Software Requirements Specification

for

Project Vozilo

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Chapter 1

Introduction

1.1 Purpose of Document

The purpose of this project is to build an efficient parking management solution to handle various aspects of today's continuously increasing parking problems. The following system serves not only as a basic parking management solution but also covers other significant factors such as security, privacy and data management. Also, this system provides a friendly user interface for users to make itself all time convenient.

1.2 Intended Audience

This project is a prototype for parking management system.It has been implemented considering university (semester project) level expectations. Hence referring it as a "prototype".it is useful both for parking lot owners and the ones using the lot. Companies looking for their parking management solutions, public parking(s), shopping malls and various others are intended audience for this project. Reading suggestions should hence be selected accordingly.

1.3 Document Convention

The following conventions have been used in this document.

CNIC	Computerized National Identity Card
CPLC	Citizens-Police Liaison Committee
AFR	Applied For Registration
NADRA	National Database and Registration Authority
KPK	Khyber Pakhtunkhwa
ER-Model	Entity Relationship Model
ML	Machine Learning
OCR	Optical Character Recognition.
LAN	Local Area Network.

1.4 Project Overview

The project will store the following data of the user (in a database) who has entered or is exiting the parking lot of a specific organization. It will store the following information:

The Owners Details: In which the software stores the owner's name and his CNIC as well as his other related information we can find.

Vehicle Details: In this the software stores the details of the details of the vehicle like the Engine Number, color, registration number and other related details.

Log-in Details: In this the software will stores the information of the organization's employees who can log-in to the software to access the contents from the database. This is used by the software in the stage of log-in screen.

AFR Vehicles: The software will also store the frequency of the vehicles who are AFR and will insert there time and date in a table of frequency.

1.5 Scope

- Due to time limitations we will not implement the portion where it will extract the number plate of a car in real time. Instead we will rely on pictures to get the number plate from user.
- Due to not having access to the governments database we will use the online website provided by the government to retrieve the information of the cars that we have scanned.

Chapter 2

Design Considerations

2.1 Assumption and Dependencies

These are the following assumptions made for this project:

1. The registration number of the car will be obtained from the video feed of a web cam of the organization.
2. The data of the vehicle's owner is taken from the NADRA database.

2.2 Risks and Volatile Areas

The major risk in our system stems from the website we are scarping data from and this is the only risk that we have identified. The problem here being that if any of the vehicle verification websites go down then we will not be able to get the data of the vehicles unless we have already entered them in the database.Web cam is used to capture photograph through which license plate is recognized and records are fetched using web scraping.

Chapter 3

System Architecture

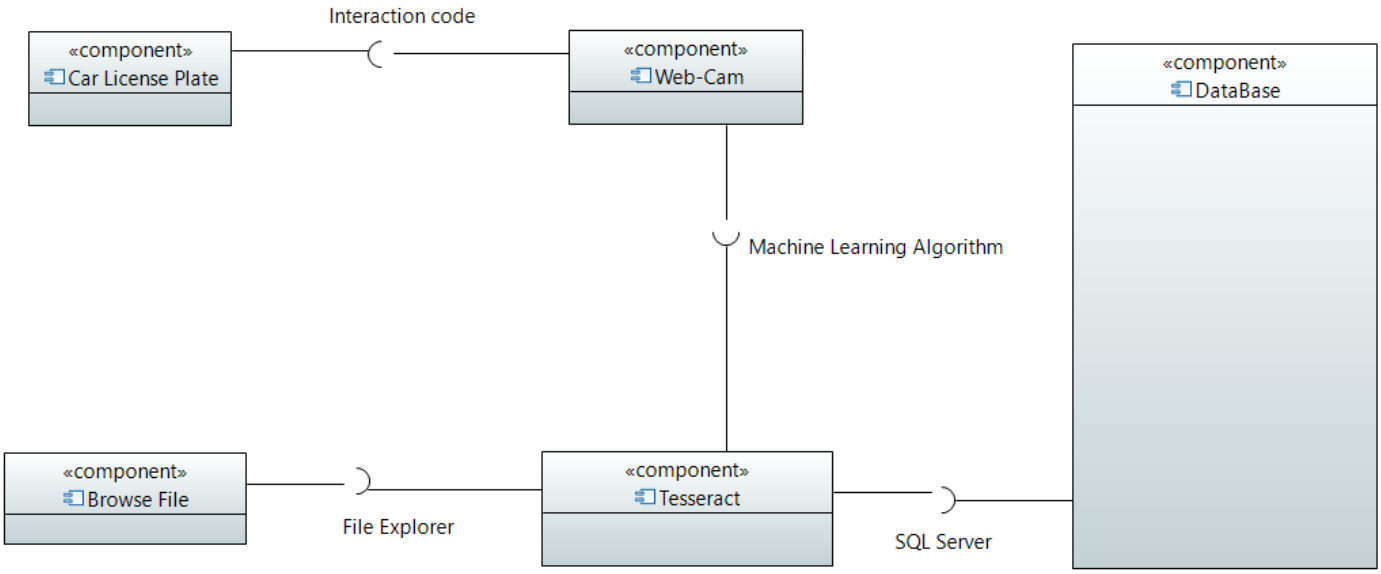
The system is composed of modules interacting with each other.Database component is providing basic database functionalities whereas tesseract is used for machine learning algorithm. SQL server is responsible for communication between server and client machines.Web cam is used to capture photograph through which license plate is recognized.license plate is then used to fetch records using web scraping.

