Requirement Specifications
Number Plate Recognition

Ribemont Francois

Supervisor: Nigel Whyte

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1 Introduction

Number Plate Recognition (NPR) is a software that reads Irish car plate numbers from pictures. The input of the program is an image, and the output of the program is a text string containing the car plate number. By executing a series of algorithms, the program will be able to take an image as an input and generate the number plate in a text format. For the Figure 2, the output would be: 03MH1847.

Figure 1: Irish car plate

2 Functional specifications

2.1 Main parts

The project can be divided into five parts and each part can be divided into subparts. The main parts are:

- Plate localization
- Plate orientation and sizing
- Character segmentation
- Character recognition
- Syntactical/Geometrical analysis

3 Functional specifications

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The plate orientation and sizing is the action of detecting in what angle and what size the plate is. We realise this operation from the Hough transformation.

The character segmentation is the action of separating characters from each others in order to deal with them one by one. In order to do this, we use the horizontal and vertical projections.

The characters recognition is the action to associate a character from the plate to a computer-usable character. Two different algorithms are possible to do this action: template matching and Optical Character Recognition (OCR)

The last part of the software concerns about the respect of the standard of Irish car plates. There is no specific algorithm, we simply look if the plate matches with the standard.

3.4 Graphical User Interface

The interface should be easy to use, specially for a program straight forward program, where the user has only one need: get the plate number from an image.

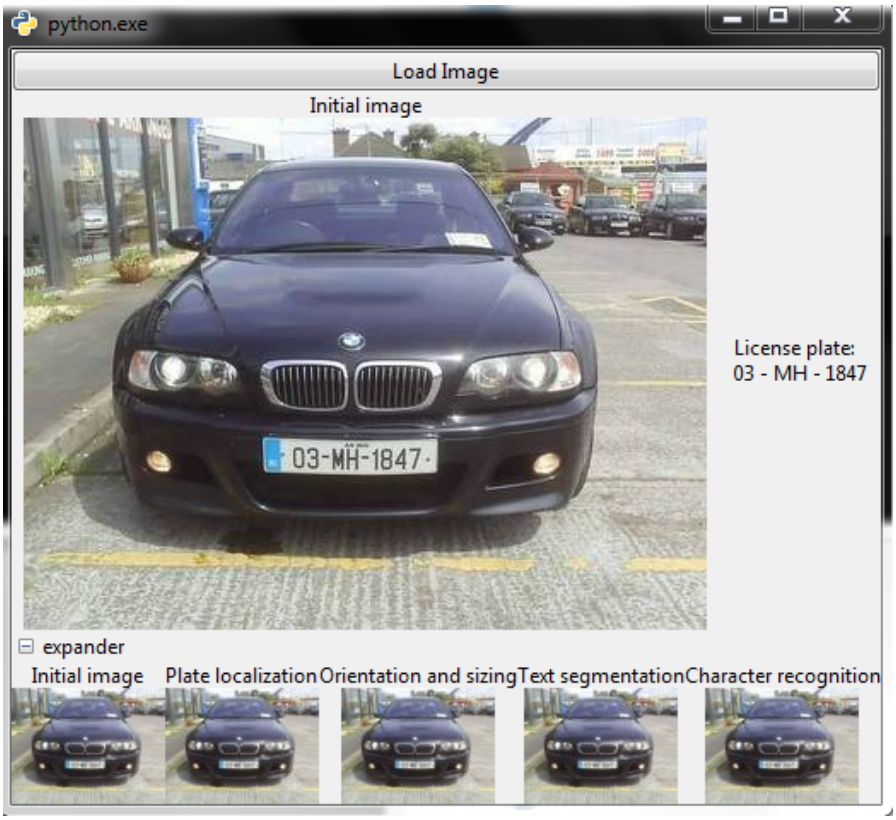

Figure 2: Mock up of the GUI

The Graphical User Interface (GUI) contains only what is required and nothing else. The main window contains a menu bar which contains two elements: File (contains Open, and Quit), and Help (contains About).

On the bottom of the interface, there is an expand button, which hides or shows what's below it. When the button is pressed, we can see a couple of images, each of them corresponds to a step of the main process. By clicking on one of them, it replaces the image in the middle part of the interface by the image the user just clicked on. In this part, images are just thumbs.

Above this, there is the main part of the application, the current image, and a label on the right containing the car plate number.

4 Users of NPR

This kind of software is mainly used by the Police in general. Because this software recognizes Irish car plates, it can be used by the Guarda in Ireland. This application can be used for two main reasons:

- Recognizing stolen cars
- Detecting speeding, or general traffic regulation violations

Students and people who are interested in understanding how computer science works can also use this software, and read the design documents. It can be very useful for other projects that use similar algorithms.

5 Metrics

NPR will process images where the car should be far from 5 to 15 meters and the plate orientation should be included in the range of 0° and 10°. The recognition rate should be high enough, more than 90%.

The image should not contain too much noise and the plate should be clean enough to be read. The input image can be of any usual image formats: JPEG, BNP, PNG.

The GUI should respect the Keep It Simple, Stupid! (KISS) principle so, it should be easy to use with only two buttons to respectively load an image, and expand the view of the input image in order to get all the images, step by step. Another interface will be available, a command line interface, which can useful in a script in order to process multiple image and save the outputs in a text file for example.

6 Existing softwares

Because the project is split in two main parts (the plate localization, and the character recognition), we can find softwares that look like it. OCR softwares do the same job as the last part of the project. They are some commercial system, like those used by the police, include the NPR system. No much information is available about these softwares, but we can say they are quite the same as this one.

Acronyms

GUI Graphical User Interface. 5

KISS Keep It Simple, Stupid!. 5

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OCR Optical Character Recognition. 4

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