Moderator

Payment

PaypalButton();

WebSite

Var UserInfo;
Boolean IsLoggedIn;
Var ReseInfo;

Boolean CheckInfo();
Boolean Reservation();
Boolean Registration();

Manager

Void SetPrice();
Void ShowSpots();
Void NewCar();
Void getCarInfo();

Sensor

Var Picture;

Void TakePhoto();
Void SendPhoto();
Void ReadPlate();
Boolean StoreInfo();

Database

Reservation

int StartTime;
int EndTime;
int ResevationNum;

Boolean ResStatus;
Spots getFreeSpots();
Void NotifyUser();

Garage

Spots[] FreeSpot;
Spots[] Occupied;
Spots[] Reserved;

Void DisplayOnLED();

Process Payment With Third Party Website 1* 3*

Set Price Info

Request Spots Info
Send Car Info

Store Car Info

Request Price Info
Store User Info

Make Reservation Request 1* 0...*

Request User Info
To Send Notification

Request All Vacant Spots

Set Reserved Spot As Reserved In Garage

Update Spots Info

0...* 0..* 0...* 1* 1* 1* 1* 0..*
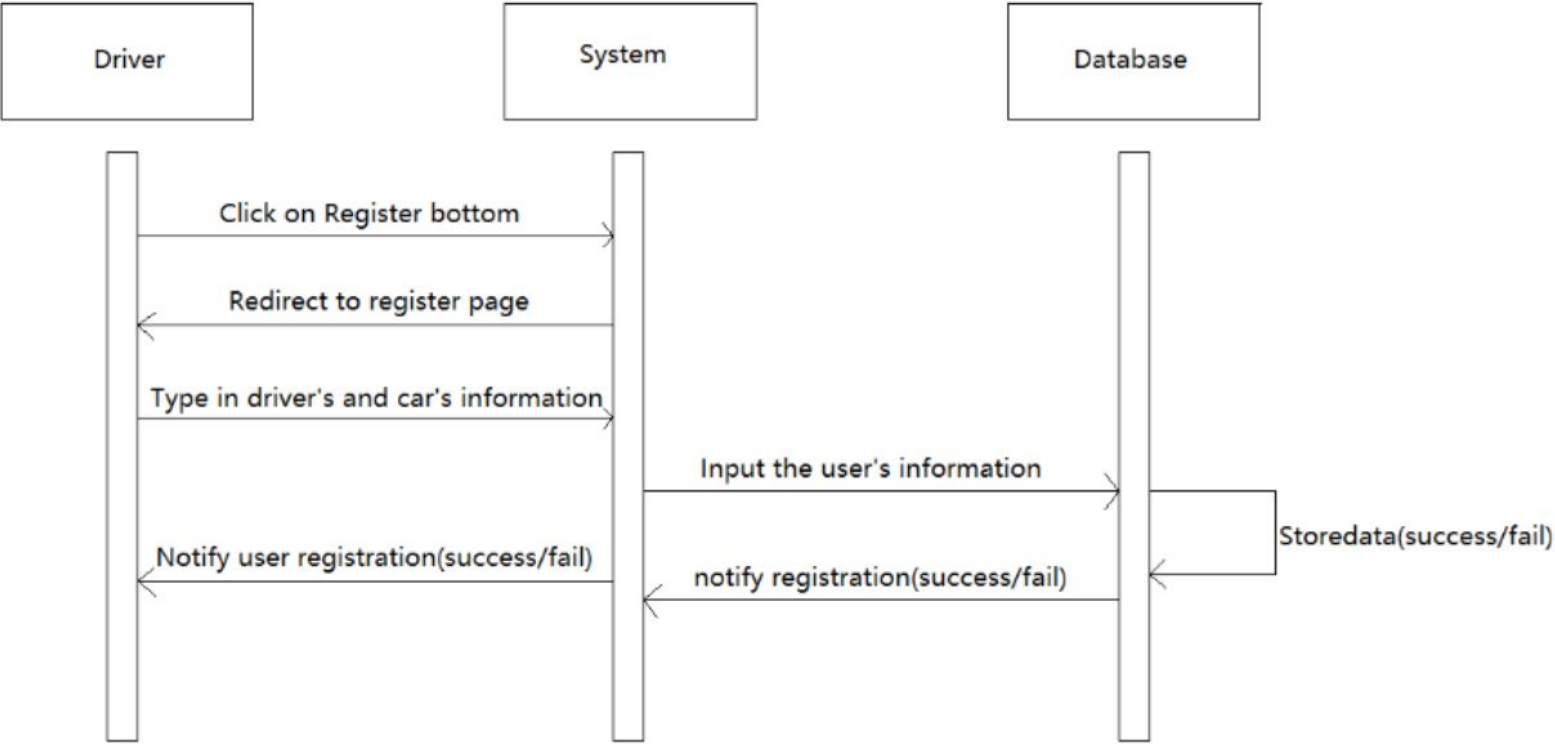
For Use Case 1

