Software Requirements Specification

for

Project Vozilo

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Chapter 1

Introduction

1.1 Purpose

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 Document Conventions

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.

1.3 Intended Audience and Reading Suggestions

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.

1.4 Product Scope

The project is intended to ease parking management and to create a convenient, easy-to-use application for customers, using it. The system is based on a relational database with its available functions. A database server will be supporting and managing the entrance and exit of cars. Also, system will be updated moment by moment describing current situation of concerned parking lot. Project scope also includes maintaining information in a database which will help detect and sort conflicts.

1.5 References

- https://krazytech.com/projects/sample-software-requirements-specificationsrs-report-airline-database
- http://www.ai-rider.com/index.php/en-us/2017-06-30-04-20-32/2017-06-30-06-23-26/32-products-2/2017-06-30-06-27-34/107-2017-07-27-09-10-03
- http://www.omnitecgroup.com/Solutions/parking-controls/parking-management-system

Chapter 2

Overall Description

2.1 Product Perspective

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.

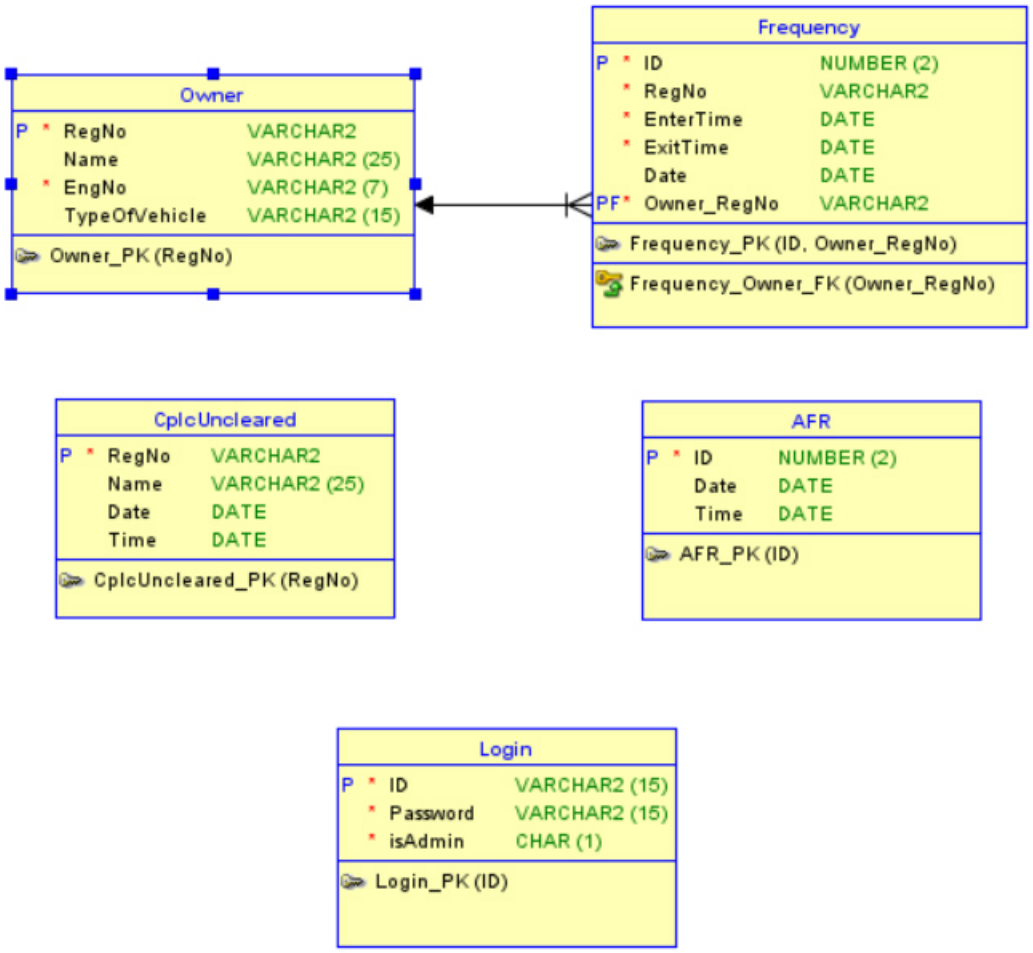
AFR Vehicles: The software will also store the frequency of the vehicles who are AFR and will insert there time and date in a table of frequency.

