Ministry Category: Ministry of state Punjab **Problem Code:** #GPB2

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Problem statement : Smart Parking System

Vehicle parking is a major concern in most of the cities of India. Currently user has to look for multiple vehicles parking station to finally get the space to park the vehicle. This could lead to wastage of money, fuel and time. Instead of this real-time Smart parking mobile app can be designed which can provide us information about nearby space availability based on the location of the user. IOT and Cloud Computing technologies could be used to create this app.

Description of Idea / Solution:

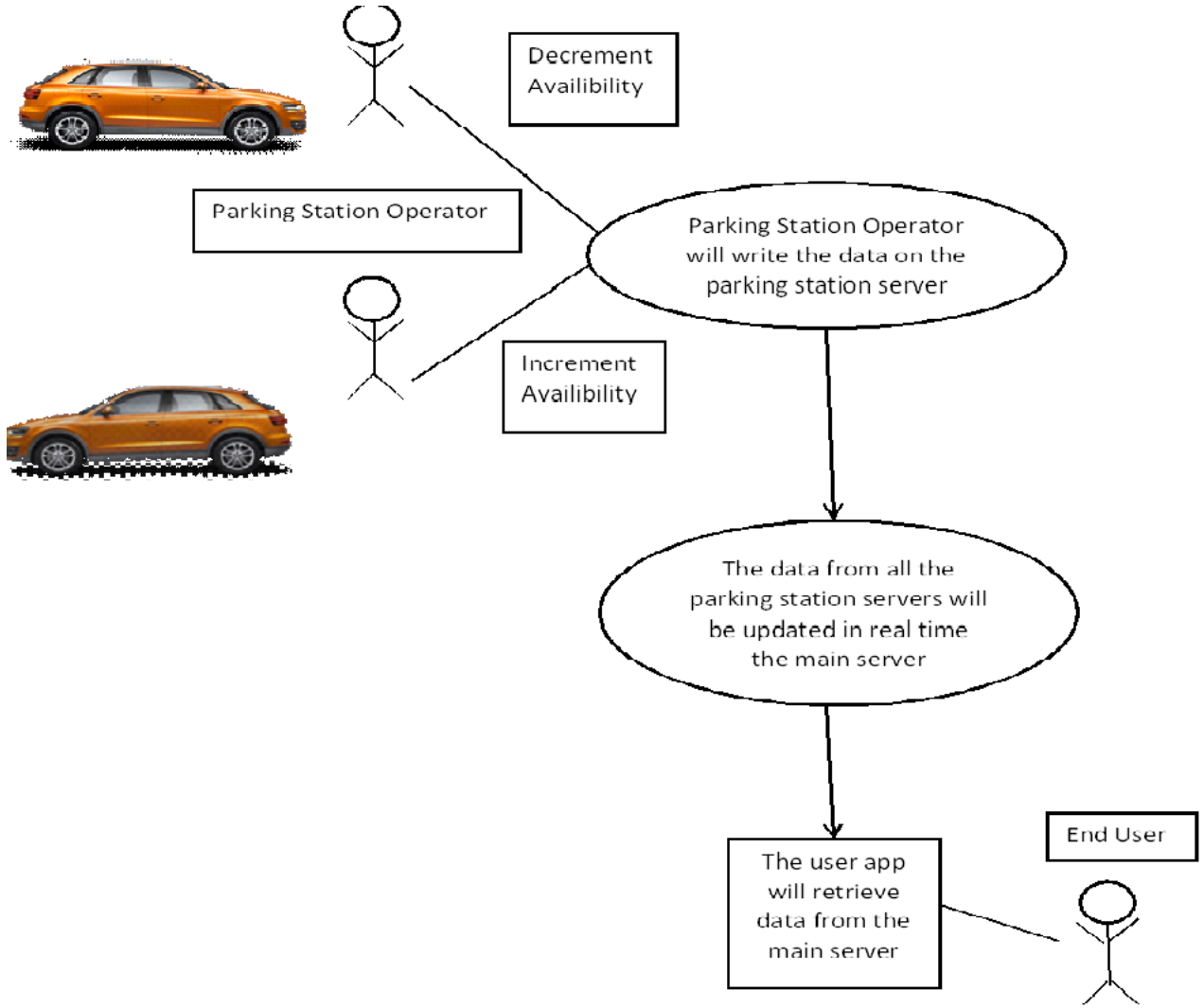
The Smart Parking System allows us to show the current availability of all parking stations around the user based on his location or based on the destination that he enters. The app will also predict the future availability of parking spaces.