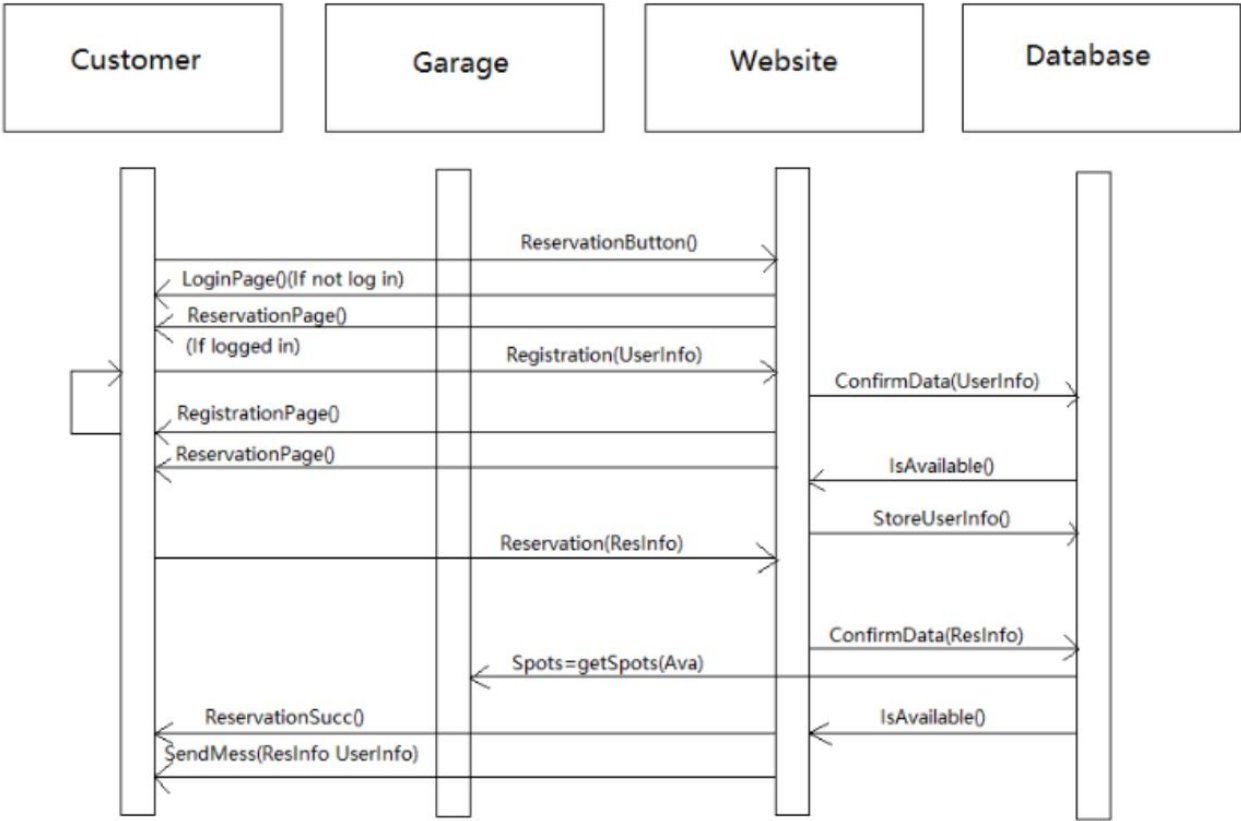Figure 1: Sequence Diagrams for Use Case 1.

