

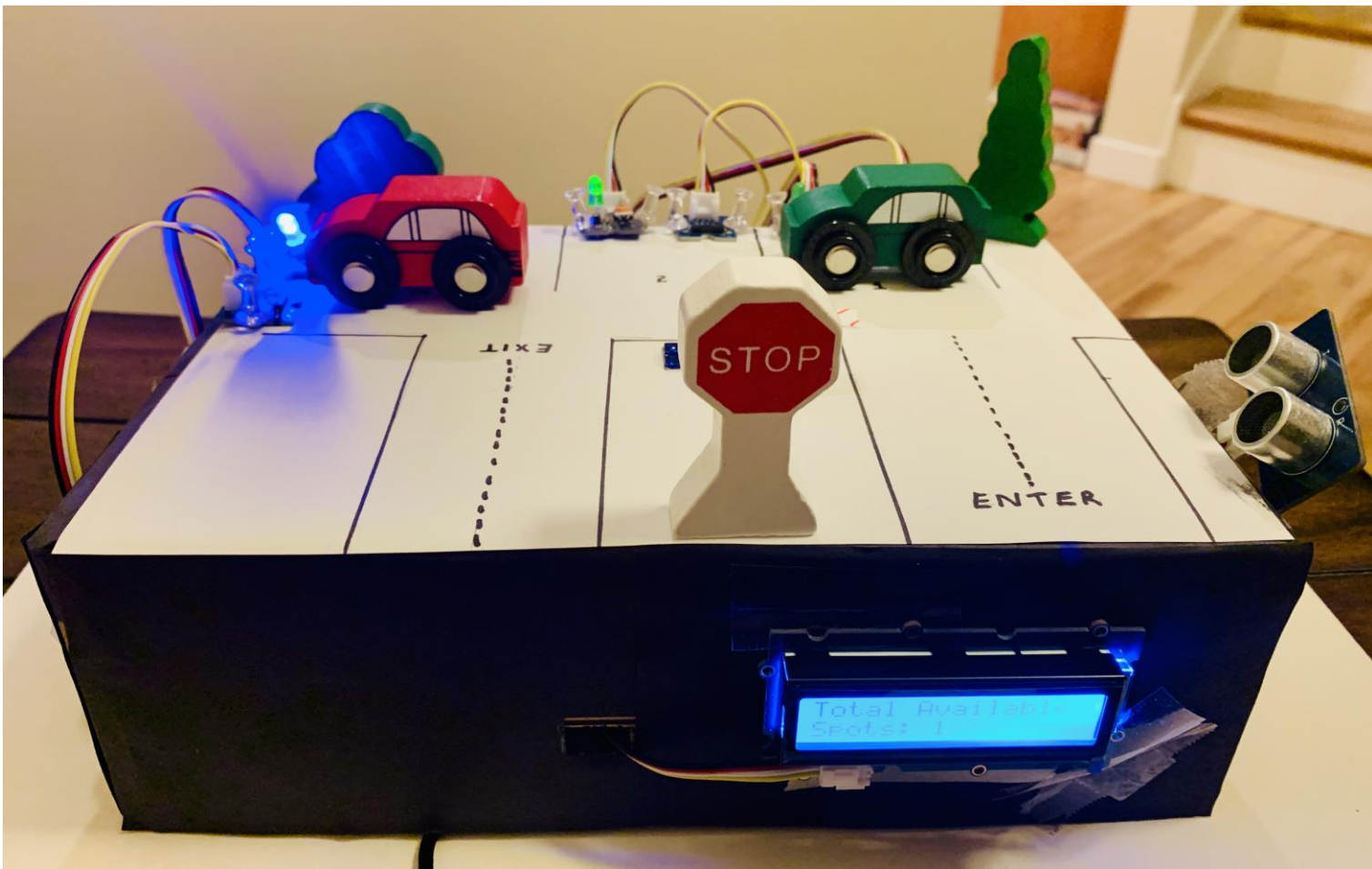
# Park Smart

TCS573 A: Internet of Things (IoT)  
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## MOTIVATION

The rapid growth in population has led to an increase in the number of vehicles on the roads and this in turn has led to a huge problem of identifying vacant parking spots, especially in busy cities. Smart Parking System mitigates this issue to a huge extent by letting the drivers know the number of vacant spots available at the parking lot, and showing the drivers on their mobile devices the available parking spots etc., thereby alleviating traffic congestion, improved parking space utilization, reduced stress on the drivers and also saves time in identifying parking. This in turn helps in improving the overall happiness of the citizens & also a major factor in building a Smart City.