As shown in the block diagram the solution will contain Main server application which will communicate with other components to provide services to them and it will fetch various data from different components.

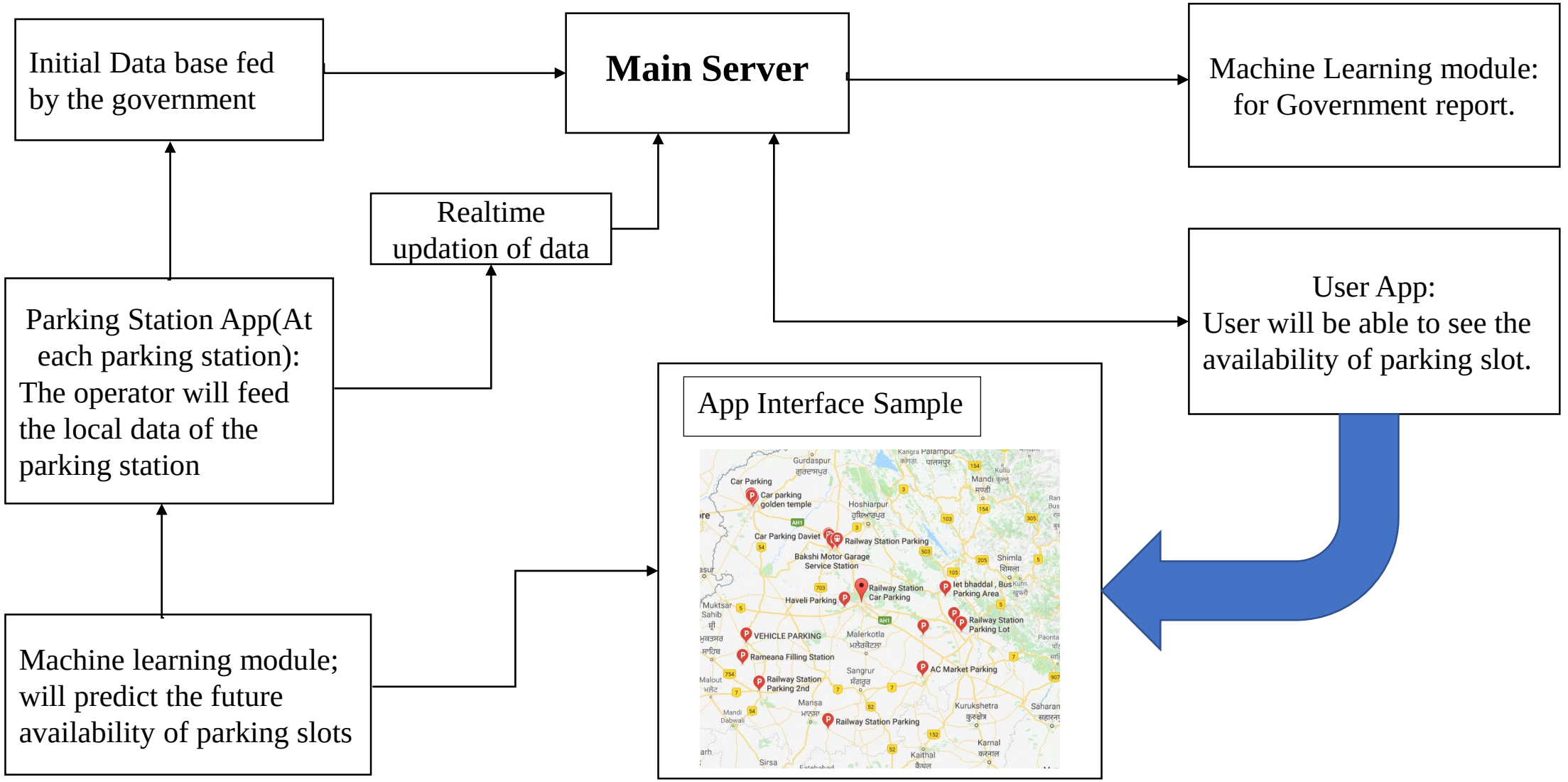
The user app when opened will directly show the user's location and the location of the parking spaces near him or near the destination that he has entered in the search box. It will also show the current available spaces at each location, the time require to reach there and will also predict the available spaces after a given time.

Eg- when a user wishes to park his vehicle at a particular location with only 2 spaces available with a reaching time of 15 mins then the app will predict by using Machine Learning the no. of spaces left after 15 mins so that he does not have to travel to another location.

