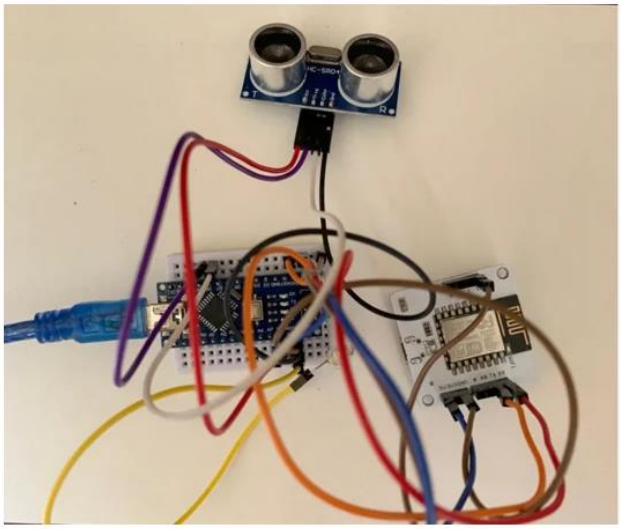
Smart Parking System



PROBLEM:

● Difficult to find an empty spot in a large, multi-storey parking lot
● Number of empty parking spaces is not known
● People have to go around the complete parking lot finding a free spot
● Time is wasted
● Manual assistance is needed

SOLUTION:

● Automated IoT based system
● Uses Bolt Cloud
● Database is updated every 10 second
● UI displays number of empty parking spaces on each floor
● LED in each parking spot to indicate empty/occupied spo

Things used in this project:

Hardware Components:

Arduino nano x1

Ultrasonic sensor x1

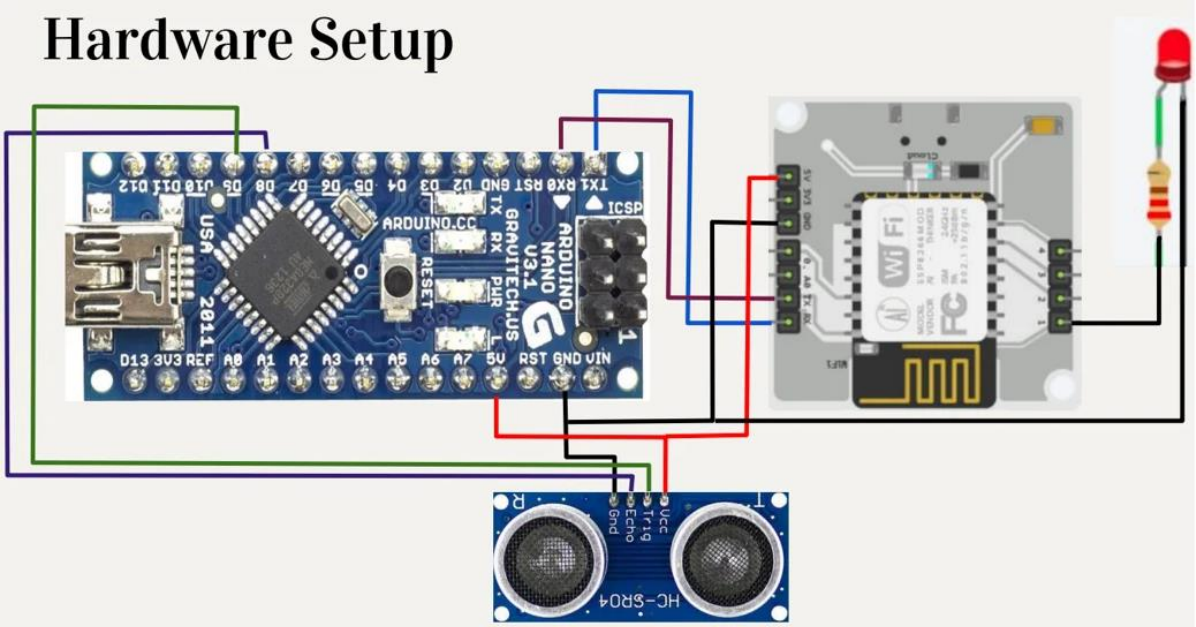
Jumper wires x10(6 male-male,6 female -female)