Smart Park System

## INTRODUCTION

- Park smart system monitors the status of the parking spots i.e. if available/ occupied and indicates the status via the LEDs.
- Park Smart displays the total available spots on an LCD Display making it convenient for the users to know if the parking lot is full or not.
- Park smart provides a facility to reserve a reserved parking spot there by allowing the user to not invest time in searching for a parking space upon arrival and hence be stress free.
- Park smart notifies the admin if an unauthorized car is parked in the reserved parking spot.
- Park smart provides analysis based on the data collected by the sensors which provides an insight on the busy days of the month, and the reservations done per month for the last one year.

## COMPONENTS & TECHNOLOGIES

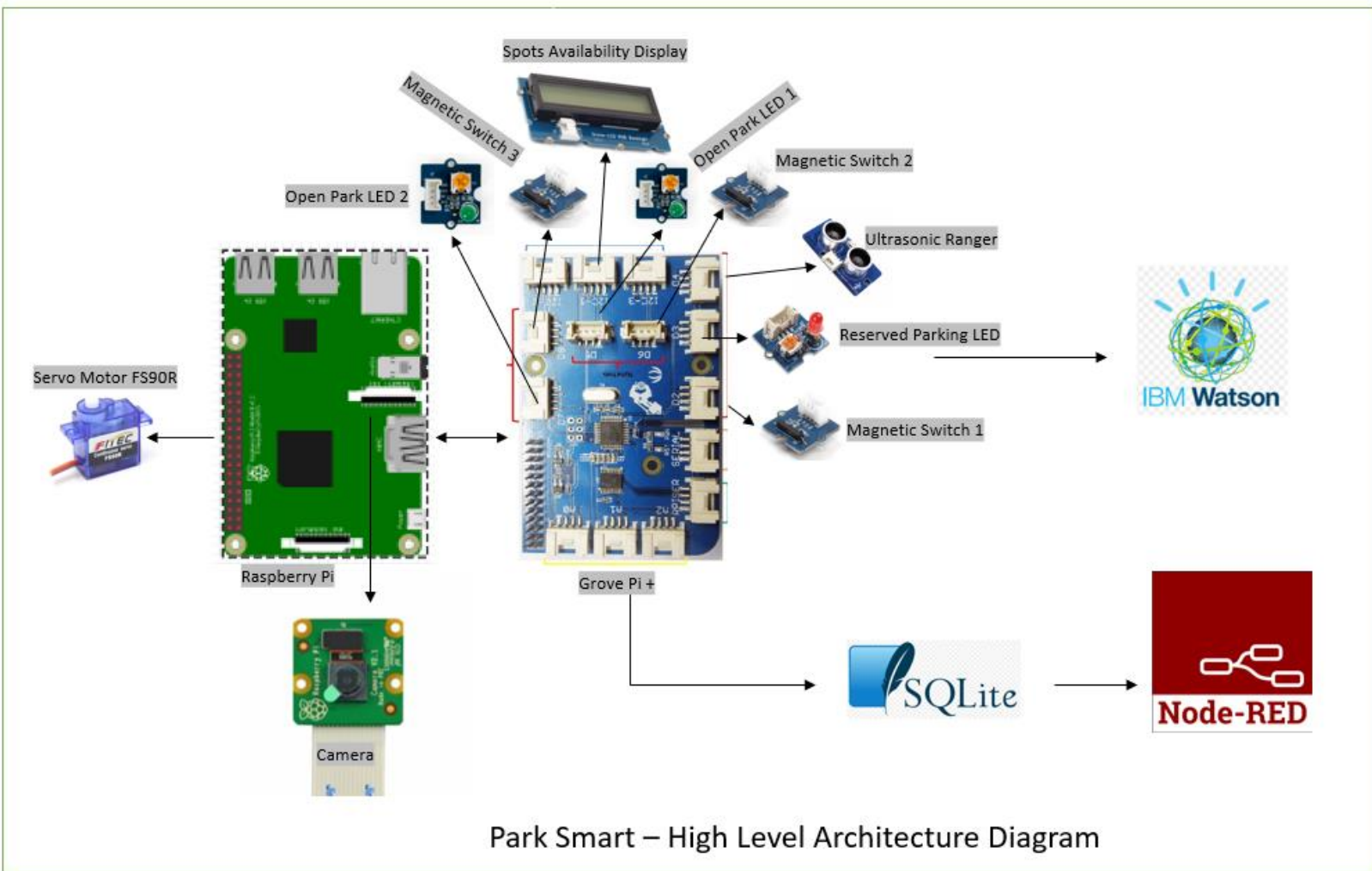
### HARDWARE:

- ❖ Raspberry Pi
- ❖ Grove Pi Plus
- ❖ Grove Magnetic Switch
- ❖ Grove Ultrasonic Ranger
- ❖ Camera
- ❖ Grove LEDs
- ❖ Grove LCD RGB Backlight
- ❖ Continuous Servo Motor – FS90R

### TECHNOLOGIES:

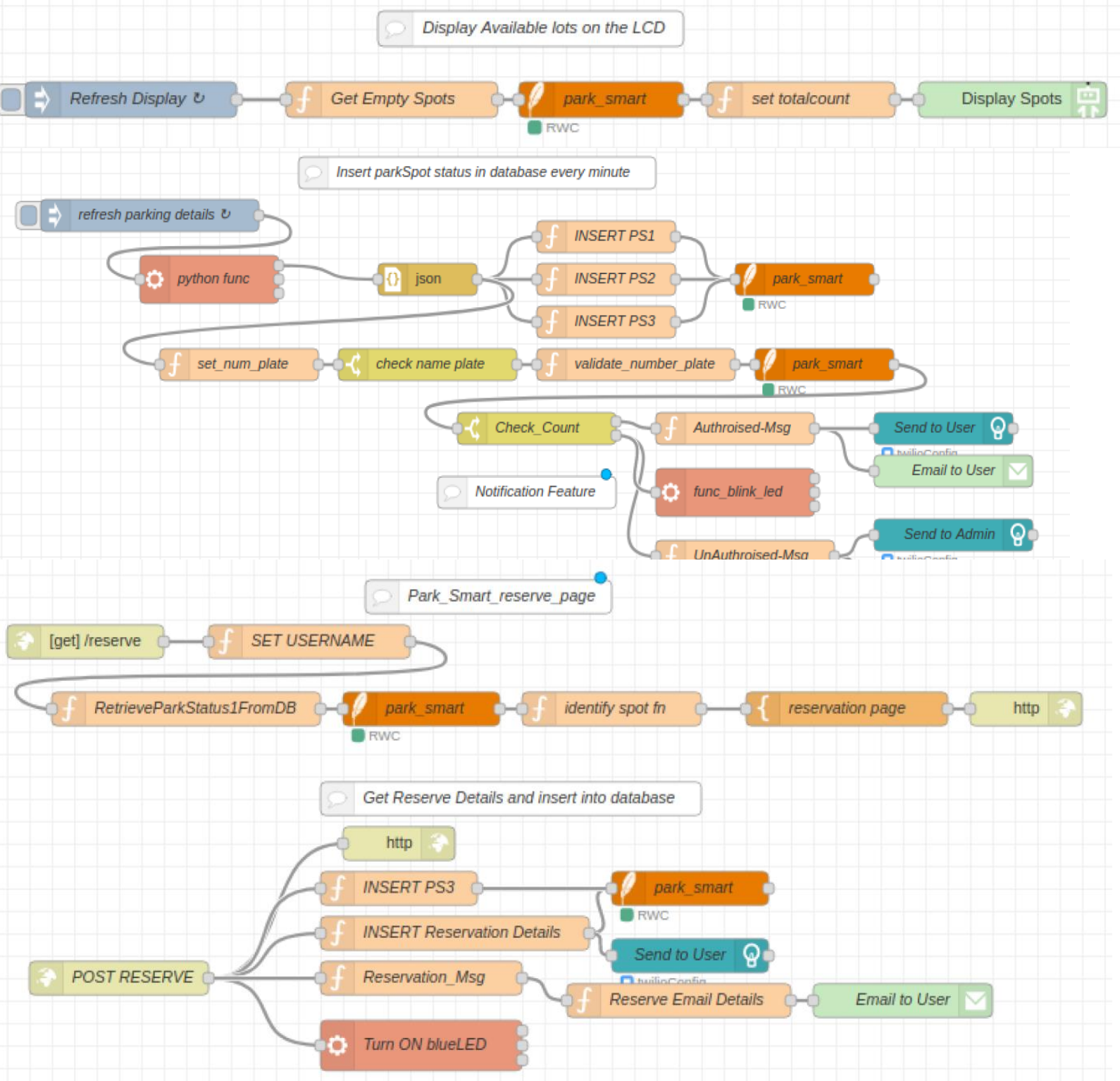
- ❖ NODE-RED
- ❖ Python
- ❖ JavaScript
- ❖ SQLite Database
- ❖ IBM Watson

