SMART PARKING SYSTEM

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Abstract: Internet of things based technologies are more advanced these days and find its applications in almost all the fields .The use of IoT in parking lot will help vehicle users to know availability of parking location.This is IoT based Parking simulation project is created using paho mqtt in python with publisher,subscriber and broker.

Background: Usually the smart parking iot project is built using sensors,controller,battery ,etc.But here we came up with one simple simulation model which works with paho mqtt.

Aim: The main objective of this project is to build an IoT based smart parking system using paho mqtt.

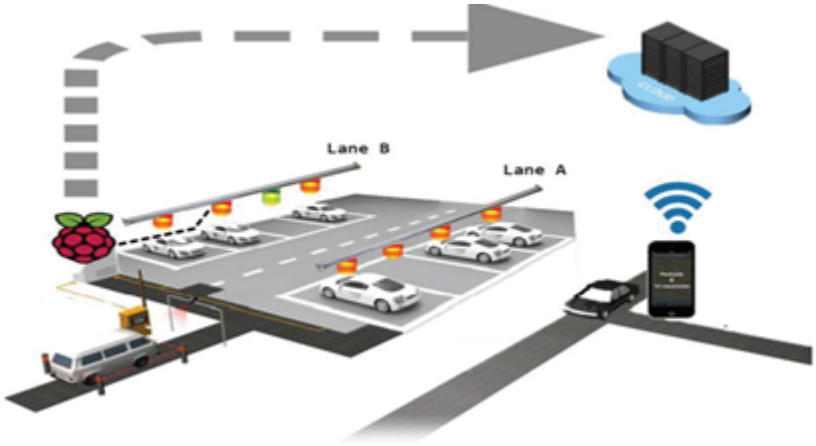

Figure 1.1: Model of automated car parking system

MQTT protocol: Message Queue Telemetry Transport:[1] it is a light weight protocol built over TCP/IP protocol stack. It is publisher-subscriber protocol. Specifically designed for M2M connection.

Comparison between conventional parking system and IoT based smart parking

Conventional parking system	IoT based smart parking
Less efficient in utilizing the space	More efficiently managing the parking space
More consumption of fuel leading to environmental harm	Less consumption of fuel
Less user friendly way(less convenience)	More user friendly way

Working of parking lot

The parking lot is designed using paho mqtt which has publisher and subscriber which are connected to broker.The system is designed in such a way that it displays the two option for client.

1. Customer has to choose 1 if he came to park the car
2. Customer has to choose 0 if he came to take out the car from park

Everytime customer parks a car he will be given a slot number in which his car is parked and later he can use this slot number to exit.The system says “slots are not available” if the slots are full .And also its always necessary to give the correct slot number while taking out the car.It also displays the bill amount you need to pay for parking your car.

Screenshots:

```
C:\Users\ramya b y\Desktop\IIT-H\2nd_sem\iot\project>python pub.py
Connected to broker
enter 1 for parking  and 0 for exit: 1
enter 1 for parking  and 0 for exit: 1
your car is in the slot:b'2'
enter 1 for parking  and 0 for exit: 1
your car is in the slot:b'3'
enter 1 for parking  and 0 for exit: 1
your car is in the slot:b'4'
enter 1 for parking  and 0 for exit: 0
enter your slot number: 4
your charge: 10
enter 1 for parking  and 0 for exit: 0
enter your slot number: 2
your charge: 20
enter 1 for parking  and 0 for exit:
```

Screenshot of pub,py

```
C:\Users\ramya b y\Desktop\IIT-H\2nd_sem\iot\project>python sub.py
Connected to broker
*************CURRENT SLOT STATE************
{1: "1'", 2: 0, 3: 0, 4: 0, 5: 0, 6: 0}
*************CURRENT SLOT STATE************
{1: "1'", 2: "2'", 3: 0, 4: 0, 5: 0, 6: 0}
*************CURRENT SLOT STATE************
{1: "1'", 2: "2'", 3: "3'", 4: 0, 5: 0, 6: 0}
*************CURRENT SLOT STATE************
{1: "1'", 2: "2'", 3: "3'", 4: "4'", 5: 0, 6: 0}
{1: "1'", 2: "2'", 3: "3'", 4: 0, 5: 0, 6: 0}
car exit
{1: "1'", 2: 0, 3: "3'", 4: 0, 5: 0, 6: 0}
car exit
```

Screenshot of sub.py

Conclusion:

The automated smart parking system simplified the system of car parking and resolves the issues of transport mobility as well as environment sustainability. It is cheap and easy way to solve the above stated issue.

Finding the appropriate parking space from distant place via web browser has become a reality now via IoT.

The system has proven to be more efficient than already existing systems.

REFERENCES:

[1] A. Khanna and R. Anand, "IoT based smart parking system," 2016 International Conference on Internet of Things and Applications (IOTA), Pune, 2016, pp. 266-270, doi: 10.1109/IOTA.2016.7562735.

[2] https://iopscience.iop.org/article/10.1088/1742-6596/1339/1/012044/pdf

[3]https://www.researchgate.net/publication/344103475_Implementation_of_a_Magnetometer_based_Vehicle_Detection_System_for_Smart_Parking_applications