3.1 System Level Architecture

Interfaces to included systems include concerned code and hardware components which include web cam on the following system.relationships identified among components are composition which may include camera as it can not exist on it's own without the interacting machines.

3.2 Software Architecture

User will be interacting with the system as per view perspective only.Data to the user will be available using a layer of Graphical User Interface.User will also be able to select data of their own choice(concerned attributes)



Chapter 4

Design Strategy

4.1 Graphical UI

A clean and very user friendly interface contains a keen impact on functionality of this system.

4.2 Machine Learning(Tesseract)

complex machine learning algorithms make precise decisions in recognizing data and evaluating it's characteristics.

4.3 Client-Server System

Client-Server system not only makes sure security but also is also reliable as data is refreshed at the very run time.

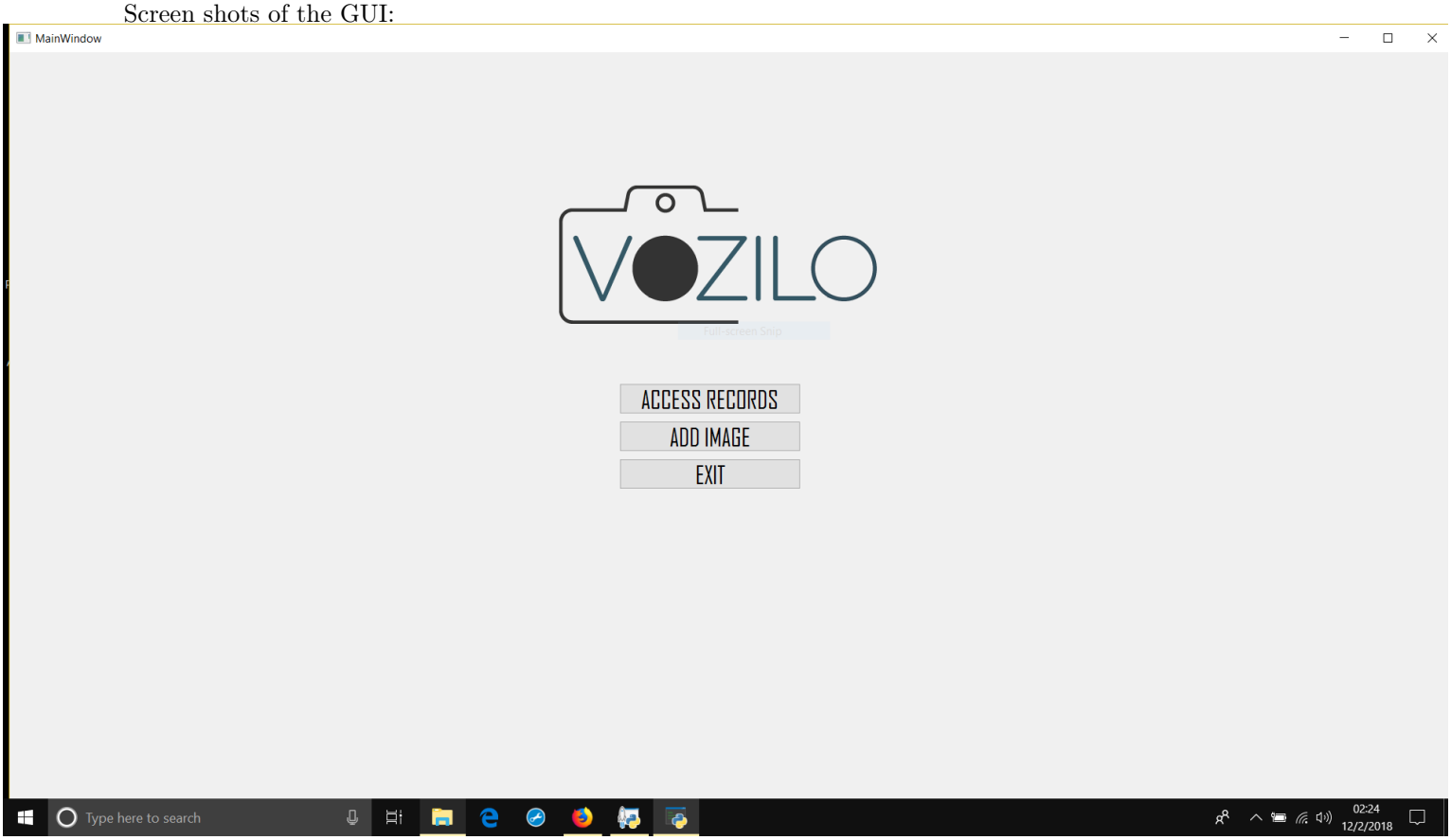
4.4 Data Management

concurrency and synchronization is made sure by system as design of database prevents inconsistent contents.Which is made by using constraints and keys on data.