For Use Case 2

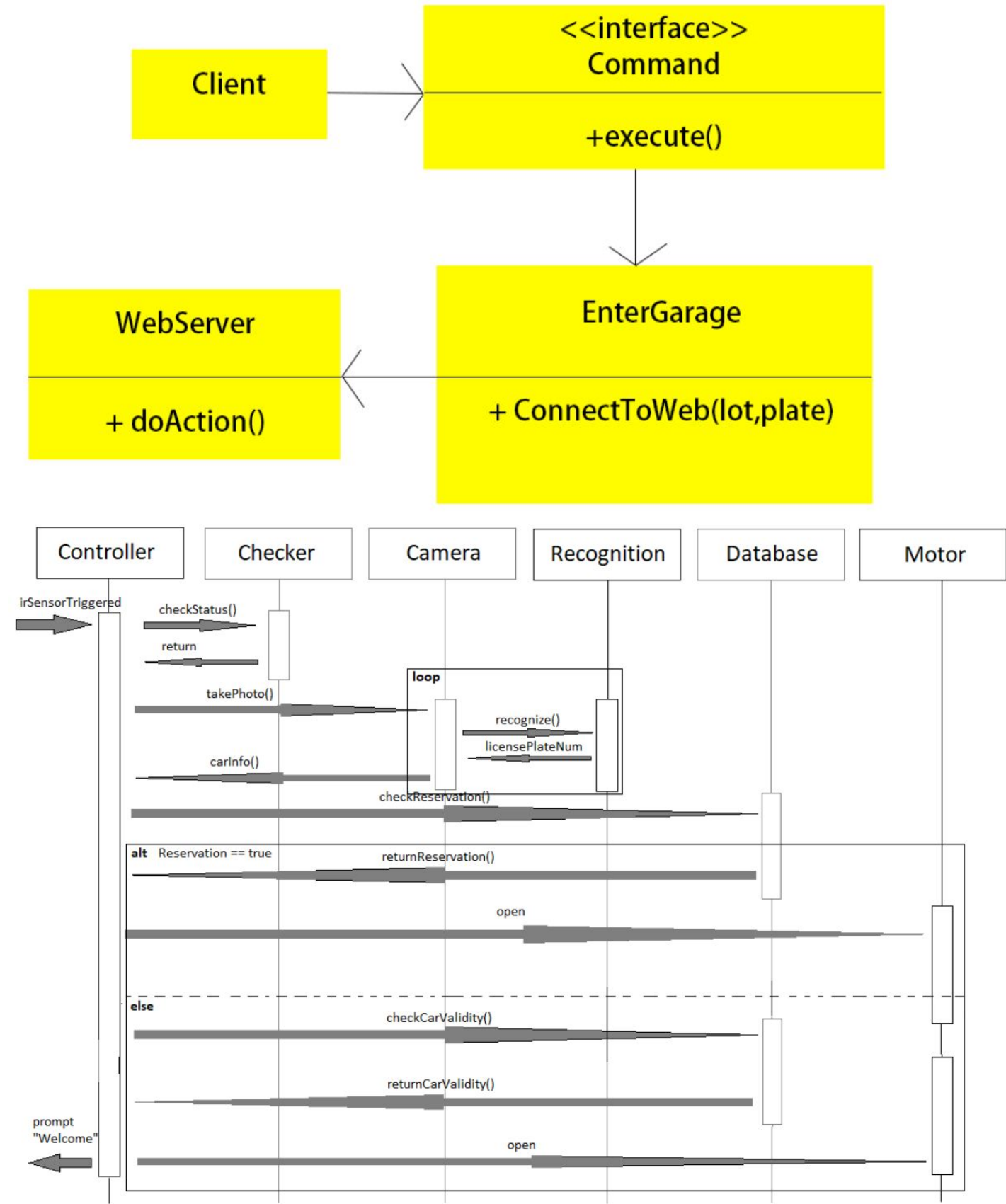Figure 2: Sequence Diagrams for Use Case 2.

