SMART CAR-PARKING SYSTEM USING IoT

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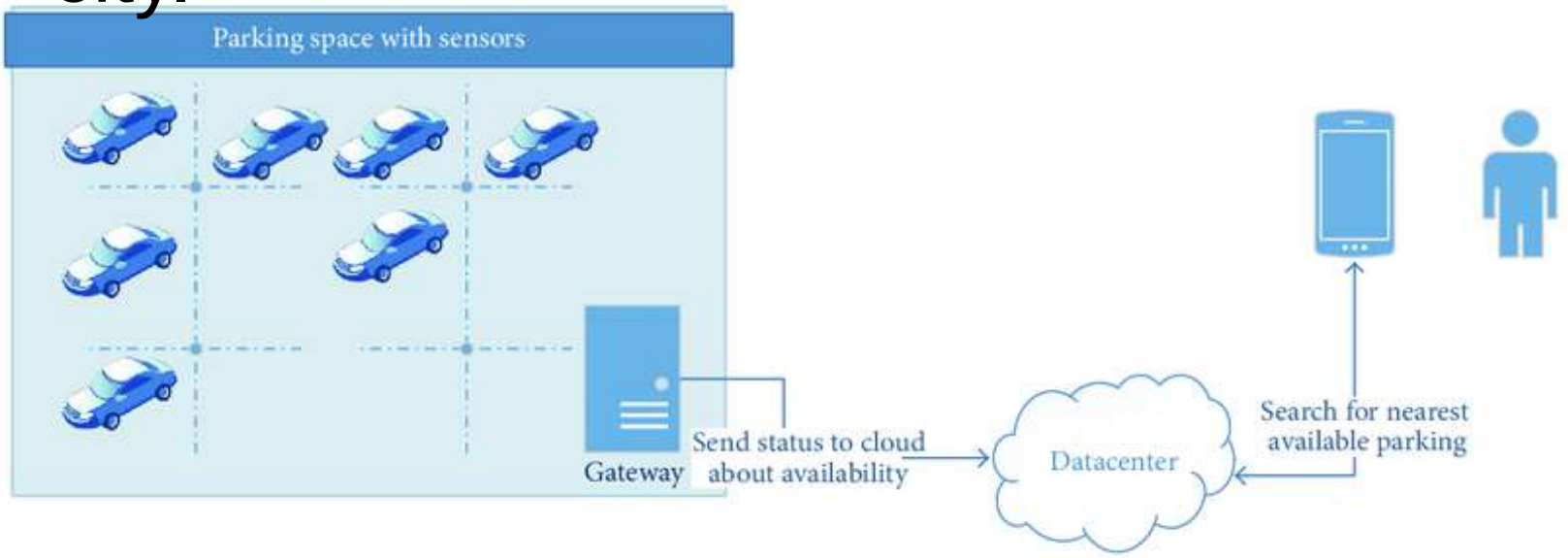
Objective

- The main aim of this project is reduces the risk of finding the parking slots in any parking area.
- It eliminates the unnecessary travelling of vehicles across the filled parking slots in a city.



Introduction

- Smart Car Parking System is an integrated system to organize cars in public areas.
- All vehicles enter into the parking and waste time for searching for parking slot .

Literature survey

- GSM based vehicle parking system in the year 2017 by M.YUAVARAJU & M.MOUNIKA.
- RFID based car parking system in the year 2014 by MECHA TERRAIN.
- Wireless sensor networks based car parking system in the year 2012 by JOSEPH JEFFRAY.