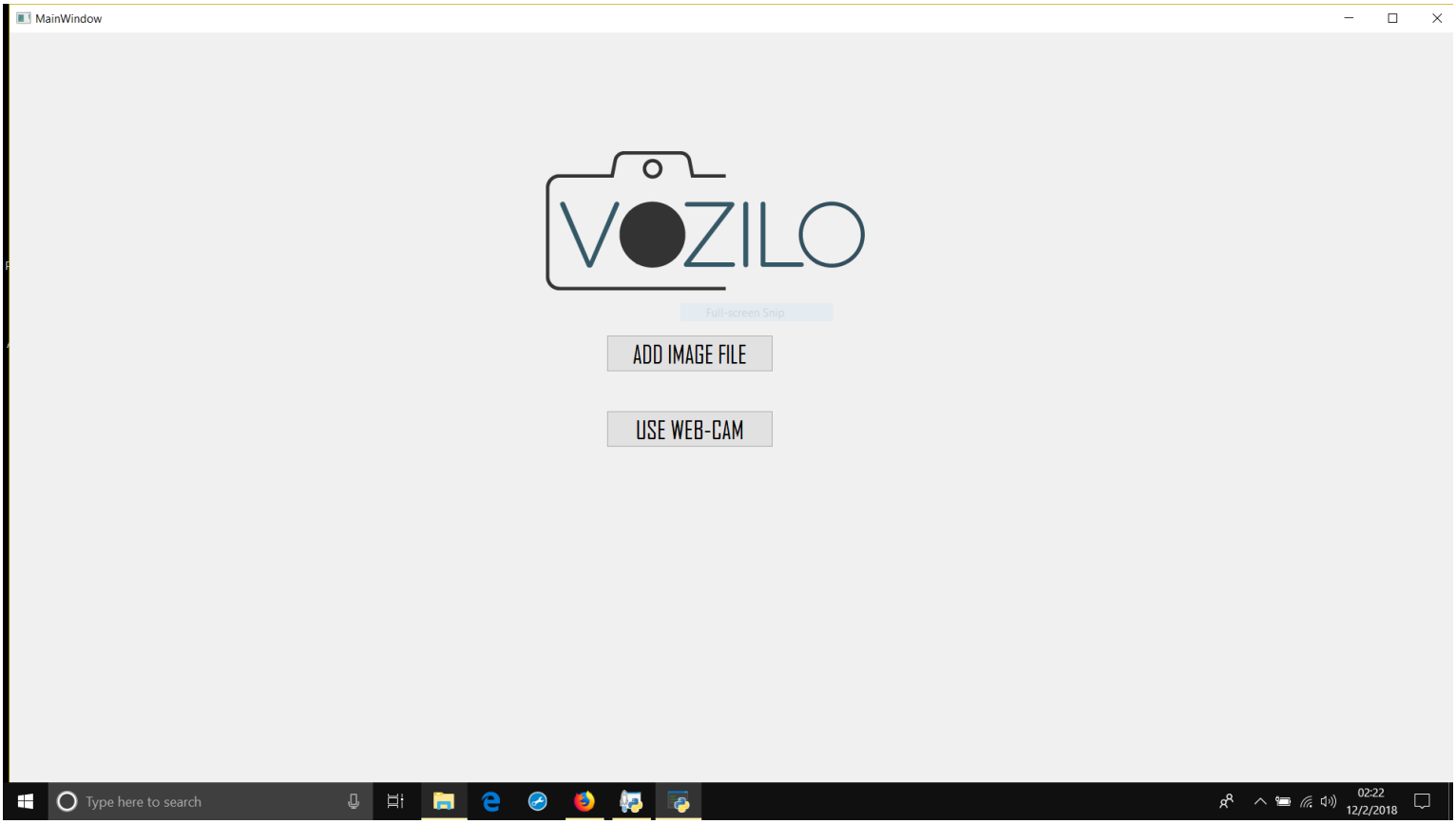
Chapter 5

Detailed System Design

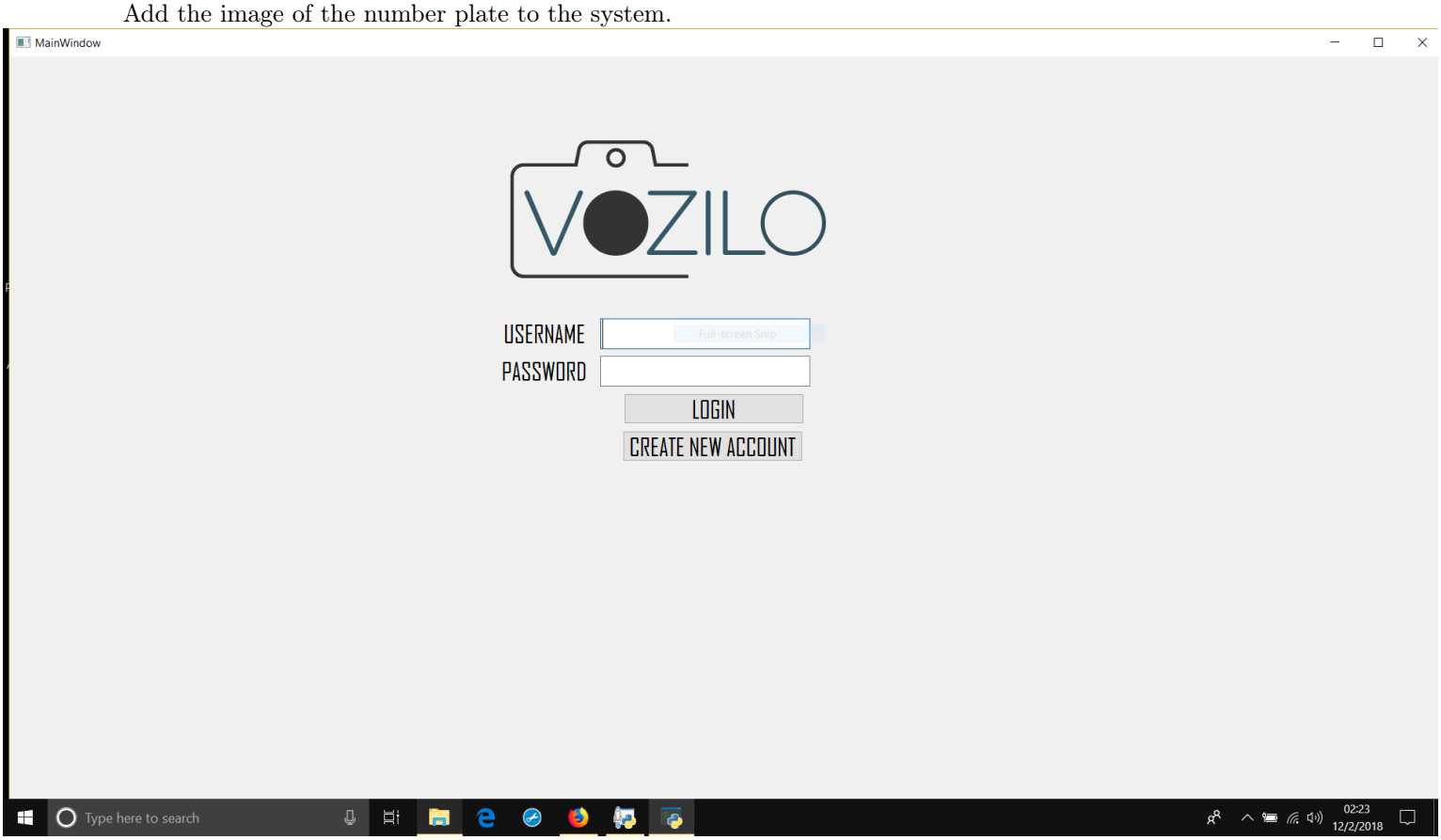
