**License plate recognition**

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1. Problem statement

Color images of vehicles are given, at different distances, with visible license plates (the license plates can be a little bit rotated to the horizontal direction and their contained characters may have different spacing). The output of the algorithm, which must identify the areas where the license plates are located, extract the characters and classify them, must return a text display of the recognized license plates characters.

2. Implementation

The implementation was made in C++ using OpenCV. The algorithm consists of several functions that do all the steps required in order to extract the text from the license plates. These steps are:

1. Extracting the license plates from the initial image - the algorithm searches for rectangular shapes in the original image, which correspond to the license plates. Before the contours are detected, the Canny algorithm is applied to the image to make the contours easier to find. Once the plates are detected using the contour function of the openCV library, the box containing the license plates are extracted into separate images.

2. Extracting each character of the license plate - once we have the license plate, we again use contour functions of the openCV library to extract each character in a separate image, binarized and resized to 28x28 pixels for further processing.

3. Classify the characters using a Bayes classifier - the algorithm classifies each character using a naive Bayes classifier, which uses a digit and letter training set in order to compute a likelihood matrix that is used to classify the unknown character.

3. Results

Initial image



Extracted license plate



Processed license plate



Sample of extracted character