For Use Case 3

Figure 3: Sequence Diagrams for Use Case 3: Entering the garage. (**Pub-Sub diagram**)

For Use Case 4

| Customer | Camera | Database | Gate |

trigger camera
when leaving →

initate customer
identity check →

Open the gate if
the payment is
done successfully →

← notify customer for insufficient funds

← store customer
infomation
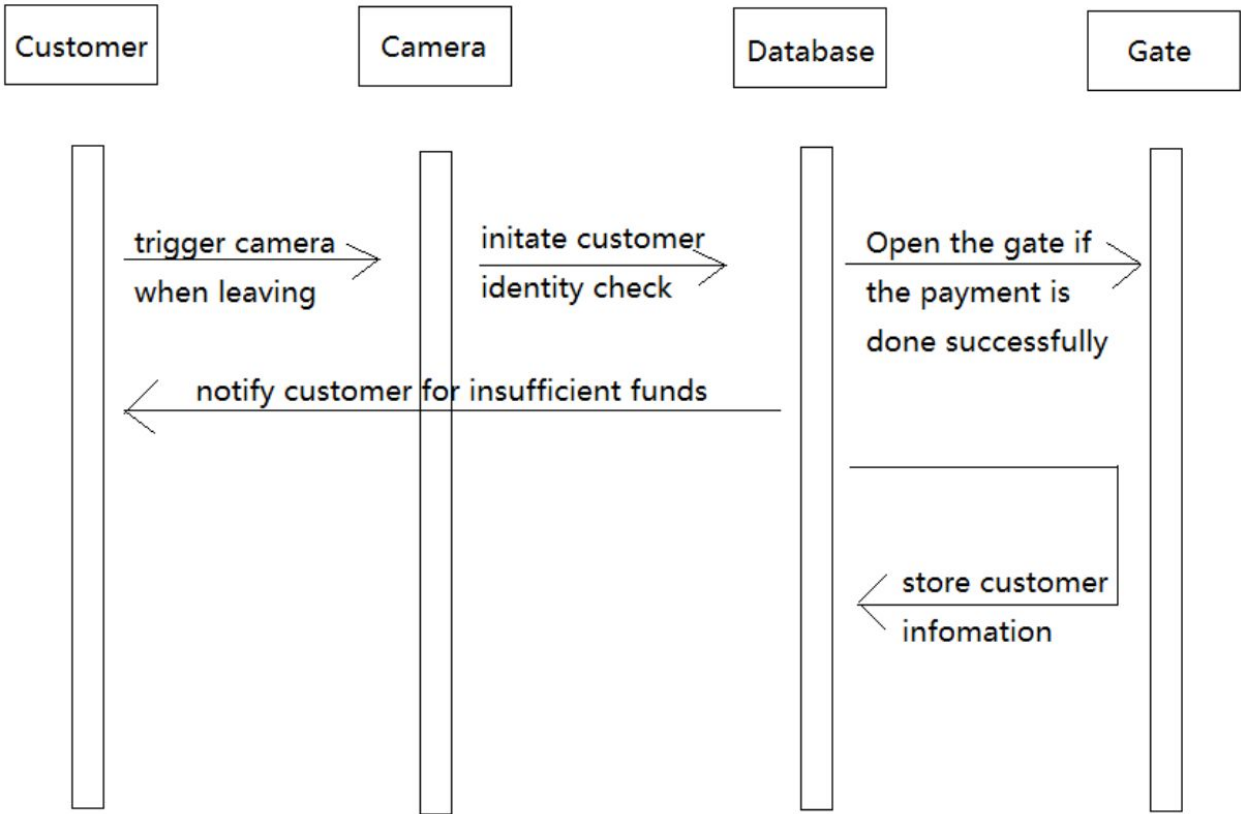
Figure 4: Sequence Diagrams for Use Case 4.