Screen shots of the GUI:



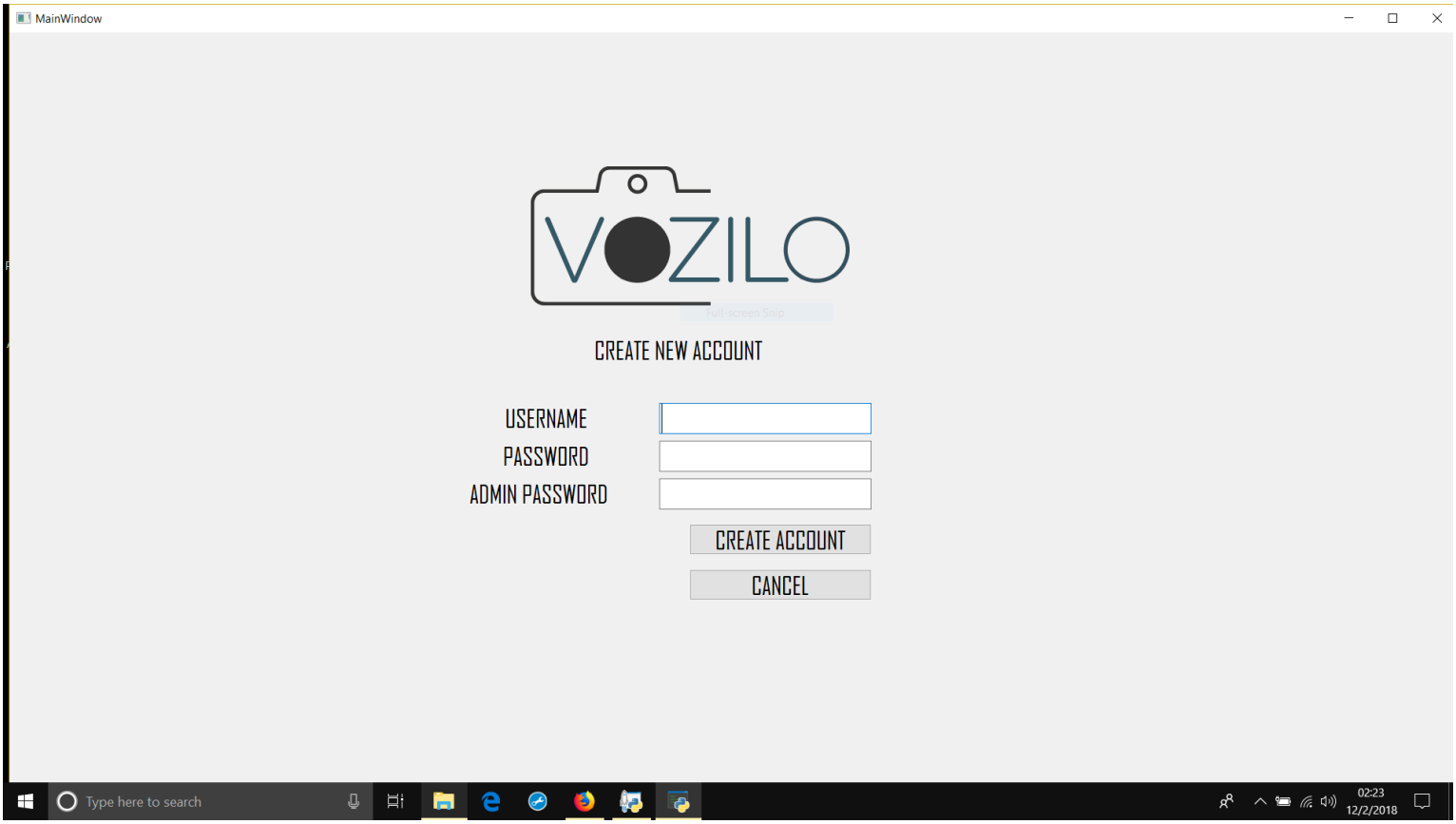
The Main menu screen of the database.



