IBM NAAN MUDHALVAN INTERNET OF THINGS

Phase 5:

Project Documentation & Submission

Topic:

Smart parking

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Sure, I can provide a high-level overview of a Smart Parking project, but it's a complex endeavor with many components. Here's a simplified breakdown:

Project Objectives:

The main objective of a Smart Parking system is to efficiently manage parking spaces and provide real-time information to drivers, reducing traffic congestion and enhancing user experience.

IoT Device Setup:

1.Sensors:

Deploy sensors (e.g., ultrasonic, magnetic, or camera-based) in parking spaces to detect occupancy.

2.Gateways:

Connect sensors to gateway devices for data collection and transmission.

3.Communication:

Use wireless protocols (e.g., Wi-Fi, Lora, or cellular) to send data to the cloud.

Platform Development:

1.Cloud Infrastructure:

Set up cloud servers (e.g., AWS, Azure) to collect and process data from the IoT devices.

2. Data Storage:

Store parking space occupancy data in a database.

3.Web Interface:

Develop a user-friendly web or mobile app for drivers to check parking availability.

4. Data Analysis:

Implement algorithms to process data and make predictions about parking space availability.

5. Alerts and Notifications:

Send notifications to users when a parking space becomes available.

Code for Smart Parking:

Here's a simple Python code snippet for simulating parking space availability using random data. In a real project, you'd use sensors and IoT devices to collect this data.

```
# Import Time

Import time

Vehicle_Number = ['XXXX-XX-XXXX']

Vehicle_Type = ['Bike']

Vehicle_Number = ['Intruder']

Owner_Name = ['Unknown']

Date = ['22-22-3636']

Time = ['22:22:22']

Bikes = 100

Cars = 250

Bicycles = 78
```

```
Def main():
   Global bikes, cars, bicycles
 Try:
    While True:
         Print("-----------------------------------------------")
         Print("\t\tParking Management System")
         Print("-----------------------------------------------")
         Print("1.Vehicle Entry")
         Print("2.Remove Entry" )
         Print("3.View Parked Vehicle ")
         Print("4.View Left Parking Space ")
         Print("5.Amount Details ")
         Print("6.Bill")
         Print("7.Close Programme ")
         Print("+---------------------------------------+")
         Ch = int(input("\tSelect option:"))
         If ch == 1:
            No = True
          While no == True:
               Vno = input("\tEnter vehicle number (XXXX-XX-XXXX) –
").upper()
           If Vno == "":
```

```
            Print("###### Enter Vehicle No. ######")
        Elif Vno in Vehicle_Number:
            Print("###### Vehicle Number Already Exists")
        Elif len(Vno) == 12:
            No = not True
            Vehicle_Number.append(Vno)
         Else:
            Print("###### Enter Valid Vehicle Number ######")
         Typee = True
         While typee == True:
            Vtype = str(input("\tEnter vehicle
type(Bicycle=A/Bike=B/Car=C):")).lower()
            If Vtype == "":
               Print("###### Enter Vehicle Type ######")
            Elif Vtype == "a":
               Vehicle_Type.append("Bicycle")
               Bicycles -= 1
               Typee = not True
            Elif Vtype == "b":
               Vehicle_Type.append("Bike")
               Bikes -= 1
               Typee = not True
```

```
    Elif Vtype == “c”:
        Vehicle_Type.append(“Car”)
        Cars -= 1
        Typee = not True
    Else:
        Print(“###### Please Enter Valid Option ######”)
Name = True
While name == True:
    Vname = input(“\tEnter vehicle name – “)
    If vname == “”:
        Print(“#########Please Enter Vehicle Name #########”)
    Else:
        Vehicle_Name.append(vname)
        Name = not True
O = True
While o==True:
    OName = input(“\tEnter owner name – “)
    If OName == “”:
        Print(“###### Please Enter Owner Name ######”)
    Else:
        Owner_Name.append(OName)
        O = not True
```

```
D = True
While d == True:
   Date = input("\tEnter Date (DD-MM-YYYY) – ")
   If date == "":
      Print("###### Enter Date ######")
   Elif len(date) != 10:
      Print("###### Enter Valid Date ######")
   Else:
      Date.append(date)
      D = not True
T = True
While t==True:
   Time=input("\tEnter Time (HH:MM:SS) – ")
   If t=="":
      Print("###### Enter Time ######")
   Elif len(time)!=8:
      Print("###### Please Enter Valid Date ######")