The parking Station Server will be initially loaded with the available spaces value given by the government and can even update it. Further these values will be altered by the local operators at the Parking Station. These operators will maintain the vehicle no. of the user, the check in and check out time .This database will be used for security and Machine Learning Analysis.


Decrement
Availibility
Parking Station Operator
Parking Station Operator
will write the data on the
parking station server
Increment
Availibility
The data from all the
parking station servers will
be updated in real time
the main server
End User
The user app
will retrieve
data from the
main server

To implement this idea following approach can be used. The solution is explained with the following **block diagram**



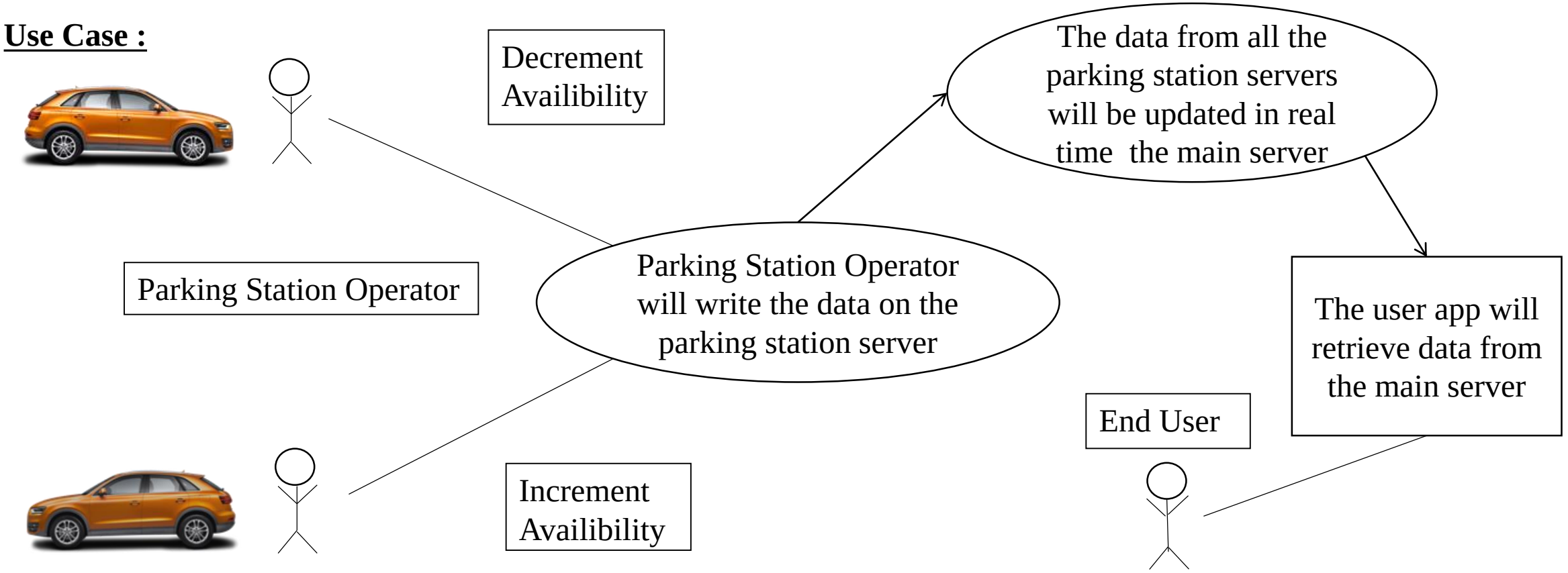
These operators will maintain the vehicle no. of the user, the check in and check out time. This database will be used for security and Machine Learning Analysis. All the parking Station Servers will be connected to the main server to collect and fetch the information in real time. The user app will be directly interacting with the main server for its requests.

The main server will generate a quarterly report giving the analysis of the usage of each parking location using Machine Learning , helping the government to build new parking lots.

Description of technology stack :

- **Android app at each parking station –** This app will be developed using Android Studio which uses Firebase Real Time Database.
- **User side Android app –** App will be developed using Android studio and GoogleMaps API.
- AWS and Google Cloud Services.

Use Case :



Explanation:

1) Whenever any vehicle will come to a parking station, a parking station operator at the entry gate will feed the vehicle plate number in the server and the time of arrival will be logged, the availability counter will be decremented. Similarly when a vehicle exits the parking station, parking station operator at the exit gate will log the exit time of that vehicle and increment the availability counter.
2) The main server will be updated in real time with the parking station server.
3) The user app will fetch the data from the main server and display it.