Add the image of the number plate to the system.



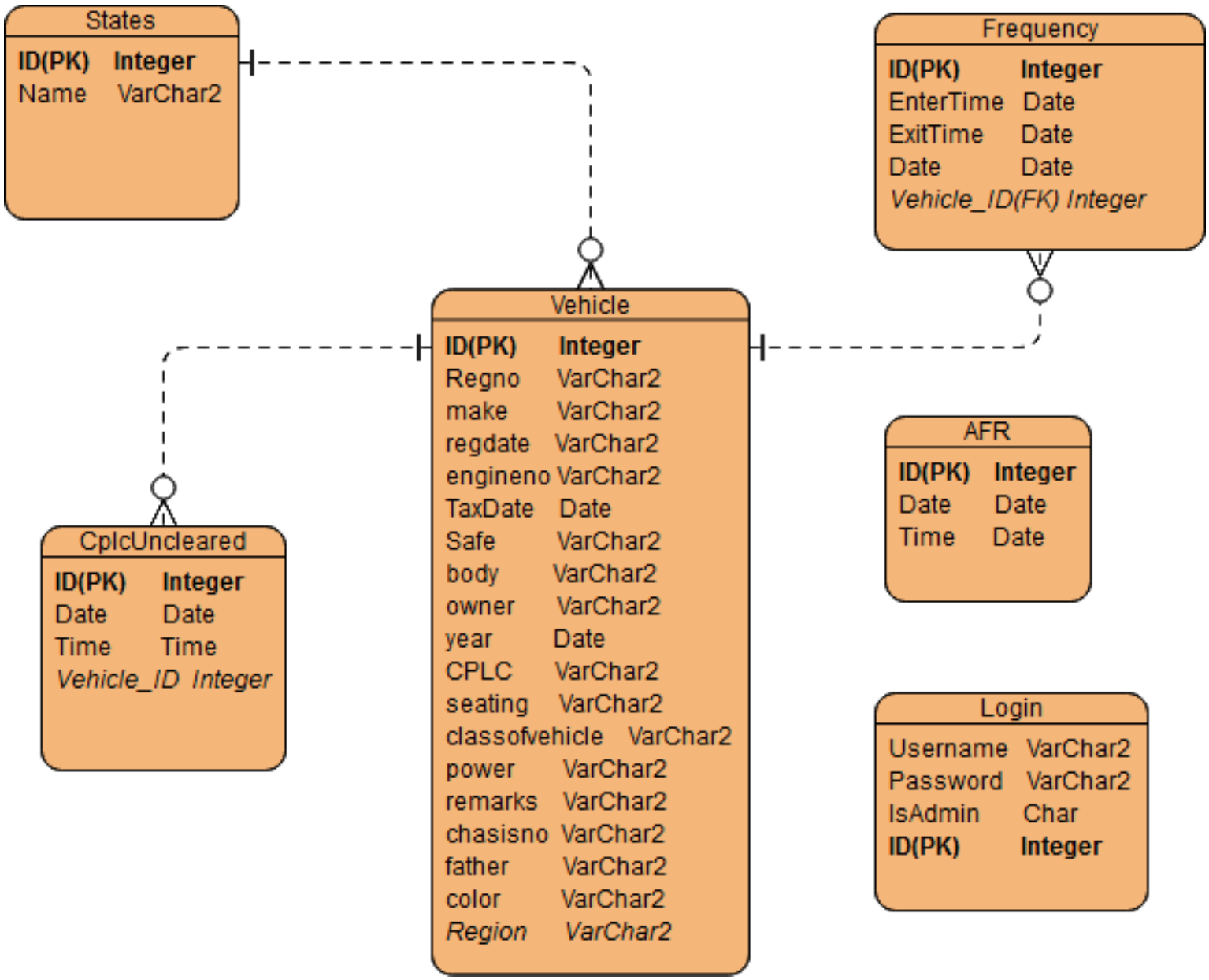
Logging in to the system to view the details.



