

Automatic License Plate Recognition

Interim Presentation

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Outline

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- 1 What?
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- 6 Tools
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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?

ALPR systems have been implemented in many countries like Australia, Korea and few others.

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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.

Scope

Understand the image processing techniques involved.

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Realize the issues and challenges for implementing the system.

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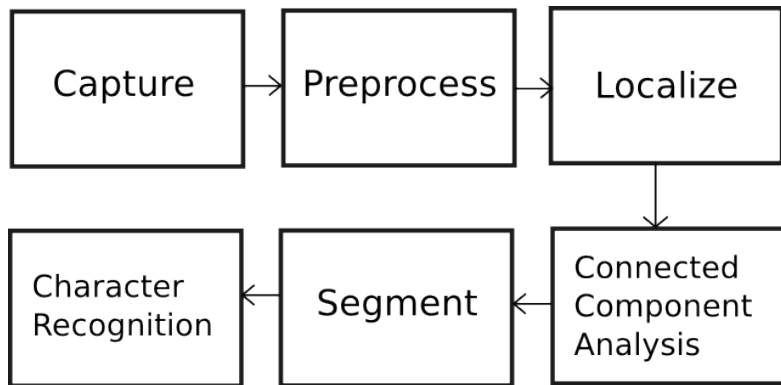
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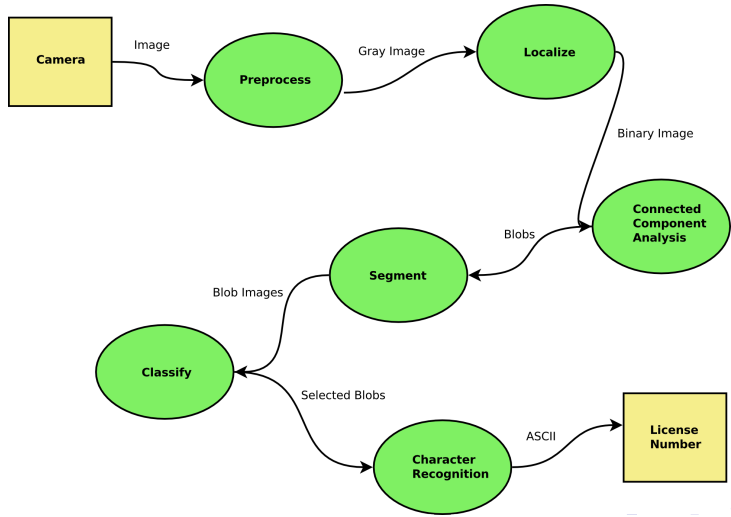
Develop basic document writing and presentation skills.

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.

Connected Components

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

Segmentation

Crop out the labelled connected components called blobs.

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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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Tesseract OCR

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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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Document Generation

LaTeX

Dia

Thankyou!

Automatic License Plate Recognition Interim Report

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