Existing system

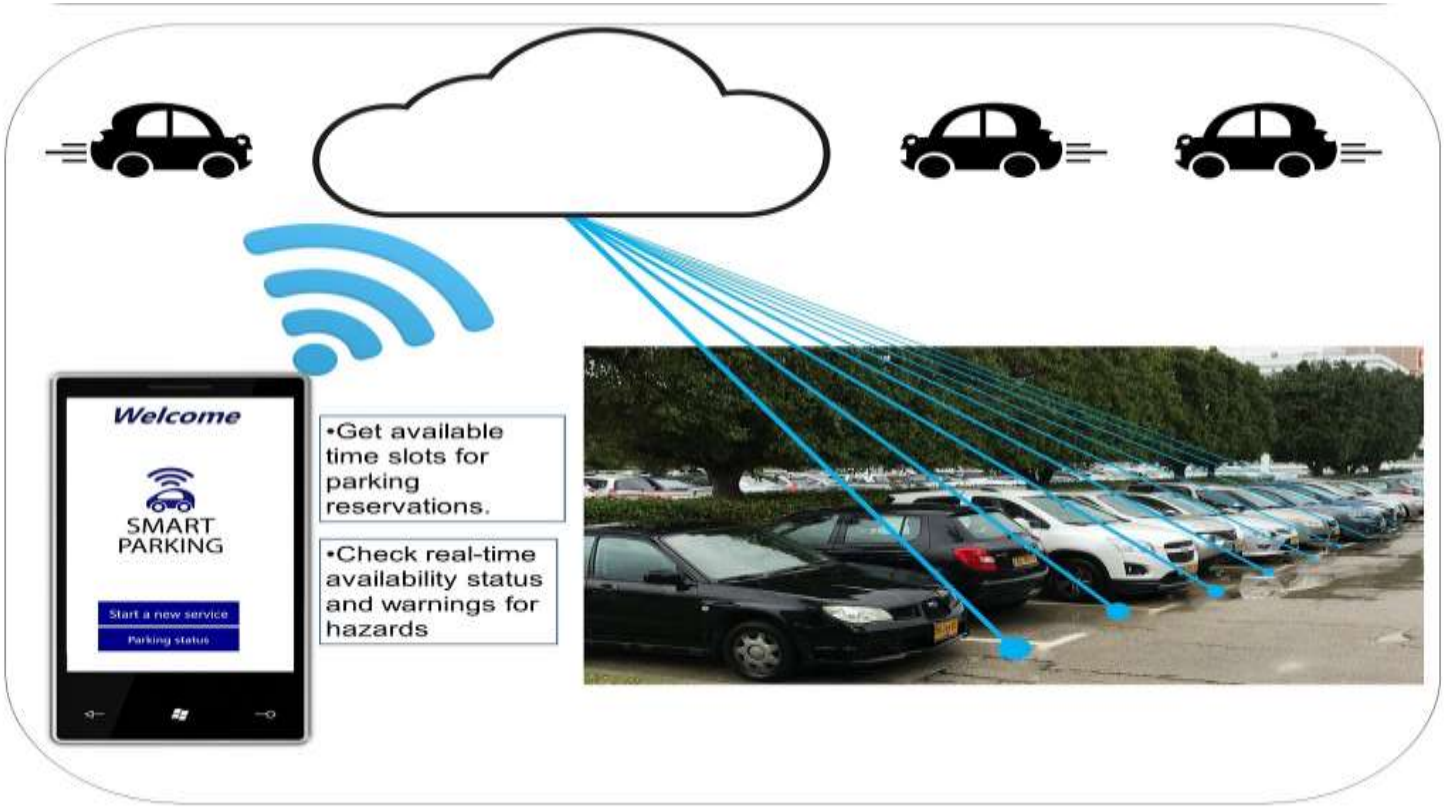
- The problem in the existing system is whether parking slot is available or not doesn't know before reach the parking area.