Creating a new account for the organization[If Needed].

5.1 Database Design

5.1.1 ER Diagram



***The class diagram is at the end of this document.**

5.1.2 Data Dictionary

States

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
ID	Identification Number for each record	Integer	4	NO		Primary Key
Name	Name of the State	VarChar2	15	NO		

AFR

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
ID	Identification Number for each record	Integer	4	NO		Primary Key
Date	Current Date	Date		NO		
Time	Current Time	Date		NO		

Login

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
ID	Identification Number for each record	Integer	4	NO		Primary Key
Username	Username of employee	VarChar2	15	NO		
Password	Password of the user's account	VarChar2	15	NO		
IsAdmin	Checking if the User is Admin or not	Char	1	YES		

Frequency

Column Name	Description	Type	Length	Nullable	Default Value	Key Type
ID	Identification Number for each record	Integer	4	NO		Primary Key
Enter Time	Time of Entry of Vehicle	Date		NO		
Exit Time	Time of Exit of Vehicle	Date		NO		
Date	Current Date	Date		NO		
Vehicle_ID	ID of vehicle	Integer	4	NO		Foreign Key

Vehicle

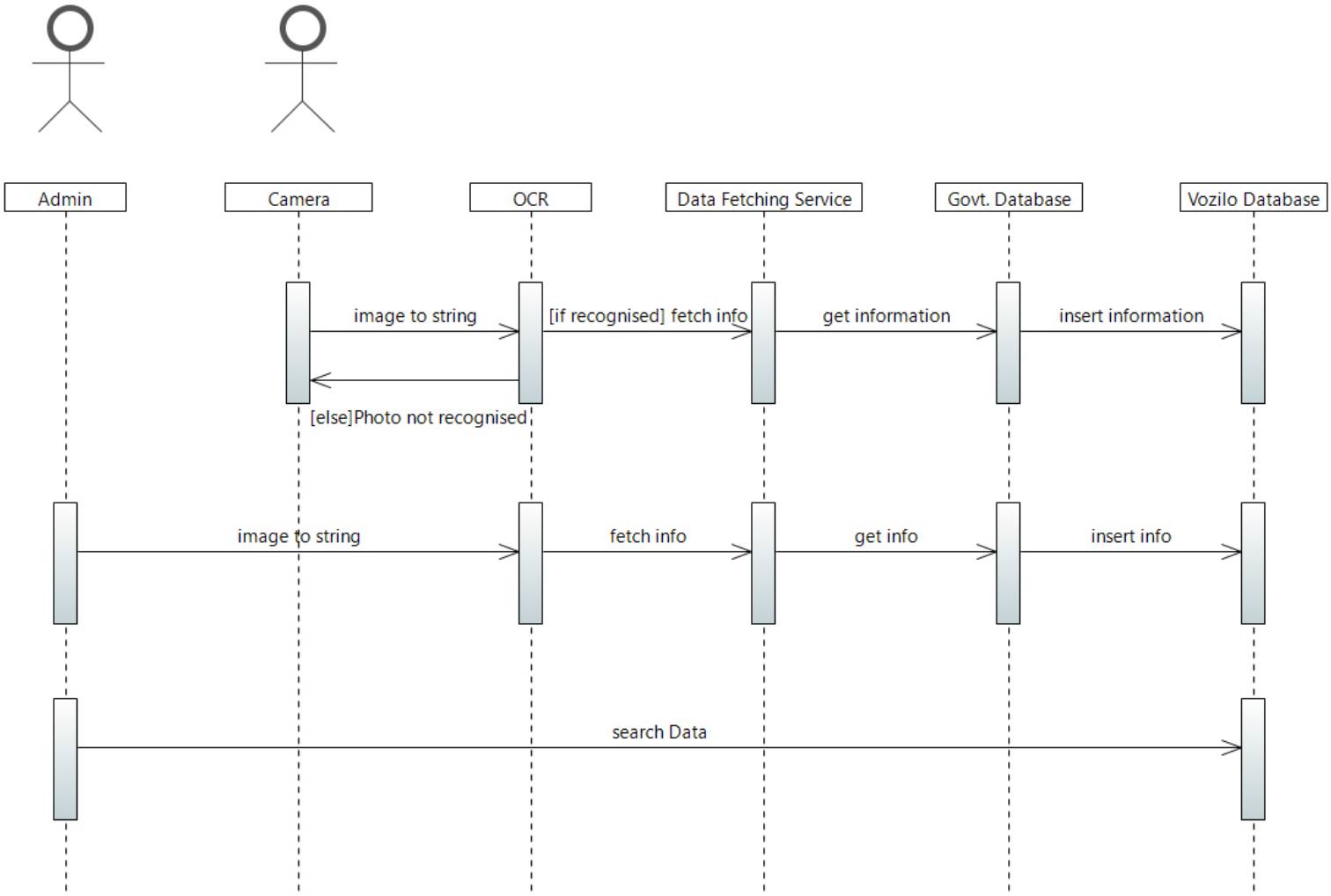
Column Name	Description	Type	Length	Nullable	Default Value	Key Type
ID	Identification Number for each record	Integer	4	NO		Primary Key
Region	Links to States in States table	Integer	4	NO		Foreign Key
Regno	Registration number of Vehicle	VarChar2	15	NO		
make	Make of Vehicle	VarChar2	15	NO		
Regdate	Date of Registration	Date		NO		
engineno	The Engine Number	VarChar2	15	NO		
TaxDate	Last Date of tax submission	Date		Yes		
Safe	Clearance	VarChar2	45	NO		
body	Body Type of Vehicle	VarChar2	15	NO		
Owner	Name of Owner	VarChar2	30	NO		
Year	Model Year of Vehicle	Date		YES		
CPLC	CPLC clear or not	VarChar2	15	NO		
seating	Seating in the vehicle	VarChar2	15	NO	1	
Classofvehicle	Type of Vehicle	VarChar2	15	YES		
Power	Horse Power of Vehicle	VarChar2	8	YES		
Remarks	Remarks on the Vehicle	VarChar2	30	NO		
Chasisno	Chasisno of Vehicle	VarChar2	15	YES		
Father	Name of owner's father	VarChar2	30	YES		
Color	Color of Vehicle	VarChar2	15	YES		

