Software Requirements Specification

for

Automatic Licence Plate Reader

Version 1.0 approved

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Revision History

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| Name | Date | Reason For Changes | Version |
| Draft | 10/6/2018 | Initial Draft | 0.1 |
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**1. Introduction**

This Software Requirements Specification Document, SRS, provides a general description of the software project named Automatic Licence Plate Reader, from here on out the project will, therefore, be referred to as ALPR. The role of ALPR is to automatically recognize any given license plate when a camera captures it. The system will return the information of the car which matches the license plate number in a given database. ALPR shall automatically capture all license plate numbers that come into view, along with the location, date, and time. The data, which includes photographs of the vehicle and sometimes its driver and passengers, it is then uploaded to a central server. ALPR is currently used in almost every major Law Enforcement Agency in the country.

**1.1 Purpose**

The purpose of this document is to give a detailed description of the requirements for the Automatic Licence Plate Reader, ALPR. This document will define the design of the ALPR, define the requirements of the ALPR, the test plan of the ALPR, and the modules of the ALPR. This document will cover all aspects of the ALPR. The SRS will provide information of ALPR about how ALPR operates, and what ALPR is used for.

**1.2 Intended Audience and Reading Suggestions**

The readers of this document is intended for developers, testers, and users. Developers and testers can review this SRS to know what is ALPR, and how it works(the design and the codes). The users of this software can review this SRS to understand what this software can do and what hardware is needed for this software. This SRS contains the Data Flow Diagram which will show how this software works to testers.

**1.3 Product Scope**

ALPR is a software which can recognize a license plate number on the car when a camera captures a car license plate. The ALPR is connected to a database which contains vehicle information. The ALPR shall receive the images from a camera, shall analyze the image to see if it contains a license plate and locate it, then shall analyze the license plate itself and parse it for the correct plate characters, it will then search the given databases and find the matching pieces of information of license plate number, then it will display all information of this vehicle on a graphical user interface. The ALPR can be used in the prevention of crime. The information collected by ALPR can be used by police to find out where a plate has been in the past, to identify travel patterns, and even to discover vehicles that may be associated with each other.

**1.4 Definitions, Acronyms, and Abbreviations**

ALPR- Automatic License Plate Reader

NCIC- National Crime Information Center

DMV- Department of Motor Vehicles

LPN- License plate number

**1.5 References**

SRS Document template is given by the California State University Los Angeles Engineering Computer Science Technology department.

“Automatic Number-Plate Recognition.” Wikipedia, Wikimedia Foundation, 28 Sept. 2018, en. wikipedia.org/wiki/Automatic\_number-plate\_recognition.

“Automated License Plate Readers (ALPRs).” Electronic Frontier Foundation, 12 June 2018, www.eff.org/pages/automated-license-plate-readers-alpr.

**2. Overall Description**

ALPR is a program that is going to be using computer vision and optical character recognition on images to locate vehicle registration plate and capture vehicle location data. ALPR is currently used in different applications from law enforcement to vehicle repossessions.

**2.1 Product Perspective**

ALPR can work with government and DMV databases. This program is very versatile, it can be used in any program that has recorded images of vehicles with visible license plate number. The program is constantly capturing images when it detects a license plate in the image, it will read the numbers on the plate and display it on the GUI, then the program will go to the database we linked and start to search the pieces of information about this license plate. Furthermore, the motivations for creating this software when compared to an existing product is that ALPR is too expensive to get. Our solution is a much more cost-effective solution.

**2.2 Product Functions**

* Analyze and locate any license plate found in an image
* Read the plate numbers if a license plate is found
* Use the plate numbers to find the name, address, sex, and phone number or any other pieces of information of the vehicle owner in a given database.
* Display and alert the driver if the information returned has anything of significant importance

**2.3 User Classes and Characteristics**

Law enforcement is currently one of the biggest use for ALPR technology. They currently use it to actively check any vehicle they pass by for warrants or if it was stolen, they also use it to log the location of vehicles in an area to monitor suspects behavior patterns. Another major user for this technology is repossession agents looking for cars that have skipped their loan payment.

**2.4 Operating Environment**

ALPR running under Java Virtual Machine which makes it cross-compatible with many different operating systems. It will work with the camera or any other product that provides an image source. It can be can be run by itself or run in conjunction with other applications, depending on how you want to use it.

**2.5 Design and Implementation Constraints**

* Hardware limitations
* Reliability requirements
* Interfaces with other applications
* Government Security standards
* Quality of image source
* Security of Personal Informations

**2.6 User Documentation**

Not applicable

**2.7 Assumptions and Dependencies**

The device must be able to run the Java Virtual Machine and python

**2.8 Apportioning of Requirements**

Not applicable

**3. External Interface Requirements**

The ALPR Data flow diagram level 0, DFD 0, provides a view of all external requirements related to the software.



DFD 0



DFD 1

**3.1 User Interfaces**

The main user interface component will have a GUI that automatically shows incoming images of license plates that was captured and a parsed version of the input just showing the plate plus what the computer interrupted as the text. The user will be given a brief summary of the vehicle information that was returned from a given database, a more detailed report can be given if the user requests it. The user will then have the option to close the window/viewing session of the person that owns that particular plate and to return to the standby/waiting screen.

A camera on the front end of the vehicle that is continuously capturing images of what passes by in front of the camera, Once the a license passes in front of the camera the license plate will come up stating the license plate number of the car and a brief description of the returned information from the database regarding that plate number. If the option selected is yes, a detailed report on the information of the vehicle and the registered owner will appear.

If the system detects a license plate that has a stolen vehicle or other types that requires an officer to immediately pull over the vehicle an alert will be given to the officer in the form of a visual and audible notice to the user.

**3.2 Hardware Interfaces**

The software will require a camera that supports continuous recording in high definition, and an external connection to any database it needs

**3.3 Software Interfaces**

* MySQL Database is required.
* Java Virtual Machine
* Python 2.7.

**3.4 Communications Interfaces**

A network connection to a SQL server will be required so the software can look up and return information that is relevant to the license plate number.

**4. Requirements Specification**

This section contains all of the necessary software requirements with enough detail to allow designers to

**4.1 Functional Requirements**

1. The system shall detect images of license plates, and return a cropped image of the license plate at a 90% accuracy.
2. If no license plate is initially detected, the system shall return a NULL value type.
3. The license plate character recognition module shall have a 95% accuracy rating of returning LPNs when testing images of standard California license plates.
4. If unable to return the LPN, the character recognition module shall return a NULL value type.
5. If a valid LPN is returned by the character recognition module, the system shall search through all given databases and compile and compare the information that is related to that specific LPN.
6. The system shall alert the user to any flagged vehicles through both an audible tone and a visual cue.
7. The program shall have a way of requesting the user’s credentials to validate if they have the correct permission to use the system.

**4.2 External Interface Requirements**

1. The external database that this program interacts with shall be able to handle up to 60 queries per second.

**4.3 Logical Database Requirements**

Not applicable

**4.4 Design Constraints**

Not applicable

**5. Other Nonfunctional Requirements**

**5.1 Performance Requirements**

Not applicable

**5.2 Safety Requirements**

Not applicable

**5.3 Security Requirements**

Not applicable

**5.4 Software Quality Attributes**

Not applicable

**5.5 Business Rules**

Not applicable

**6. Other Requirements**

Not applicable

**Appendix A: Glossary**

Not applicable

**Appendix B: Analysis Models**

Not applicable

**Appendix C: To Be Determined List**

Not applicable