Problem Definition

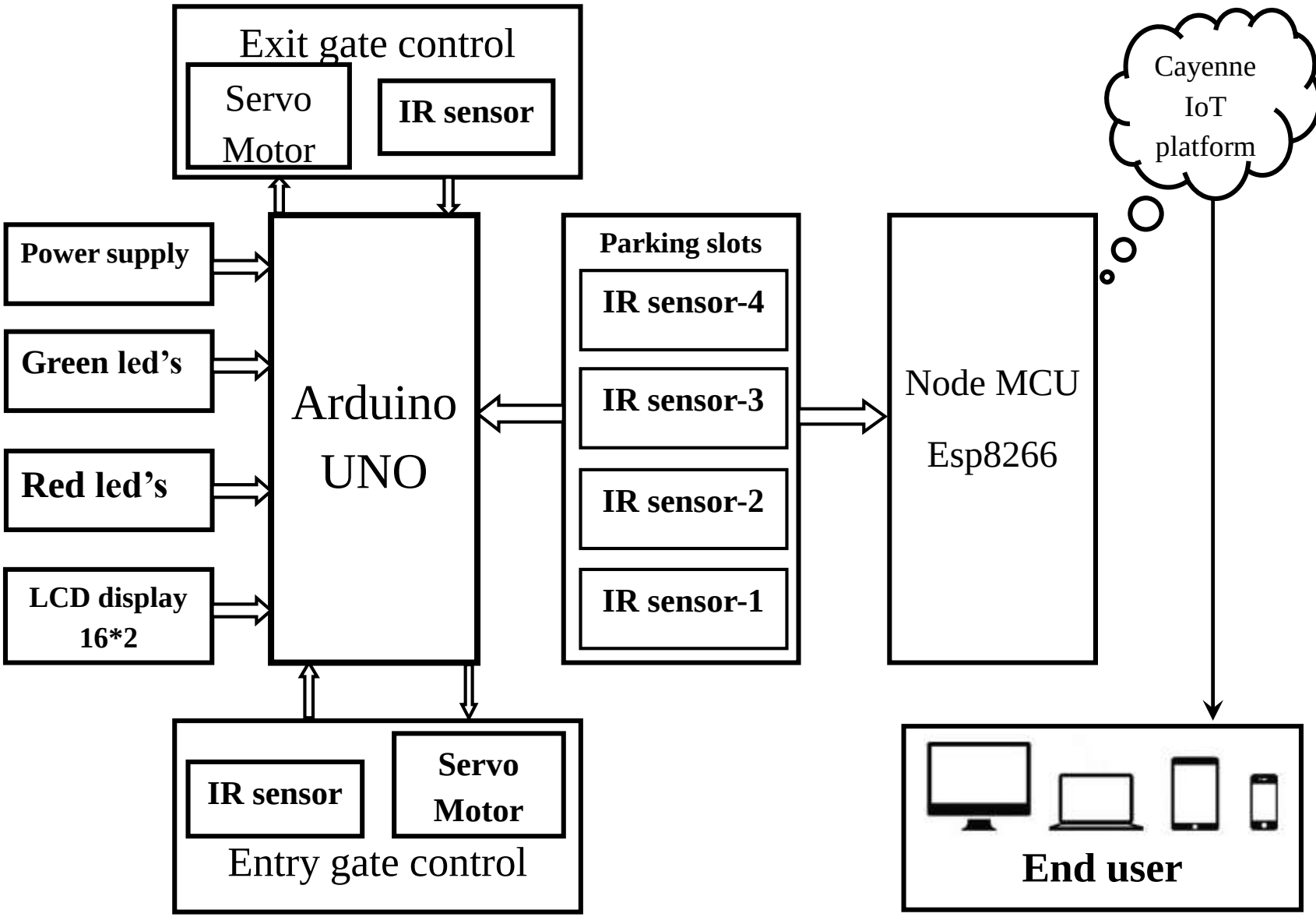
- With increase in the population, number of vehicles increases and due to unmanaged parking it leads to many problems.

Proposed system

- To find the parking space from any where by using the mobile applicaton.



Block Diagram



Component description

Hardware

- Nodemcu
- ARDUINO UNO
- IR Sensors
- Servo Motors
- LED lights
- LCD Display

Software

- Arduino IDE
- Cayenne

Arduino Uno

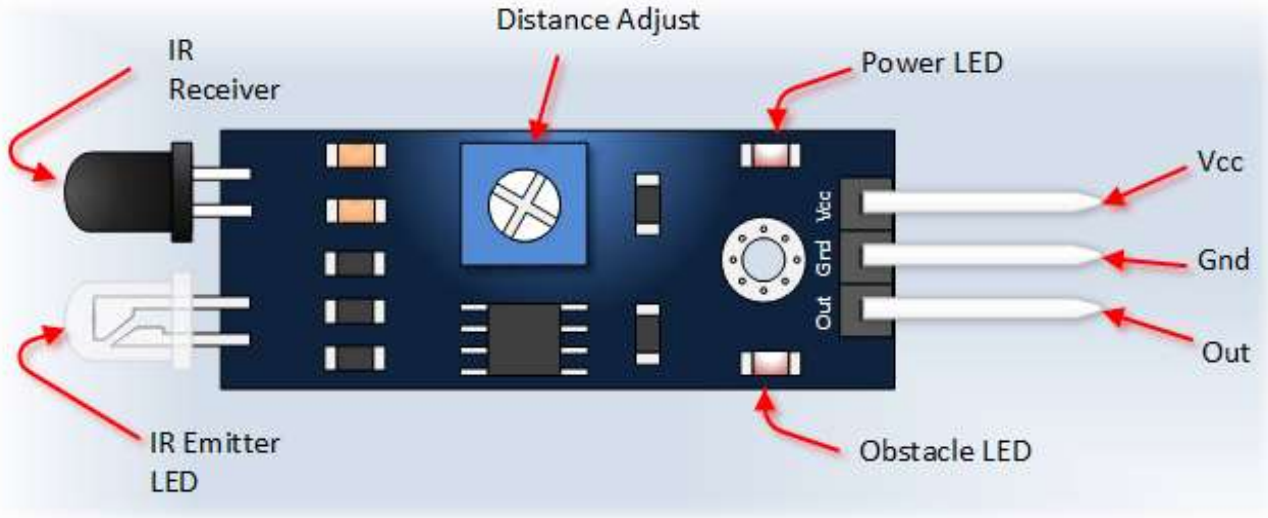
- Microcontroller: ATmega328
- Operating Voltage: 5V
- Input Voltage (recommended): 7-12V
- Input Voltage (limits): 6-20V
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin: 40 mA
- DC Current for 3.3V Pin: 50 mA
- Flash Memory: 32 KB
- SRAM: 2 KB (ATmega328)
- EEPROM: 1 KB (ATmega328)
- Clock Speed: 16 MHz