5.2 Application Design

5.2.1 Sequence Diagram

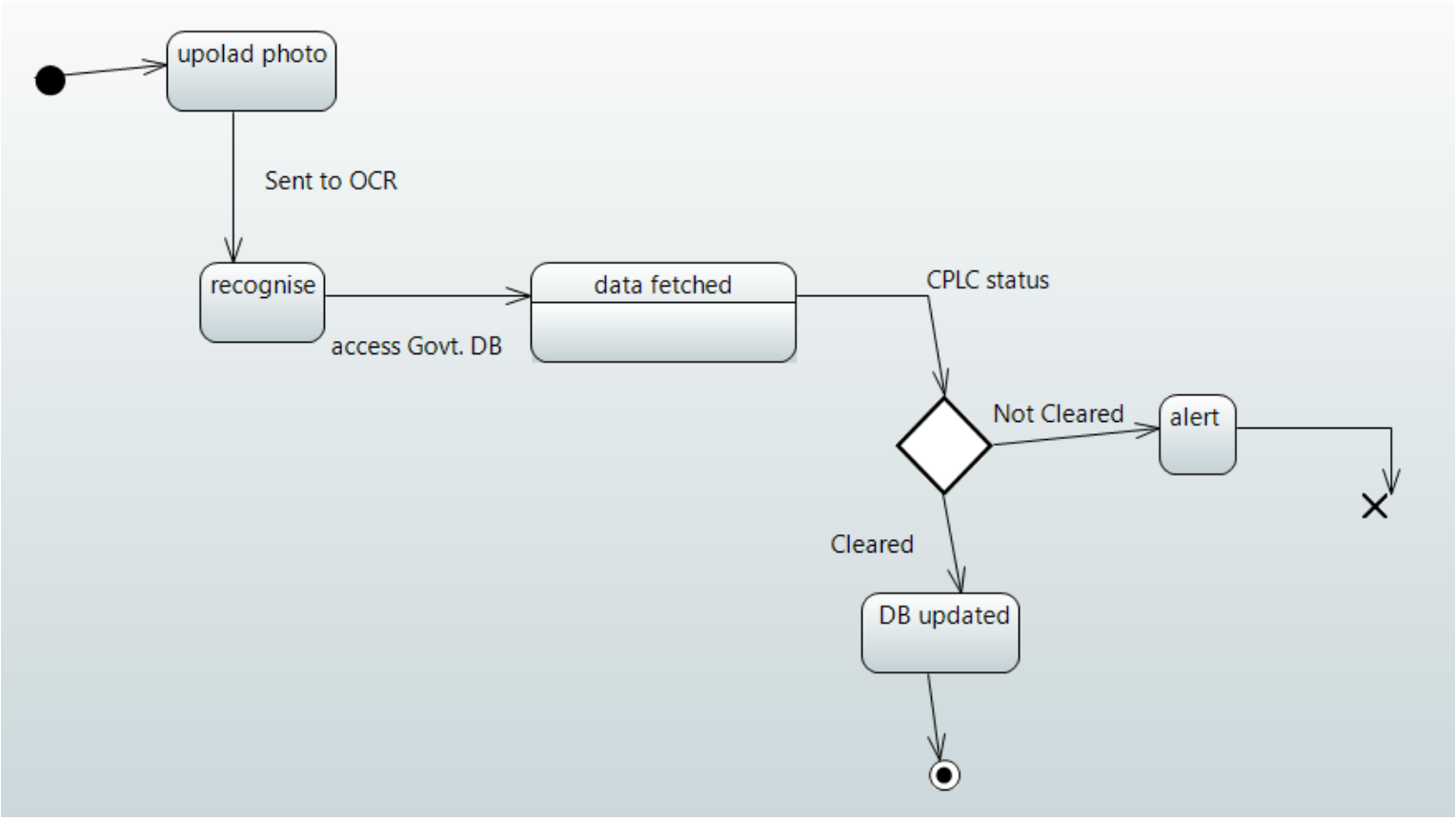
Following is a fully descriptive sequence diagram for Vozilo, showing 2 actors i.e Admin and user.

