

# Automatic License Plate Recognition

## Interim Presentation

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# Outline

## 1 What?

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- 2 Why?

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- 2 Why?
- 3 Scope

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- 3 Scope
- 4 System
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  - Licensing
- 5 Issues
  - Standardization
  - Image Quality
- 6 Tools
  - Language
  - Libraries
  - Others

# What?

**Automatic License Plate Recognition (ALPR) is a real time embedded mass surveillance system that captures the image of vehicles and recognizes their license number.**



Some applications of the system are:

- **Automated traffic surveillance and tracking system.**
- **Automated high-way/parking toll collection systems.**
- **Automation of petrol stations.**
- **Journey time monitoring.**

**Making the process fast, effective and cost efficient**

# Why?

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**These countries enforced standards on the license plates in terms of dimensions, borders, colour, font size and type. Thus making the system easy to implement.**

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**Systems have been implemented using proprietary tools and libraries.**

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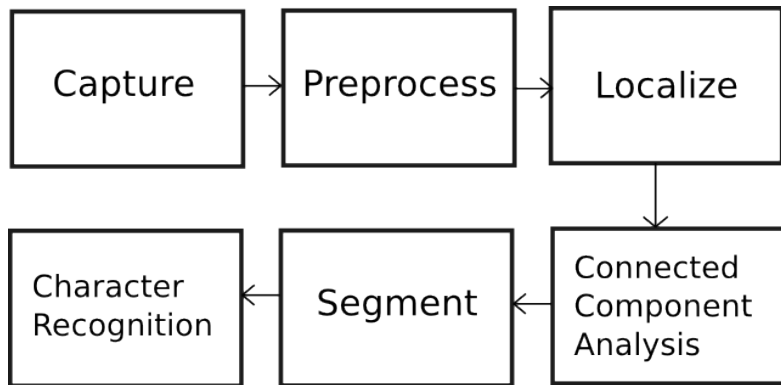
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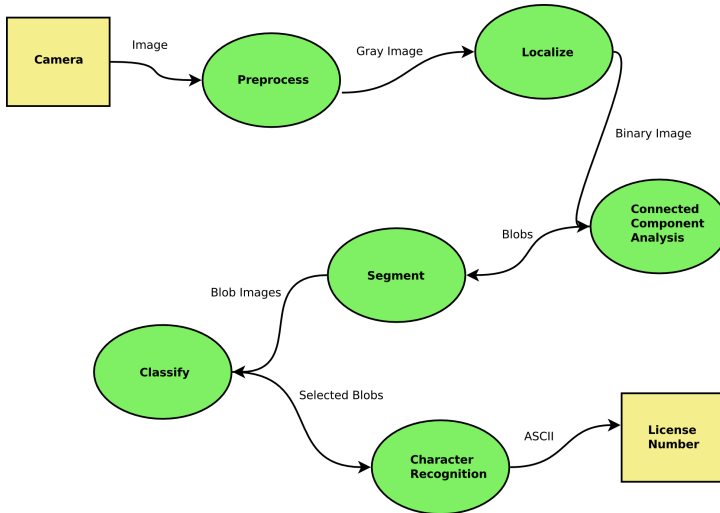
**Develop basic document writing and presentation skills.**

# System

The proposed system consist of 6 phases



# Data Flow Diagram



## Capturing Image

**The image of the vehicle is captured using a high resolution photographic camera.**

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To understand the variations in settings like exposure, frame aperture etc, we have chosen 3 cameras.

- **Canon 1000D**  
High resolution DSLR camera. HD images.
- **Canon PowerShot IS 800**  
8 MP digital camera with Image Stabilization.
- **Nokia E72**  
5 MP digital camera embedded on a mobile phone.



# Preprocessing

**Two operations involved are:**

## 1. Resize

**Image from the camera is to be resized for optimization reasons.**

## 2. Change color space

**Image is converted to Grayscale from RGB.**

# Localization

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**We use this operation to convert the image to binary and localize the license plate from the image of the vehicle.**

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**To be precise, Otsu thresholding is used.**

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**cvBlobsLib is a library under OpenCV which extract 8-connected components in binary or grayscale images.**

# Segmentation

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**Save them as individual images.**

# Character recognition

The blobs are send to an **Optical Character Recognition engine** for returning the **ASCII**.

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Tesseract is a leading OCR library developed in the HP Labs, later acquired and highly modified by Google.

Google released this into the open source community.

# License

**The system will be released under the GNU General Public License V 3.0**

# Issues

**Complexity and probability of failure of the system increases as there are multiple issues.**

# Flaw in license plate standardization

- **Dimensions**
- **Fonts – type, size**
- **Art works**
- **Colours**
- **Position of the plate**



# Thresholding

- **White balance**
- **Colour spaces**
- **Camera**
- **Lighting**

# Blob Classification

**Undesirable blobs creep in during connected component analysis which if un-noticed can cause trouble in the character recognition phase.**

# Tools

**The entire system is implemented using free software.  
Ubuntu GNU/Linux operating system is used.**

# Python

**Python is an interactive, interpreted, dynamic language which is free and highly efficient.**

**Python is language libre. Shaped by the users around the world. Attracting more developers due to its simplicity.**

**The entire ALPR system is implemented in Python**

# Libraries

## Open Computer Vision

**OpenCV library is developed at the laboratories of Intel Corporation. They contain sets of highly efficient multimedia processing functions.**

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## Python Imaging Library

**PIL is the base image processing library from Python.**

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## Qt Designer and PyQt

**The GUI is designed using Qt designer and Python code for the same generated using PyQt.**



# Other Tools

Project Management

**Subversion Source code control system.**

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**Subversion** Source code control system.

## Document Generation

**LaTeX**

**Dia**

**Thankyou!**

## **Automatic License Plate Recognition Interim Report**

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