Node MCU

- 32-bit RISC CPU 80MHz
- 64KB of instruction RAM
- 4MB flash
- 96 KB of data RAM
- 13- GPIO pins
- SPI, I^2C
- Can be programmed with Lua, C/C++,Python, Basic, Arduino IDE

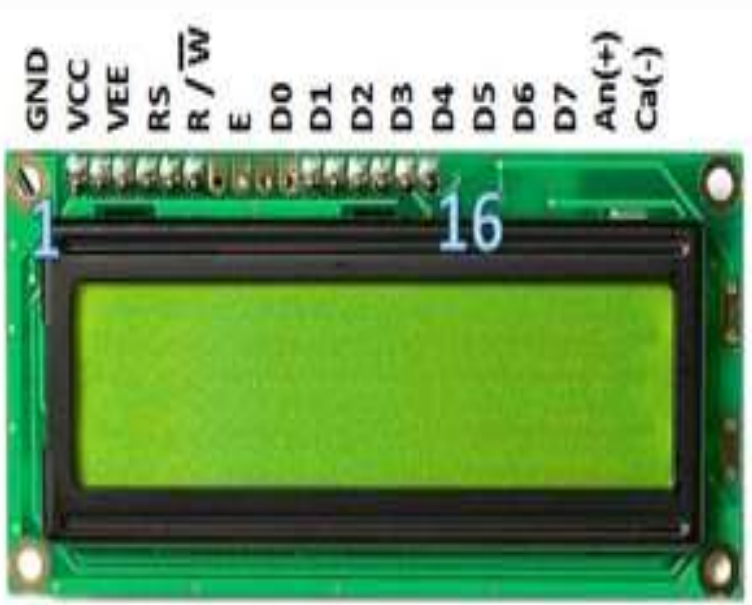
IR - Sensor

- Active output level: **Outputs Low logic level when obstacle is detected**
- On board Obstacle Detection LED indicator



LCD Display

- A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines.



Servo Motor

- Servo motors are used to lift the gates at the entry and exit of the parking area

