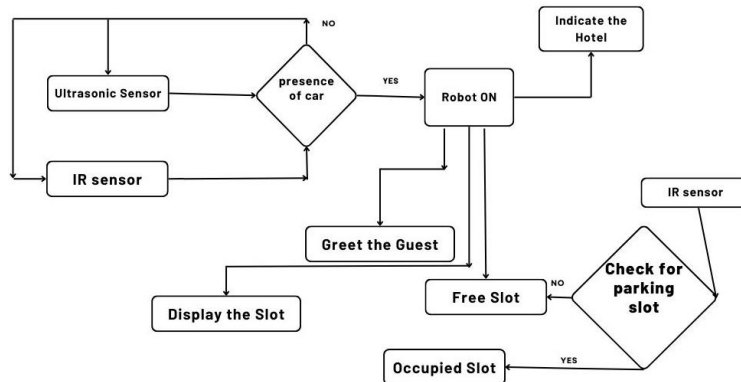

FIGURE 2. PROCESS FLOW DIAGRAM

4. SIMULATION

Simulation is the process of using a model to study the performance of a system virtually using the software. In this project, simulation is done using Tinker CAD. Tinker cad is a free web app for 3D design, electronics, and coding. This site has all the components we need to simulate the project.

Display of Hotel Name: The hotel's name will be displayed on a display board in the following stage. This makes the hotel easier to spot from a distance for guests. The system waits for a signal from the IR sensor at the hotel entry after displaying the name of the hotel. Before taking any further action, this ensures that the guest has actually entered the hotel grounds.

Switch Off Period: The system automatically shuts off if a visitor does not check in to the hotel within a predetermined time frame. To prevent the system from wasting power unnecessarily, the waiting time can be adjusted to a minimum.
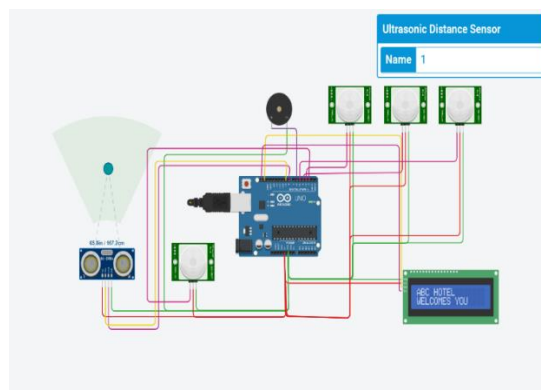

FIGURE 3.1 DETECTING VEHICLE AND GREETING

IR Sensor Detection: As soon as a visitor enters the hotel, the IR sensor recognises their vehicle and alerts the security system.

Welcome Message: The system then welcomes the visitor with a speaker and display. This message can be altered to suit the hotel's needs.
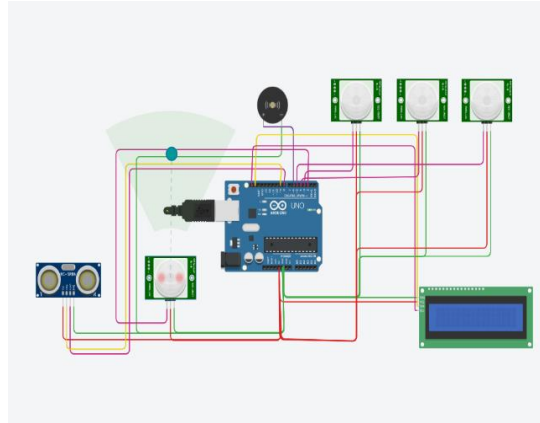
FIGURE 3.2 DETECTING VEHICLES INSIDE THE HOTEL AND GREETING

Slot Availability Check: To determine whether any parking spaces are available, the system analyzes the information from the IR sensors. A slot is designated as available if it is empty.

Display of Slot Number: The system then shows the parking space's slot number on the display board. This makes it easier for the visitor to find and move towards the parking place. Once the visitor has located a parking space, the system provides the quickest path to that space via the speaker. A text-to-speech system or a voice message that has already been recorded can be used for this.
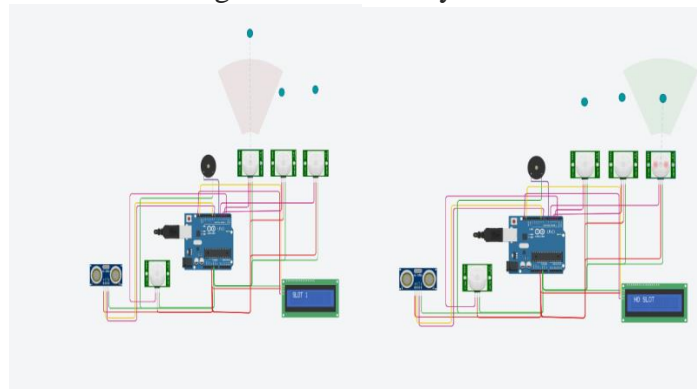

FIGURE 3.3 CHECKING FOR FREE SLOT

5. RESULTS AND DISCUSSION

This Valet Robot is developed using an ultrasonic sensor, IR sensor, Arduino UNO microcontroller, voice module and LCD. The prototype of this robot is capable of indicating the hotel, inviting the guests, and allocating the parking slot.
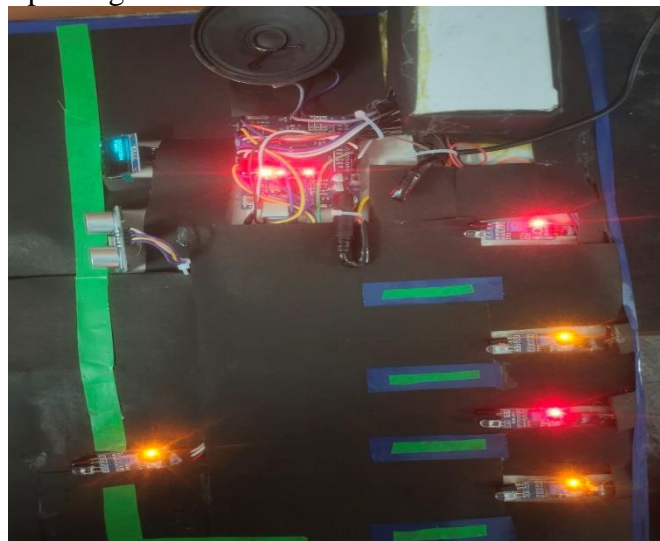

FIG.4.1 PROTOTYPE MODEL

6. FUTURE SCOPE

This developed technology can be used in any urban area where security guards and valets as they are standing too long in the sunlight and their health is affected. So, this project is mainly developed to replace those valets. The upcoming future development of this project can be implemented in
- Shopping malls
- Cinema halls
- Hospitals
- Airports

As per their needs and requirements that can be developed.

7. CONCLUSION:

The Valet robot is a revolutionary technology designed to enhance customer experience and improve the efficiency of hotel operations. This robot is equipped with advanced features that enable it to identify the presence of the hotel and park the vehicles of the guests or passengers.The Valet robot is intended to save hotel owners money as well as provide customers with ease and efficiency. Hotels may save a lot of money by placing the robot to reduce the amount of personnel needed for parking and associated services.

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