LED(included with bolt IOT training kit) x1

Software online services :

- Python IDE
- Arduino IDE
- SQLite
- Vue js
- Flask

Hardware setup :



Software Programming:

MAIN.py

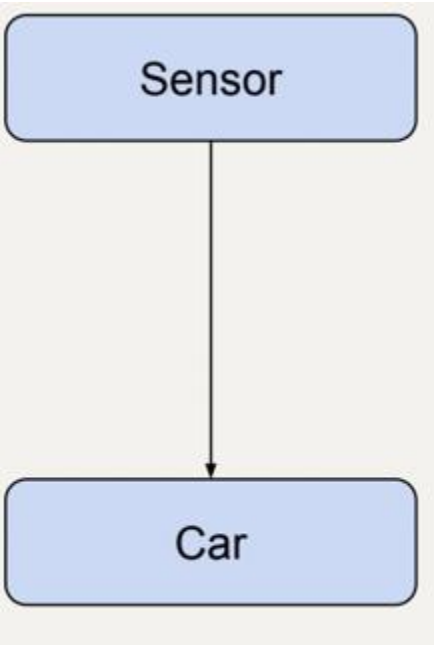
```
import schema

import state

import time
```

```
#create connection
schema.InitConnection()
#create database
schema.InitDB()

#check if the database has a lot by the name "Swargate". Number of rows matching the address is returned.
lots = schema.ParkingLot.selectBy(address = "Swargate")

#if there is no lot by the name "Swargate", create a lot.
if lots.count() == 0:
    lot = schema.CreateLot("Swargate", 3, 50, "Enter_bolt_cloud_access_token")
else:
    lot = lots[0]

#set the sensor of a parking lot.
schema.SetSensor(lot, 2, 1, "Enter_bolt_device_id")

#loop for checking and displaying number of empty spaces on each floor every 10s.
while True:
    state.CheckAll()
    for floor in lot.floors:
        print("Empty spaces on floor ", floor.fid, ":", floor.freeSpaces)
    time.sleep(10)
```

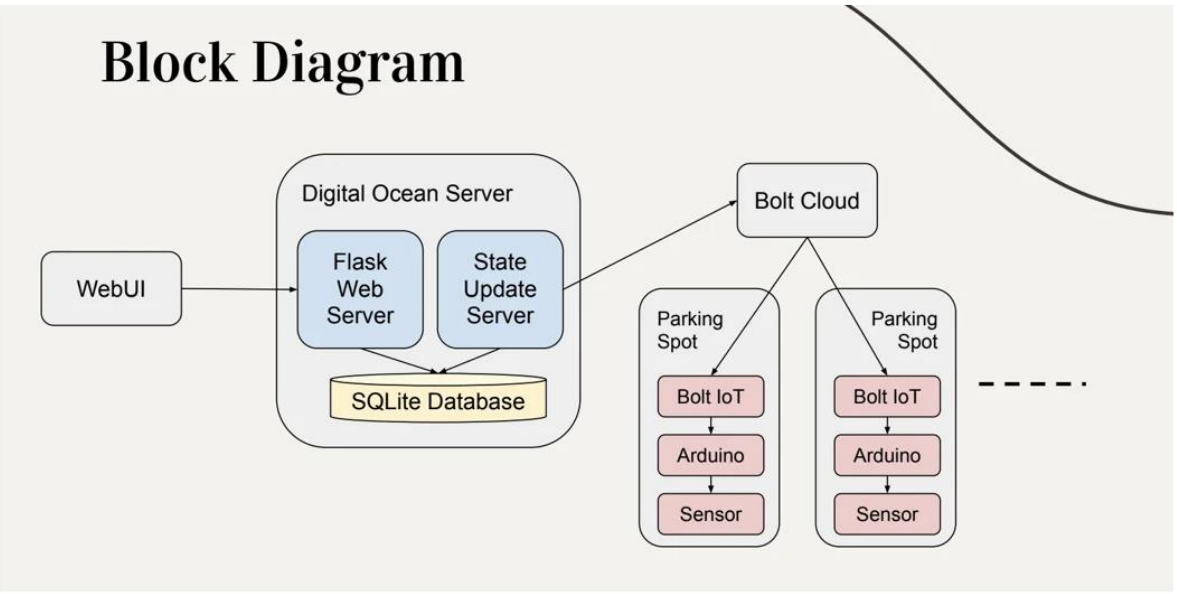
Basic Working:

- Detecting empty parking spot
- Indicating empty parking spot

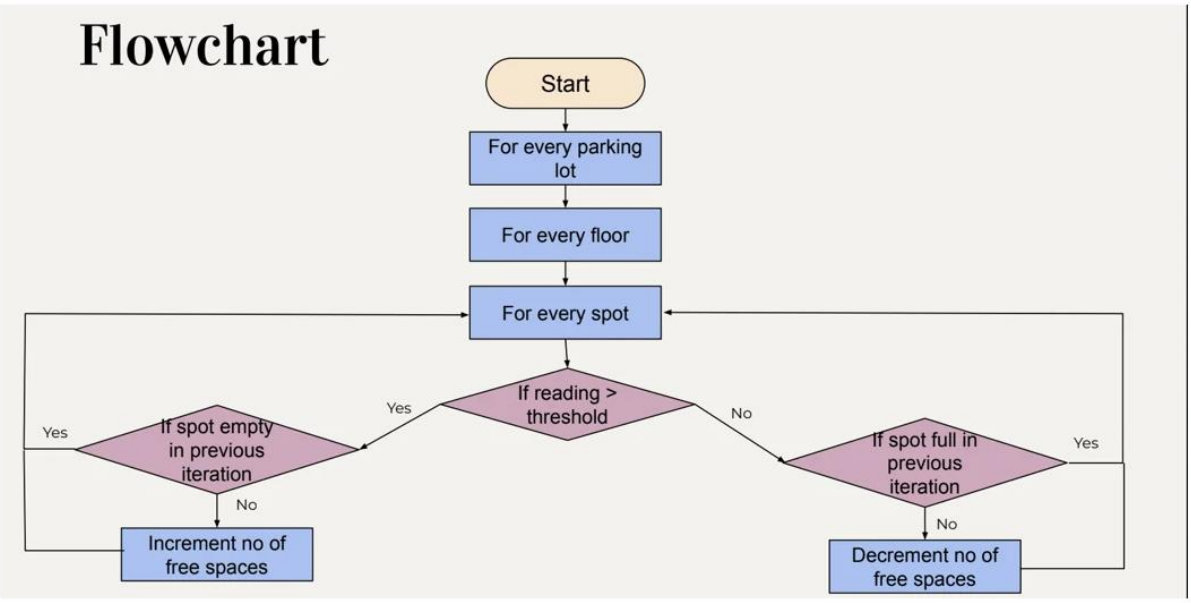
● Display total number of empty parking spots