LED

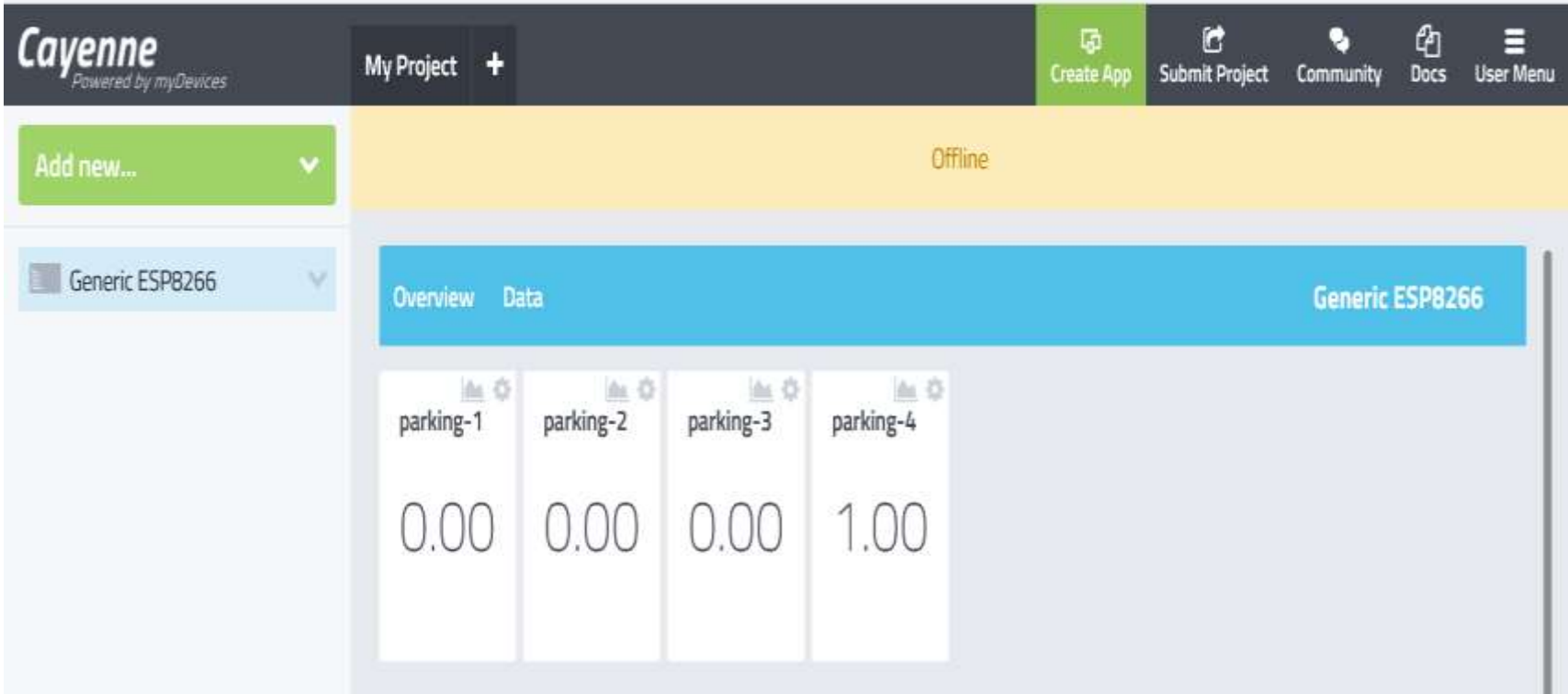
- A light-emitting diode (LED) is a semiconductor light source. LED's are used as indicator lamps in many devices, and are increasingly used for lighting.

Arduino IDE

- The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures.

Cayenne

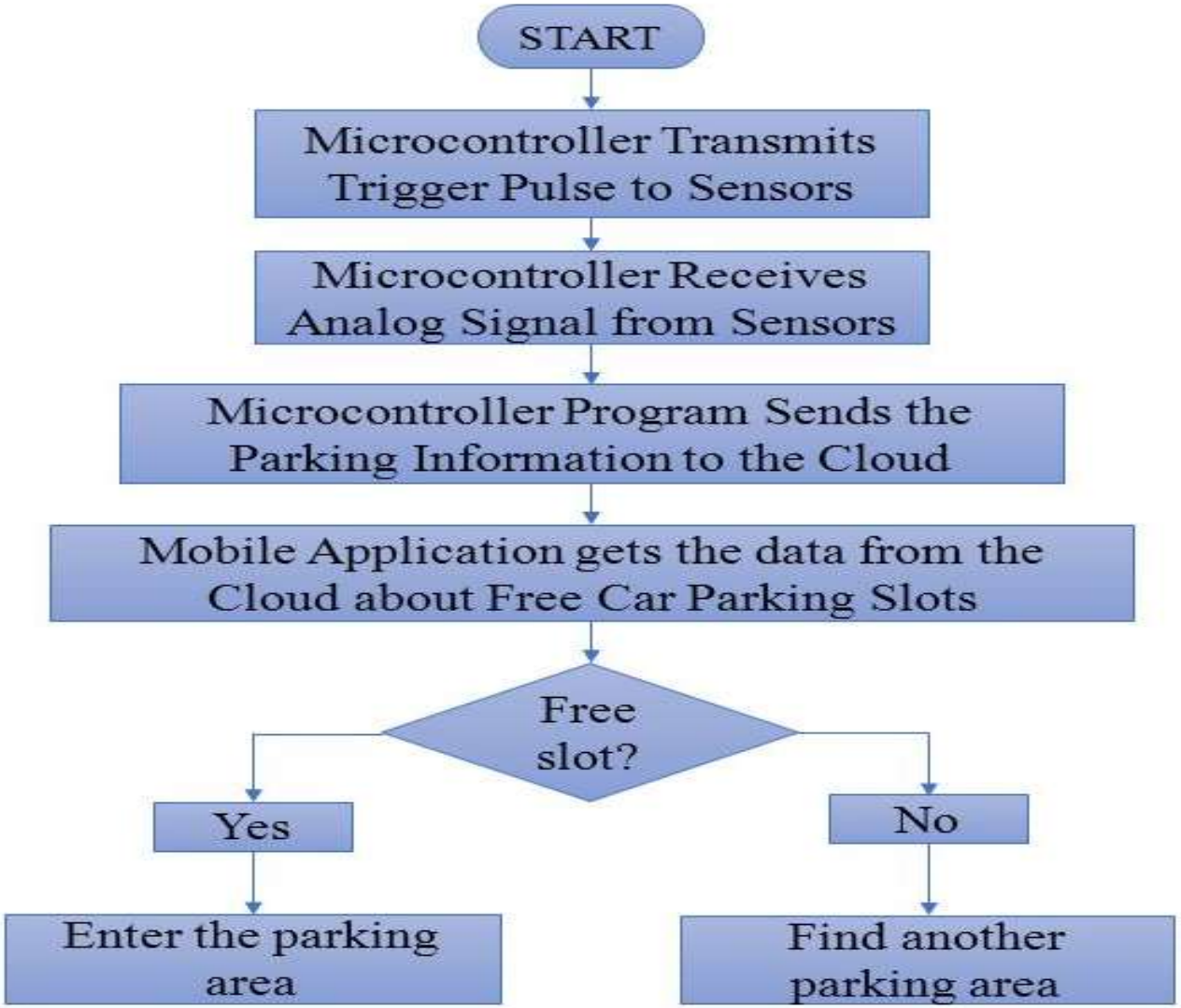
- The cayenne platform provides a user friendly platform for IOT companies to connect sensors and view data intelligently.
- It provides an application also for users to get the information about their interconnected devices in IOT.
- Now we use this platform to know the status of parking area.