## HIGH-LEVEL ARCHITECTURE



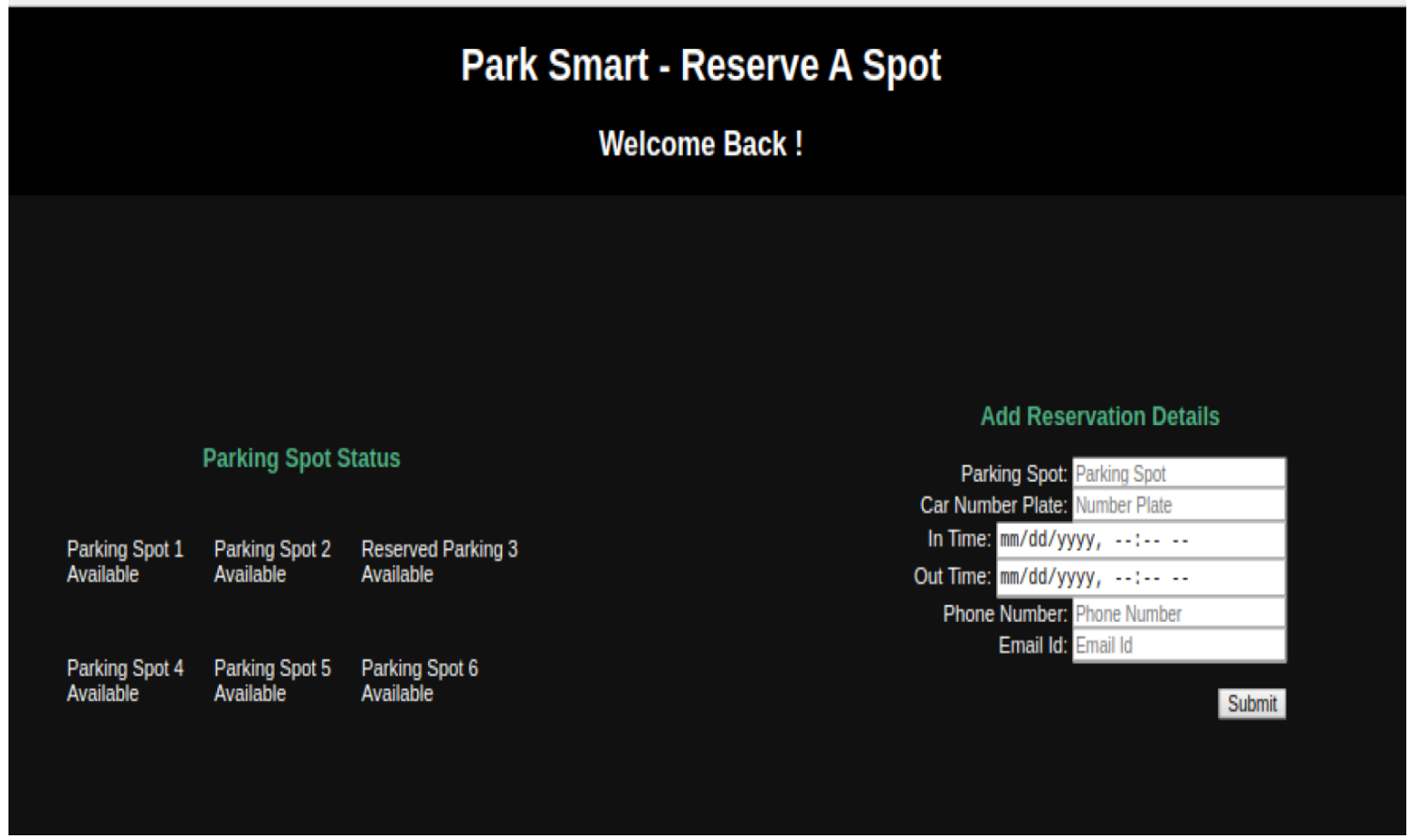
## KEY FEATURES

- Realtime update of the total available spots on the LCD Display
- Realtime notification of the open parking spots via LEDs.
- Ability to reserve a parking spot online.