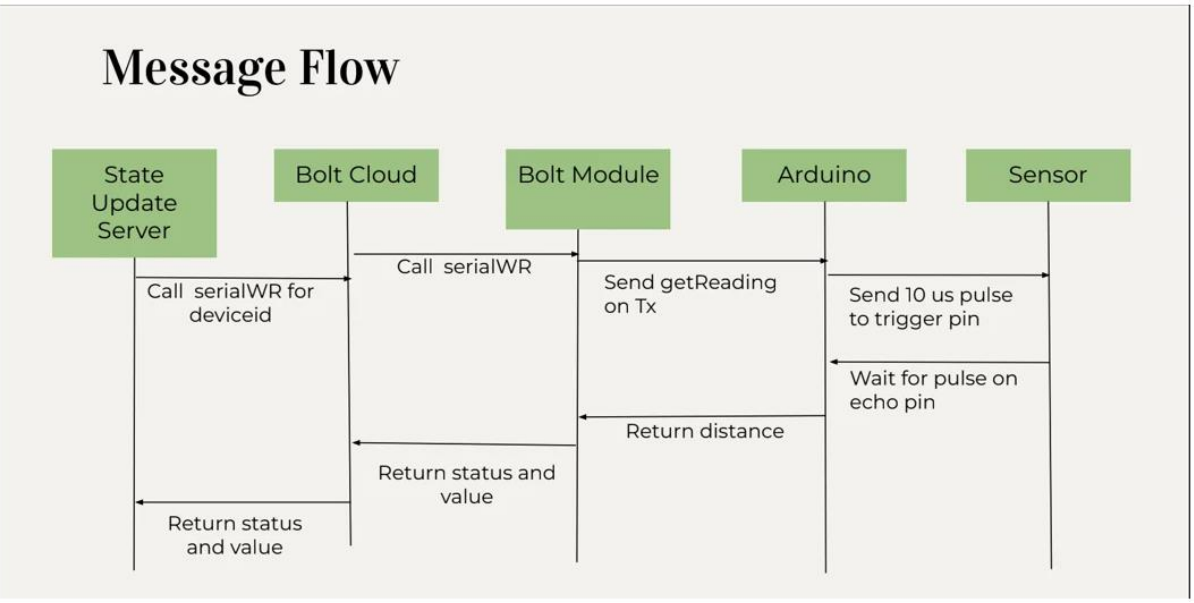
Block Diagram:



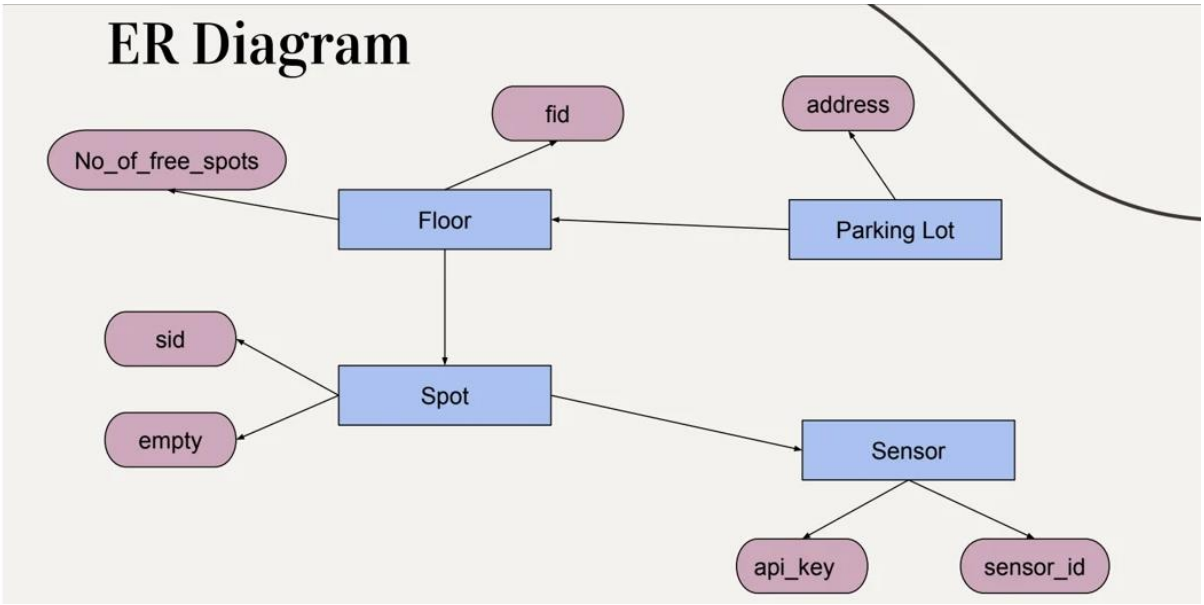
Flowchart:



Message Flow:



ER Diagram:

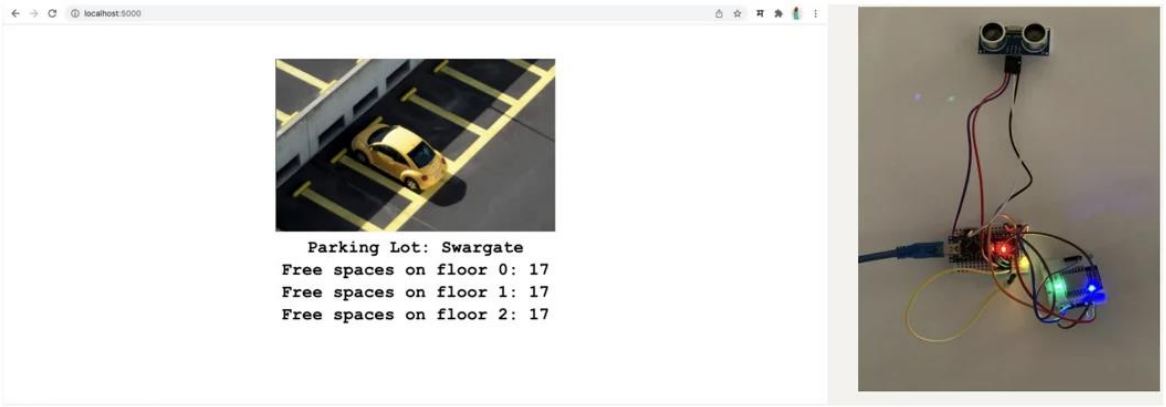


OUTPUT:

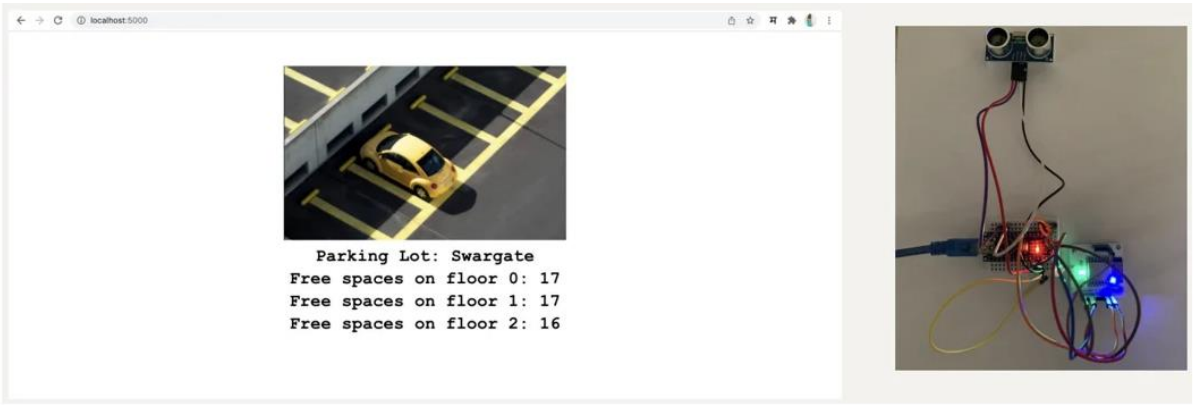
Debug Log Output:

```
PROBLEMS    OUTPUT    TERMINAL    DEBUG CONSOLE

Reading:  260
Empty spaces on floor:  0 17
Empty spaces on floor:  1 17
Empty spaces on floor:  2 17
Reading:  260
Empty spaces on floor:  0 17
Empty spaces on floor:  1 17
Empty spaces on floor:  2 17
Reading:  78
Empty spaces on floor:  0 17
Empty spaces on floor:  1 17
Empty spaces on floor:  2 16
Reading:  59
Empty spaces on floor:  0 17
Empty spaces on floor:  1 17
Empty spaces on floor:  2 16
Reading:  260
Empty spaces on floor:  0 17
Empty spaces on floor:  1 17
Empty spaces on floor:  2 17
```

Output - Spot is empty:



Output - Spot is full



Conclusion:

- Automated IoT based system
- Number of free spaces displayed
- Glowing LED to indicate presence of empty spot
- Database updated every 10 seconds
- Manual assistance eliminated
- Time wastage eliminated