Project planning

- Implementation of the proposed system.
- To study Software & Hardware components.
- Experimental setup of proposed design
- Checking the output by writing appropriate code.
- Result & Discussion.

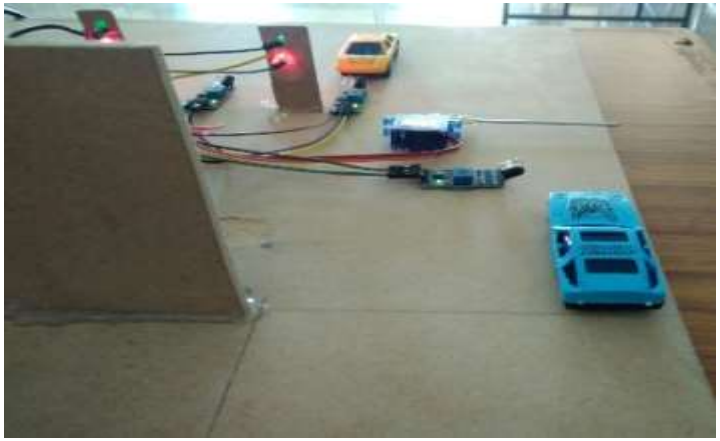
Flowchart


START
Microcontroller Transmits Trigger Pulse to Sensors
Microcontroller Receives Analog Signal from Sensors
Microcontroller Program Sends the Parking Information to the Cloud
Mobile Application gets the data from the Cloud about Free Car Parking Slots
Free slot?
Yes
No
Enter the parking area
Find another parking area

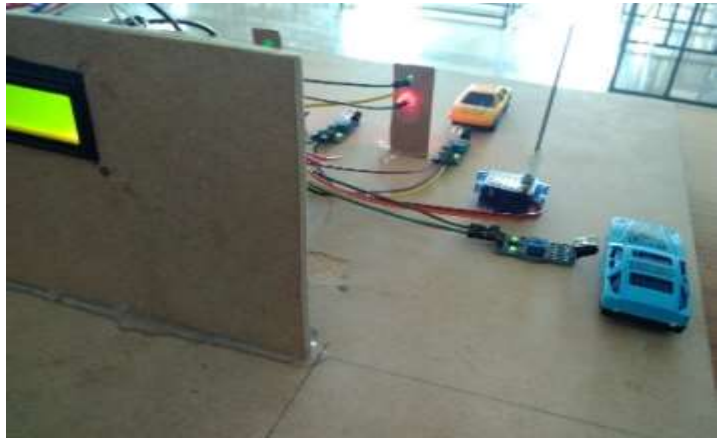
Working:

Stage-1:

When car enters the parking area IR sensor that is present before IN gate will detects the passing vehicle and the gate will be opened automatically.