- Camera will automatically take frames from live video and extract a frame having registration number plate in it using CNN, or it can also be used to take a photo of the number plate. We are not using live video feature in this project.
- Admin can upload a photo into the system and access the database.



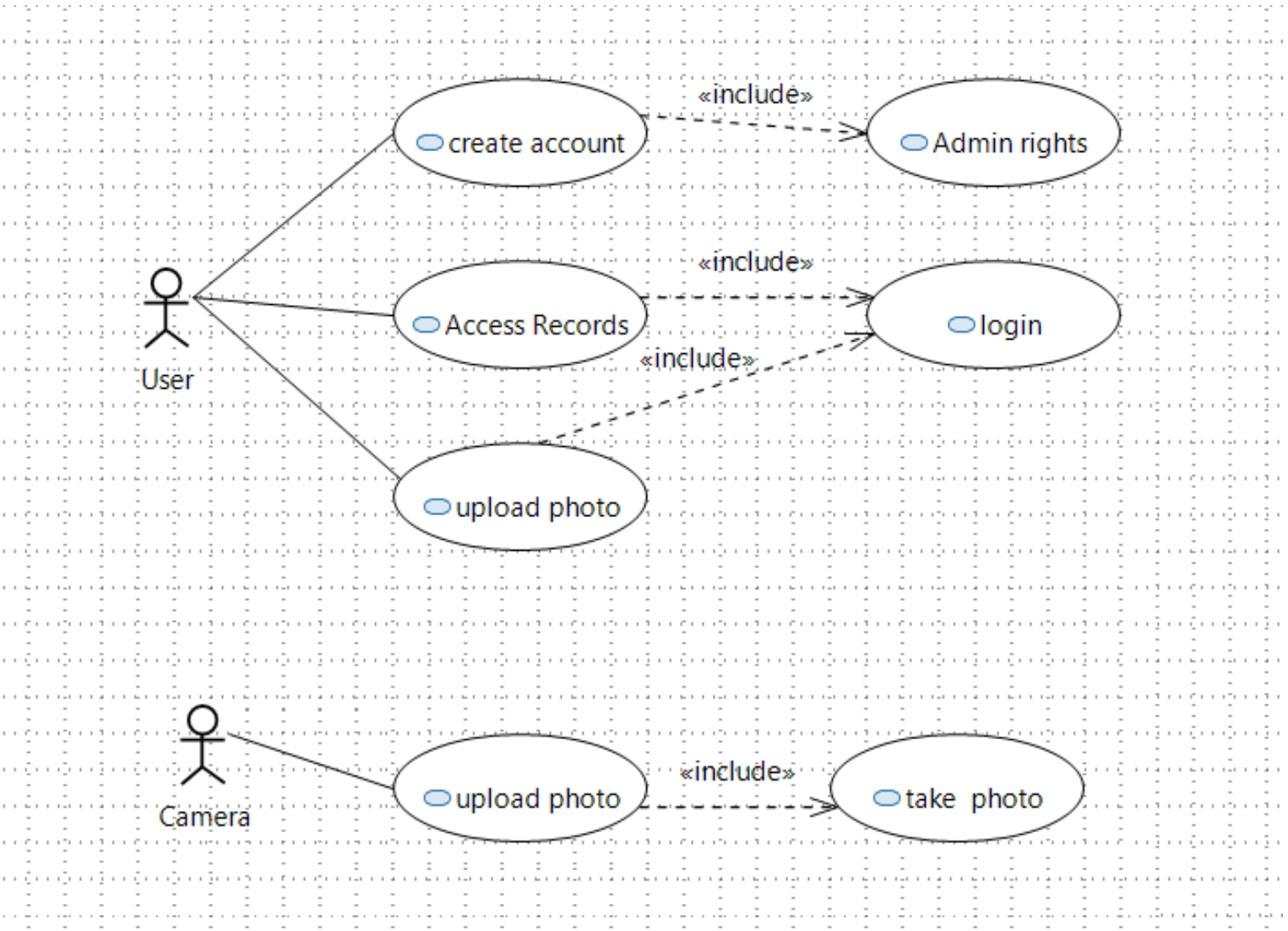
5.2.2 State Diagram

State diagram is given blow.



5.2.3 Use Case Diagram

Following is the Usecase diagram of Vozilo.



Chapter 6

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- Sindh vehicle Verification