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SMART AND EFFECTIVE REALTIME MANAGEMENT OF STREET PARKING

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Abstract: The constant rise in the vehicles is creating many problems one of which is the parking system which is not organized and is being managed manually. Which leads to a lot of man power and the search of empty parking in this traffic world is a tough task. With the growth of technology, the concept of the Internet of Things (IoT) and deep learning can be used in the planning of Smart cities which can gradually tackle urban mobility problems and can also help to provide a sustainable infrastructure economically, ecologically, and socially to the citizens. The proposed method involves the development of small devices that send data to the internet using the internet of things (IoT) technology. The free parking space closest to the current location is found by genetic algorithm.

I. INTRODUCTION

The proposed used friendly method will help user to find the vacant parking on the go to their destination. They can either pre-book the spot or can go and go and do on the spot booking. Just like all the parking its cost will be fair and will be effective to everyone. Which will encourage to use this method. It will be detecting the nearest parking available. Like on Google map it shows the nearby restaurant or pump, and will be informing. Smart Parking is a parking solution than can include in-ground Smart parking sensors, cameras or counting sensors. These devices are usually embedded into parking spots or positioned next to them to detect whether parking bays are free or occupied. The smart car parking system is an integrated system to recognize the nearest available parking zone. So, the main purpose of the system is to provide a solution to the parking problem, to reduce the time to search for parking lots, and to eliminate unnecessary travel for vehicles. Smart parking system detect parking space availability in real-time, helping to optimize on-street parking in cities and in parking garages or surface parking lots such as those in shopping malls, train stations, corporate campuses, and more. The motivation for the project to help the user and make the payment way easier.

II. COMPONENTS REQUIRED

(1)Arduino UNO: The Arduino UNO is a popular microcontroller board based on the ATmega328P microcontroller. It is widely used in various electronics projects due to its simplicity, ease of use, and large community support. The Arduino UNO features 14 digital input/output pins, 6 analog input pins, a 16 MHz quartz crystal, a USB connection, a power jack, and a reset button.

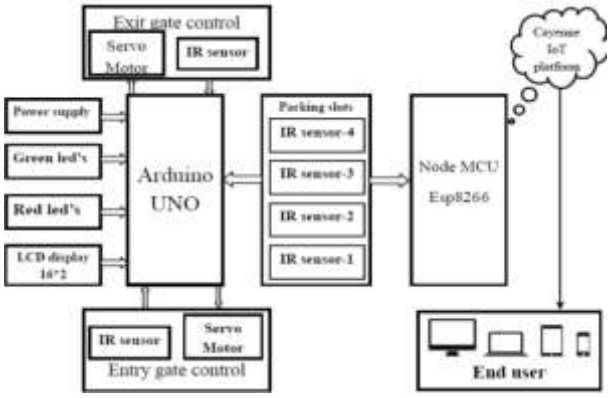
(2) IR Proximity Sensor: The image you uploaded appears to be an IR (Infrared) Proximity Sensor. These sensors are widely used in electronics projects, including parking systems, for detecting the presence of objects within a certain range.

(3)Servo motor: A servo motor is a type of motor that is specifically designed to provide precise control of angular or linear position, velocity, and acceleration. Unlike regular motors, which rotate continuously, a servo motor moves to a specific position and holds that position until instructed otherwise. This makes them ideal for applications requiring high precision.

(4)16×2 LCD i2c display: A 16×2 LCD I2C display is a commonly used electronic display module that can show 16 characters on each of its 2 rows, for a total of 32 characters. The I2C (Inter-Integrated Circuit) interface simplifies the wiring and control of the display, reducing the number of pins required for connection to a microcontroller like an Arduino.

(5)Jumpers: Jumpers are typically small plastic housings that contain a conductive material inside. The housing fits snugly over two or more pins on a circuit board, allowing electricity to flow between the connected pins.

III. ARCHITECTURE OF PROJECT



When the user will come to park the vehicle or exit from the parking lot, at first the IR sensor detects the motion of the vehicle and with the help of servo motor gate will open. Then the Arduino UNO collects the data from the IR sensor. The LCD displays which displays the path or direction for the parking. In every parking lot there are two types of LED's, Red and Green LED. Red LED refers that the parking space is occupied by someone or it is reserved. Green LED refers that the parking space is available for the vehicle.

IV. ALGORITHM

Algorithm for I2C Scanner:

1. Start the I2C connection and show "I2C Scanner" on the screen.
2. Check all addresses from 1 to 5:
   If a device responds, show its address.
   If there's an error, show "Unknown error."
3. If no devices are found, say "No devices found."
4. Wait 5 seconds and do it again.

Algorithm for Car Parking System:

1. Arrangement:

- Initialize LCD, servo motor, and IR sensors.
- Display "ARDUINO PARKING SYSTEM" for 2 seconds.
- Set the gate (servo motor) to the closed position.
- Set the available parking slots (Slot).

2. Repetition:

o When a car arrives (IR1 sensor detects it):

♣ If slots are available, open the gate and reduce the number of slots.