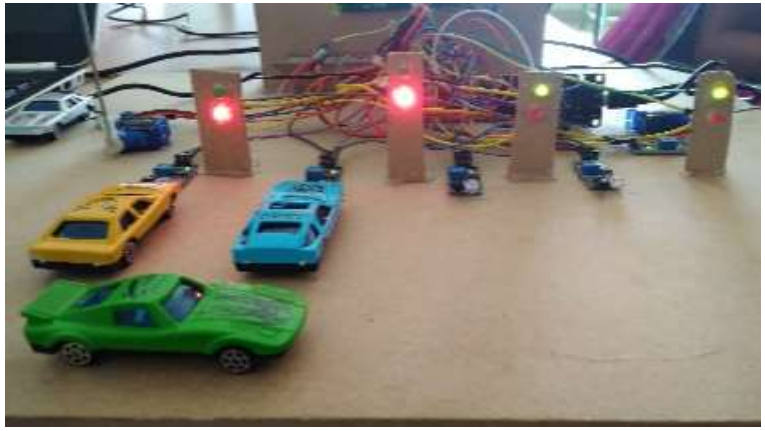
Before reaching to IN gate



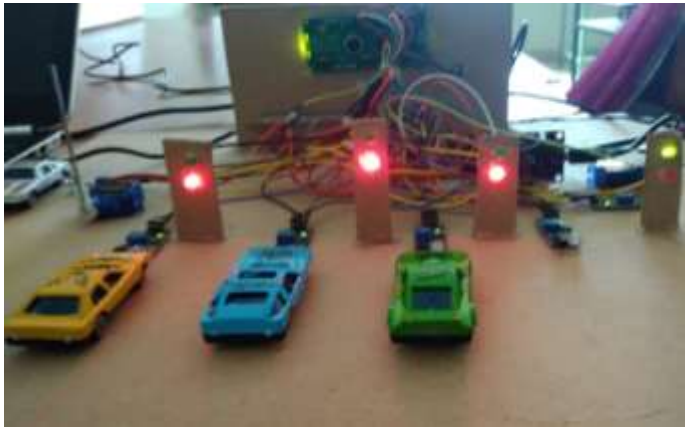
After reaching to IN gate

Stage-2:

The car will enter into the parking area at that time person doesn’t know which slot is empty, for this there will be an indication of LED’s for every slot when the Green light glows the slot is empty when the red light glows the slot was filled. By this the person easily know which slot is empty.



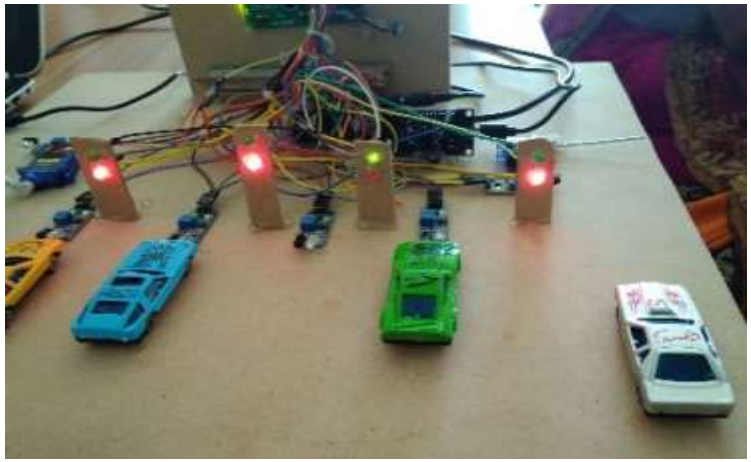
Before reaching to slot



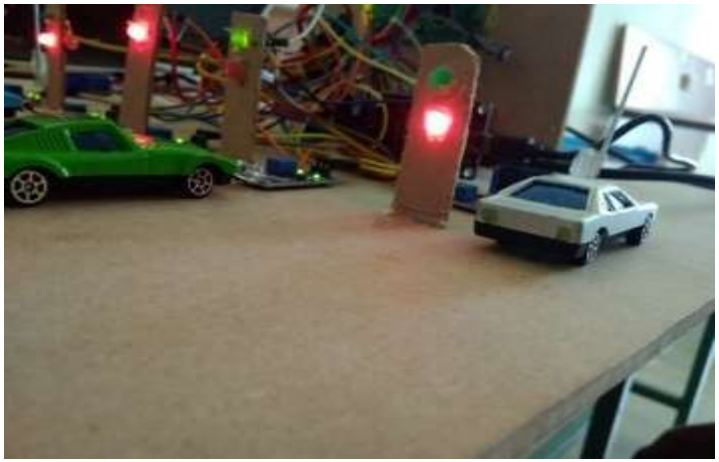
After reaching to slot

Stage-3

The operation of exit side will be same as that of the entrance. When the car is leaving the parking area, the IR sensor that is present before the OUT gate will detect the passing vehicle and the gate will be opened automatically.