Domain Model Diagram

Vehicle Reader

-To identify car plate, car make, car model, and car color, years, orientation

-To identify whether a car is ready for taking a photo to analyze

Send all information of the car>>

Graphic User Interface

-To show all available parking spots on website

-To let user make a reservation on Parking WebSite

<<Parking spots information

Parking spots information>>

Database

-To reserve customers' License Plate/Payment Info

-To keep track of parking time

-To register user into Database

-To store all parking vehicles' information

Online System

-To enable any customer to register

-To enable registered customer to make reservations

-To send email of reminder/confirmation/coupon to customers

-To connect users' balance in Database with VISA or paypal

User Data>>

Garage Management

-To monitor parking spot usage

-To navigate customer to their reserved spot

-To send email of reminder/confirmation/coupon to customers

-To indicate all available spots' locations by LED monitors

-To send email to customer regarding their recent visit, recipt, and any event

Backend Management

-To assign parking lots to customers

-To manage rate of parking and get customer's info

-To manually enter car information into Database when Vehicle Reader fails

User

Manager

Customer Use Case Diagram
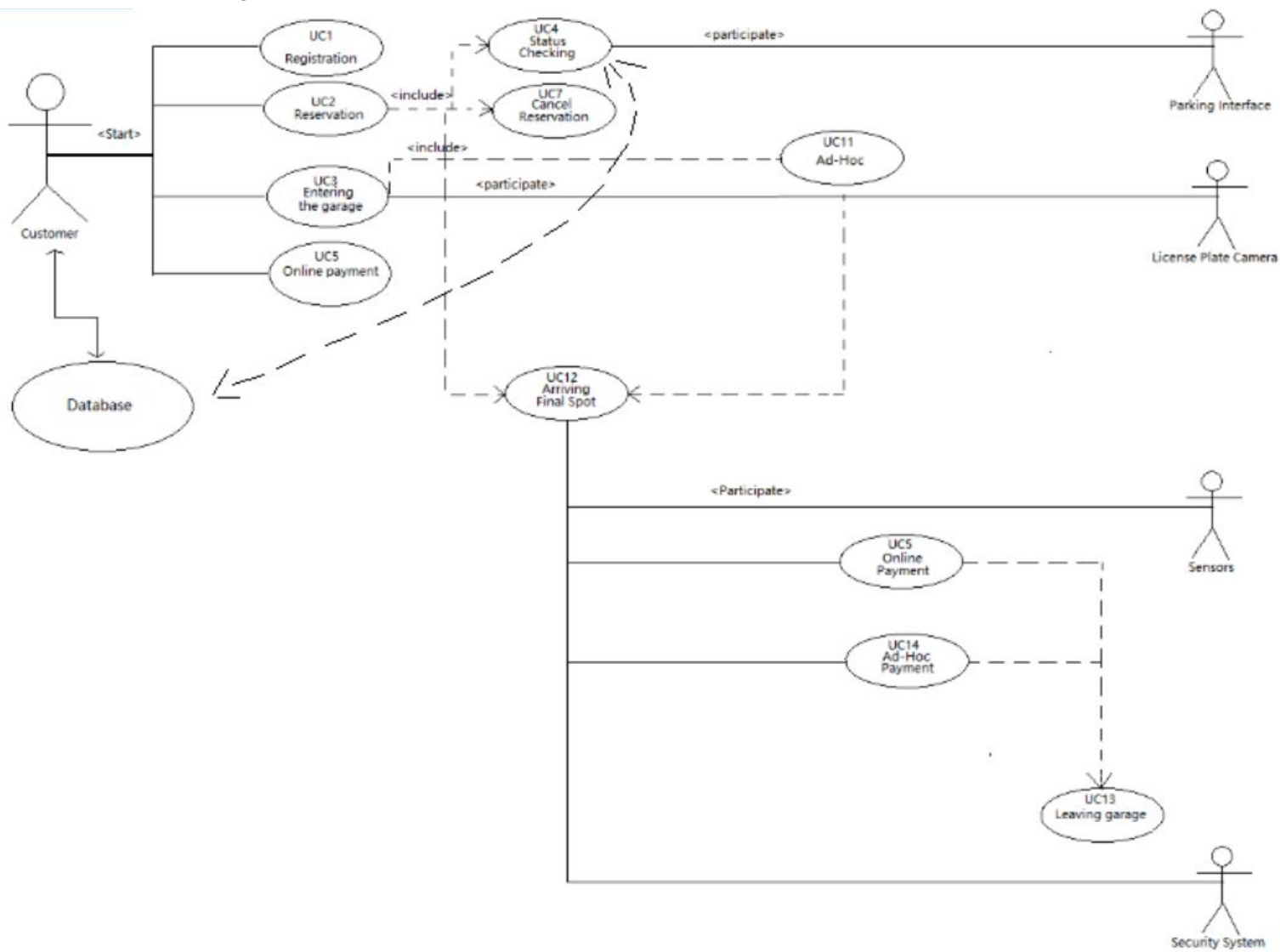
Parking lot design diagram

Spot 1

IR

IR 5V Power
    Module

    BreadBoard

StepperMotor

Arduino UNO R3
/w Adafruit Motor Shield

AndroidPhone

IRSensor

Gate

Entrance

AndroidPhone

IR

ServoMotor

ServoMotor

Arduino UNO R3

IR

Spot 2

BreadBoard

Exit

IR

IR

IR