2.2 Project Features

The main features of our project are the following:

- **Deep-Learning Algorithms:** We have used a library known as 'Tesseract' to read the letters from the image.
- **Web Scarping:** We have used two libraries urllib and beautifulsoup to extract data from the following websites.
  1. KPK vehicle Verification
  2. Sindh vehicle Verification
- **User-Interface:** The whole project will have a graphical user interface so that the end-user can easily use it.
- **Database:** All the data of the vehicles and their receptive entities will be securely stored in a database.

ERD



2.3 User Classes and Characteristics

This project for the most part is automated. The system will have the following functions:

1. Take a picture of the vehicle number plate.
2. Get the registration number of the vehicle from the image.
3. Use web-scraping to get the vehicle details.
4. Add these details to the database.

The Employee will have the following functions:

1. View Details from the database.

The details will be viewed by the queries written by us(the programmers).

The Admin will have the following functions:

- Provide a new employee with privileges to access the data.
- Add new admins in the database.

2.4 Operating Environment

The operating environment of the project is as listed below:

- **Platform:** Desktop[Python]
- **Operating System:** Windows
- **Database:** SQL + Database

2.5 Design and Implementation Constraints

The following design constraints will be enforced by the software.

1. There will specific queries the organization's employee can use to view the data from the database.
2. The software will not allow a person with a wrong user-name and password to enter the system or view it's records.

The following implementation constraints will be enforced by the software.

1. Due to not having the government database we will use the online data provided by the government for vehicle verification.
2. To implement our client/server system we will use two laptops one which will act as the web-cam and the other will act as the client's computer.
3. As it's it is quite difficult to extract a number plate from a video we will use images to record data into the database.
4. The system will require net connectivity to obtain the vehicle details.

2.6 Assumptions 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 NARDA database.

Chapter 3

External Interface Requirements

3.1 User Interfaces

The following project includes user-friendly user interface which allows user to access various functionalities regarding database being managed by the system. User can perform following functionalities in the system.

- Login or create account.
- View records.
- Perform searches on the basics of the options provided by the system.

Along with above mentioned user can also perform other functionalities such as checking CPLC status of any vehicl and etc.

3.2 Hardware Interfaces

- x86 CPUs

3.3 Software Interfaces

Following are the software used for Vozilo.

OS	Windows
Data Base	SQL
Programming Language	Python

3.4 Communications Interfaces

User computers will communicate with each other using LAN. They can also use one PC as a server for storing database.

Chapter 4

System Features

4.1 Uploading Utility

The following system includes a built-in photograph uploading utility of any vehicle registration/license plate so that further progress can be made. The system will then use it's algorithms by fetching string intelligently from uploaded photograph.

4.2 Cropping Utility

The following system includes a built-in photograph cropping utility which acts on the uploaded photograph and crops the uploaded photograph to a suitable size and hence can be processed further on.

4.3 Converting String(ML)

By using the photograph, the following system intelligently fetches the license string using machine learning algorithm with the help of tesseract on its own.

4.4 Fetching Vehicle Information

The system fetches the concerned vehicle data using authenticate government websites for verification of vehicles. This includes name, CNIC, address and various other information regarding the vehicle. The system also fetches CPLC status of a car which represents a suspicious vehicle.

4.5 Alerting Operator

The system considering the CPLC status of the vehicle alerts the operator if the vehicle should be allowed to enter the lot so that safety is guaranteed.

Chapter 5

Non-Functional Requirements

5.1 Performance Requirements

Simultaneous Users: There can be multiple users connected with LAN (Ethernet Cable). Currently we are using laptop's web-cam as a security camera and making a local DB in same computer, later we can use an actual camera and a server to increase the number of users.

OCR Accuracy: Our OCR is almost 80% accurate.

5.2 Security Requirements

Creating Admin Account: If a user have default Admin's (Made by us) pass-code, then he can create admin account.

- Admin account is used for creating other users.

Creating User Account: Officials can create User account using their Admin account.

Log Off Option: User can log off the system if he is leaving the Computer.

5.3 Software Quality Attributes

Availability: If the internet service gets disrupted then it is on Admin to either block the barrier and stop operations, or allow everyone to enter in the parking without getting the information from Government Database.