Before reaching to OUT gate



After reaching to OUT gate

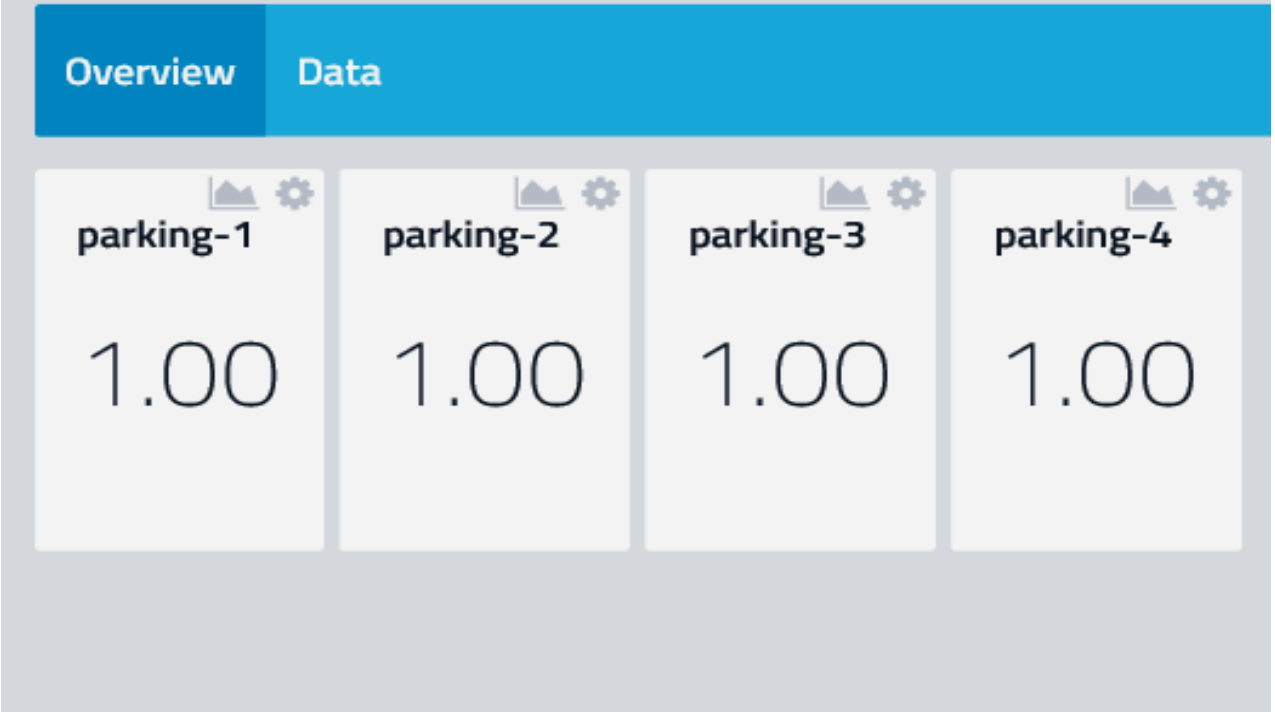
Stage-4

In front of the parking area, there will be an LCD display that is used to show the status of the parking slots, whether the parking is available or not.

Stage-5

The main advantage of the current system is the user will register in CAYENNE application/website.

From this application/website also the user can see the status of parking area. In this application it will show the information of parking slots individually.



Advantages

- Shorter waiting time at parking place.
- It saves fuel, money, space and time.
- Reduced pollution.
- Reduced traffic.
- Carbon emission is reduced.
- Efficiency

Applications

- The smart car parking system can be implemented in
- Shopping malls
- Restaurants
- Theatres

Conclusion

- This project focuses on implementation of car parking place detection using Internet of Things.
- The system benefits of smart parking go well beyond avoiding time wasting.
- Developing a smart parking solutions with in a city solves the pollution problem.

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- Kaempchen .N, Franke . U, and Ott .R, (2002) “Stereo vision based pose estimation of parking lots using 3-D vehicle models,” in Proc. IEEE Intel. Veh. Symp., pp. 459–464.

THANK YOU

ANY QUERIES