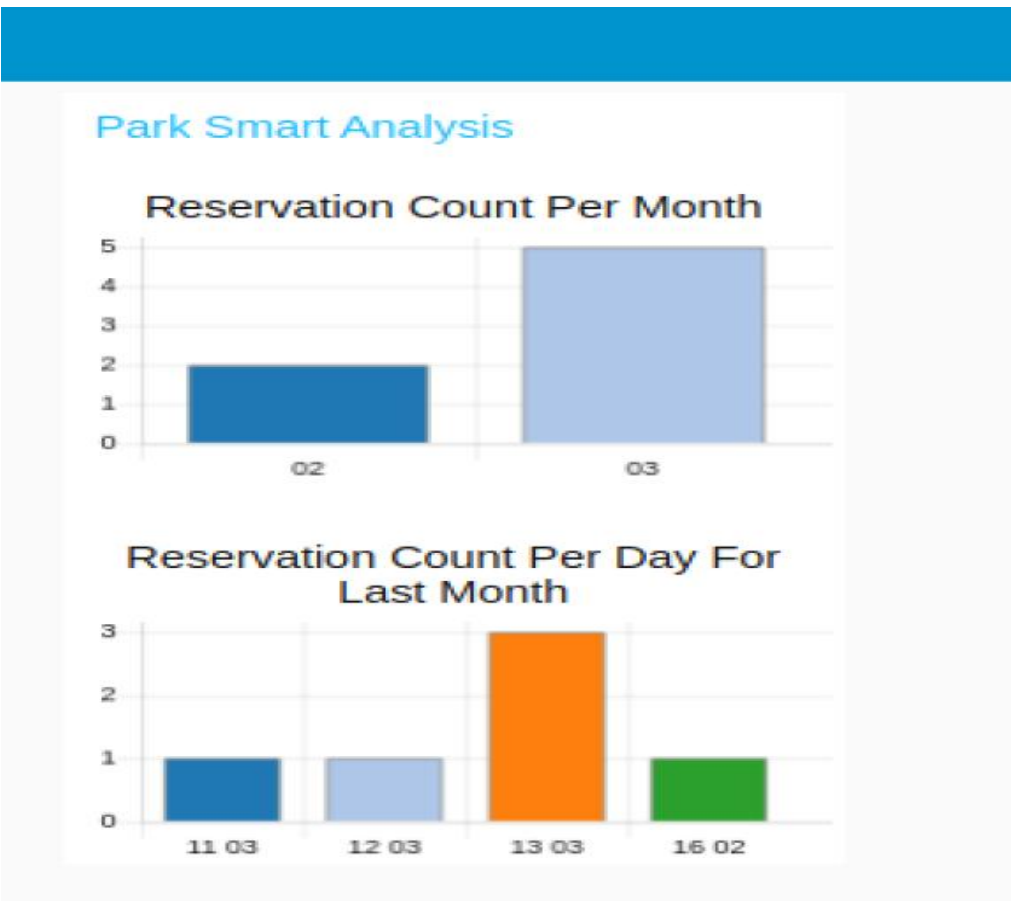


## DASHBOARDS

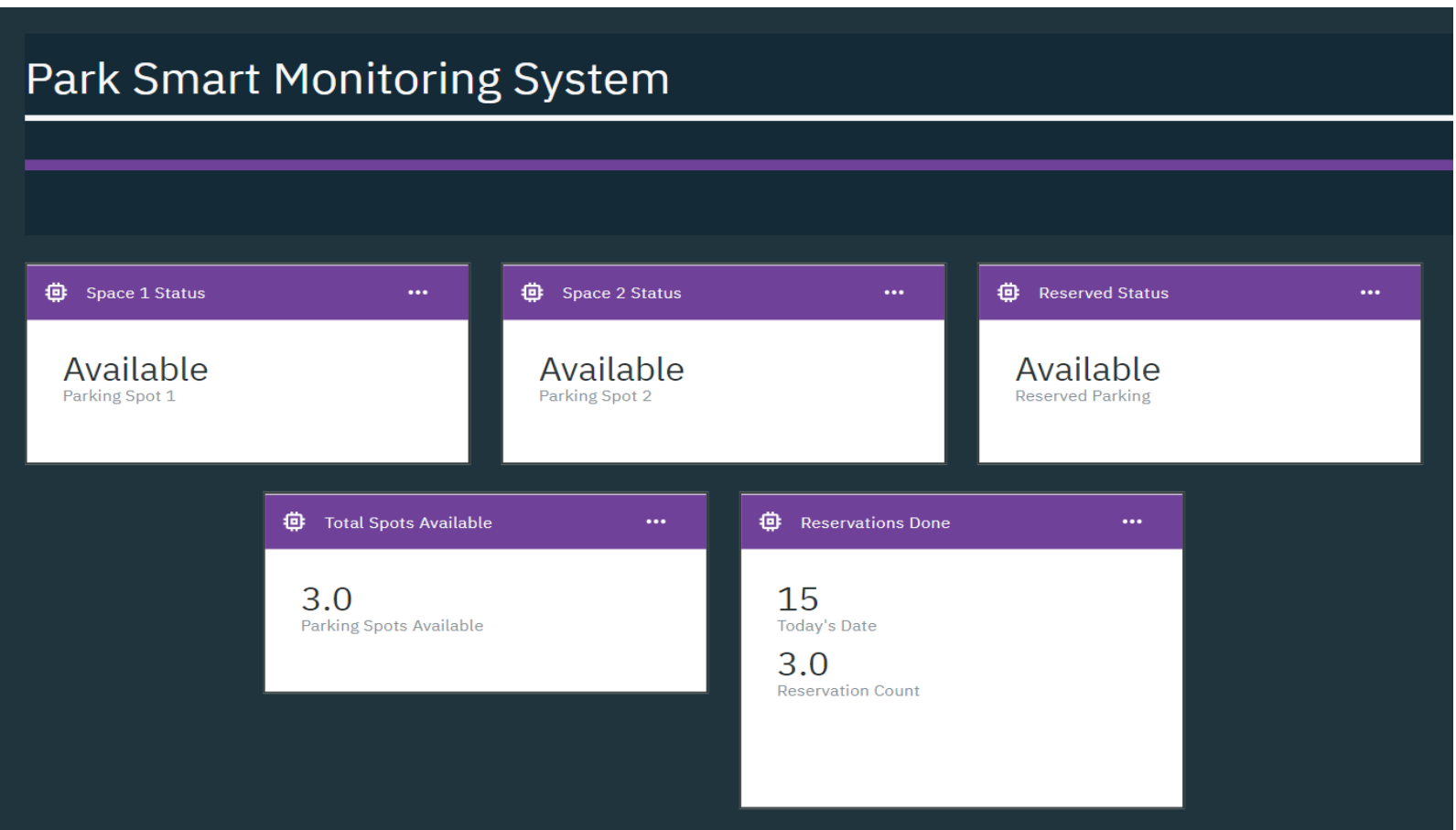
### Reservation/Status Display Page:



### Local Dashboard:



### IBM Watson Cloud Dashboard:



## FUTURE WORK

- Park Smart has a wide area/ options to expand. Few of them are listed below:
- To include payment options when reserving a parking space.
  - To include different payment rates for hours reserved on weekdays/weekends.
  - More analysis of the data collected at edge needs to be done on cloud to identify the busy hours in a day.
  - Based on the data analysis, provide offers and discounts to the frequent customers.
  - Provide directions to the driver to an open parking spot