♣ If slots are full, display "Parking Full" for 3 seconds.

o When a car leaves (IR2 sensor detects it):

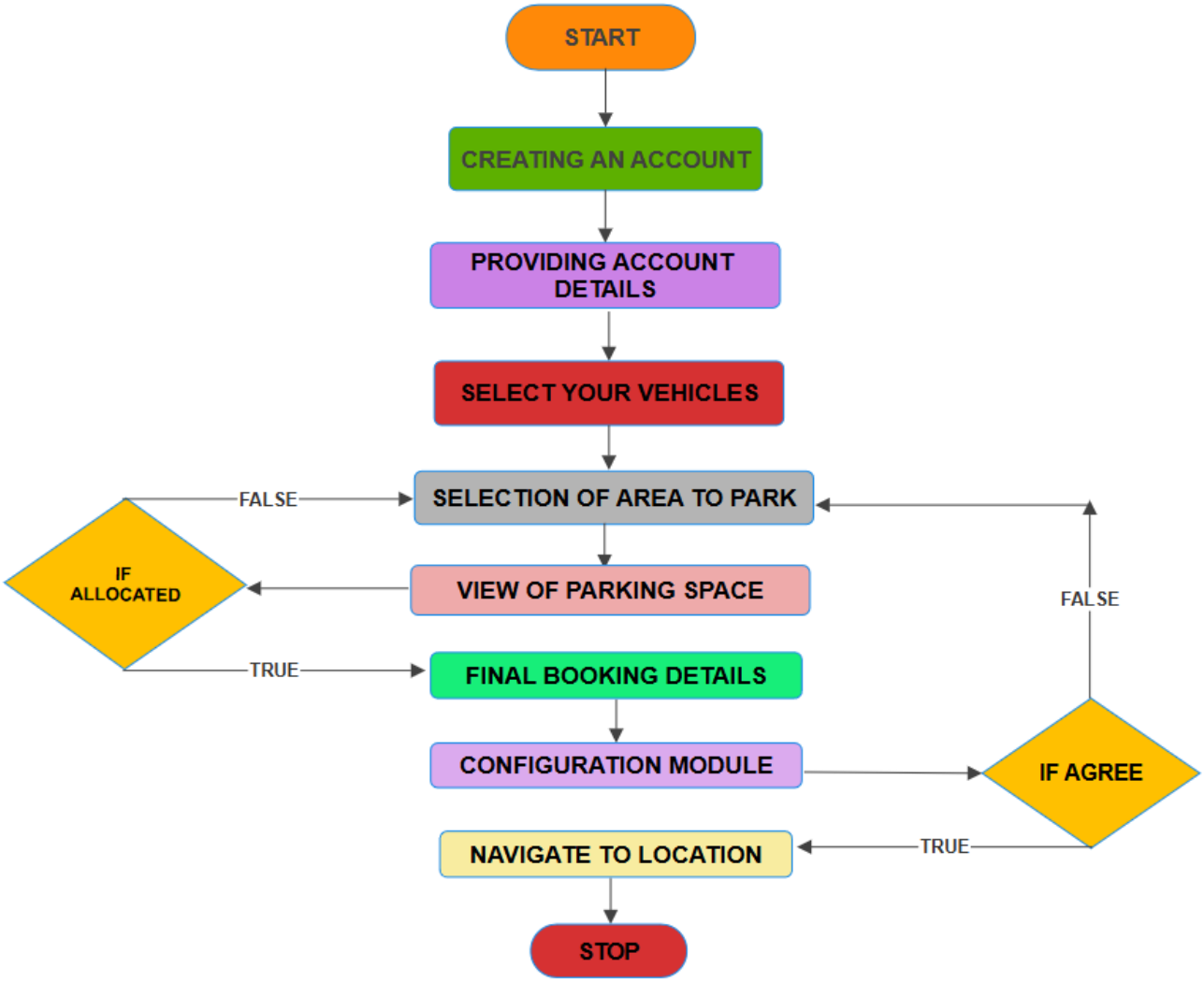
♣ Open the gate and increase the number of slots.

o Close the gate after 1 second if both arrival and departure are detected.

o Display "WELCOME!" and the remaining slots on the LCD.

o Repeat continuously.

V. FLOW CHART



VI. ADVANTAGE

1. Use parking protection easily.
2. Monitor your parking lots.
3. Manage parking lot using real-time-data.
4. Faster process.
5. Improved security.
6. Cost efficient.
7. Shorter waiting time at parking place.
8. It saves fuel, money and time.

VII. APPLICATION

- It helps an individual to pre-book the parking spot from the distant area.
- It reducing traffic congestion and allowing a user to know the availability of parking space in advance.
- It provides real time data on parking space availability, pricing, payments and beyond.
- It positively impacts the traffic and environment.
- It helps to save time and fuel.

VIII. CONCLUSION

The development of IoT based smart parking information system is one of the most demanding problems for the growth of sustainable smart cities. It can help the driver to find a free car parking space near to the destination. It will also save time and energy consumption by efficiently and accurately predicting the available car parking space in the real time using real time data and

is cost efficient and can be better in the Indian cities. Future work will also focus on the development of various techniques to predict the real time availability of parking lots using image and video data captured through various sensors.

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