   Else:
      Time.append(time)
      T=not True
Print("\n……Record detail saved……")
```

```
        Elif ch==2:
            No=True
            While no==True:
                Vno=input("\tEnter vehicle number to Delete(XXXX-XX-XXXX)
– ").upper()
                If Vno=="":
                    Print("###### Enter Vehicle No. ######")
                Elif len(Vno)==12:
                    If Vno in Vehicle_Number:
                        I=Vehicle_Number.index(Vno)
                        Vehicle_Number.pop(i)
                        Vehicle_Type.pop(i)
                        Vehicle_Name.pop(i)
                        Owner_Name.pop(i)
                        Date.pop(i)
                        Time.pop(i)
                        No=not True
                        Print("\n.....Removed
Sucessfully.....")
                    Elif Vno not in Vehicle_Number:
                        Print("###### No Such Entry ######")
                    Else:
                        Print("Error")
```

```
            Else:
                Print("###### Enter Valid Vehicle Number ######")
        Elif ch==3:
            Count=0
            Print("----------------------")
            Print("\t\t\t\tParked Vehicle")
            Print("----------------------")
            Print("Vehicle No.\tVehicle Type      Vehicle Name\t      Owner Name\t    Date\t\tTime")
            Print("------------------------")
            For I in range(len(Vehicle_Number)):
                Count+=1
                Print(Vehicle_Number[i],"\t  ",Vehicle_Type[i],"\t ",vehicle_Name[i],"\t      ",Owner_Name[i],"      " ,Date[i]," ",Time[i])
            Print("------------------------")
            Print("--- Total Records – ",count----------")
            Print("---------------------------------")
        Elif ch==4:
            Print("---------------------------------")
            Print("\t\t\t\tSpaces Left For Parking")
            Print("-----------------------------")
            Print("\tSpaces Available for Bicycle – ",bicycles)
```

```
        Print("\tSpaces Available for Bike – ",bikes)
        Print("\tSpaces Available for Car – ",cars)
        Print("-----------------------------")
    Elif ch==5:
        Print("-----------------------------")
        Print("\t\t\t\tParking Rate")
        Print("----------------------")
        Print("*1.Bicycle      Rs20 / Hour")
        Print("*2.Bike         Rs40/ Hour")
        Print("*3.Car          Rs60/ Hour")
        Print("----------------------")
    Elif ch==6:
        Print(".. Generating Bill..")
        No=True
        While no==True:
            Vno=input("\tEnter vehicle number to Delete(XXXX-XX-XXXX)
– ").upper()
            If Vno=="":
                Print("###### Enter Vehicle No. ######")
            Elif len(Vno)==12:
                If Vno in Vehicle_Number:
                    I=Vehicle_Number.index(Vno)
```

```
            No=not True
        Elif Vno not in Vehicle_Number:
            Print("###### No Such Entry ######")
        Else:
            Print("Error")
    Else:
        Print("###### Enter Valid Vehicle Number ######")
Print("\tVehicle Check in time – ",Time[i])
Print("\tVehicle Check in Date – ",Date[i])
Print("\tVehicle Type – ",Vehicle_Type[i])
Inp=True
Amt=0
While inp==True:
    Hr=input("\tEnter No. of Hours Vehicle Parked – ").lower()
    If hr=="":
        Print("###### Please Enter Hours ######")
    Elif int(hr)==0 and Vehicle_Type[i]=="Bicycle":
        Amt=20
        Inp=not True
    Elif int(hr)==0 and Vehicle_Type[i]=="Bike":
        Amt=40
        Inp=not True
```

```
        Elif int(hr)==0 and Vehicle_Type[i]==”Car”:
            Amt=60
            Inp=not True
        Elif int(hr)>=1:
            If Vehicle_Type[i]==”Bicycle”:
                Amt=int(hr)*int(20)
                Inp=not True
            Elif Vehicle_Type[i]==”Bike”:
                Amt=int(hr)*int(40)
                Inp=not True
            Elif Vehicle_Type[i]==”Car”:
                Amt=int(hr)*int(60)
                Inp=not True
    Print(“\t Parking Charge – “,amt)
    Ac=18/100*int(amt)
    Print(“\tAdd. Charge 18 % - “,ac)
    Print(“\tTotal Charge – “,int(amt)+int(ac))
    Print(“…..Thank you for using our service……”)
    A=input(“\tPress Any Key to Proceed – “)
Elif ch==7:
    Print(“..Thank you for using our service…”)
    Print(“**********(: Bye bye☺**********”)
```

```
            Break
            Quit
    Except:
        Main()
Main()
```