Car plate detection using MATLAB IPT

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Group 1

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Summary

- Introduction;
- First task:
  - Process;
  - Results;
- Second task:
  - Process ;
  - Results;
- Third task;
- Conclusion.

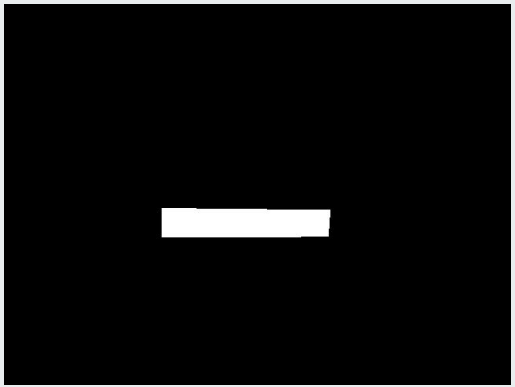
Introduction

- Program able to detect and recognise car plates of a back car image

- Divided into three tasks:

    1. Detection and segmentation of the plate and creation of a region of interest (ROI) containing the detected area, evaluated via de Jaccard Index
    2. Identification of the characters (letters and digits) of the plate images obtained from the ground-truth (GT) of the first task, evaluated via the percentage of well recognized chars in each plate.
    3. Application of the developed algorithms to a dataset containing a limited number of images that were acquired in hard light or weather conditions, evaluated by visual inspection

First Task

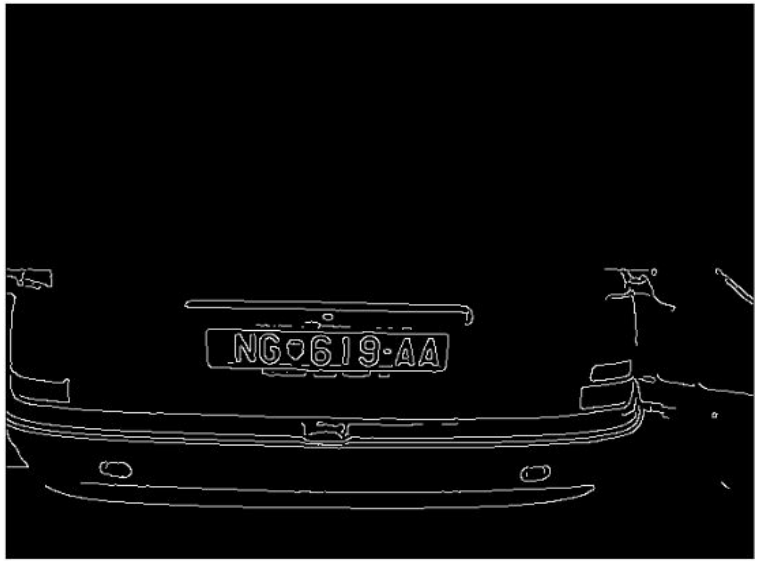


First task

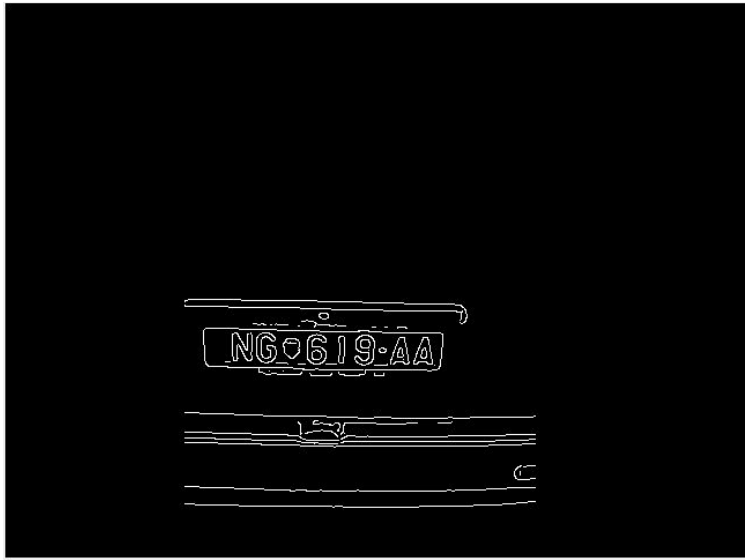
Grayscale conversion and intensity range resizing, gaussian filter and upper image section cut

White enanchments (top-hat)

First task

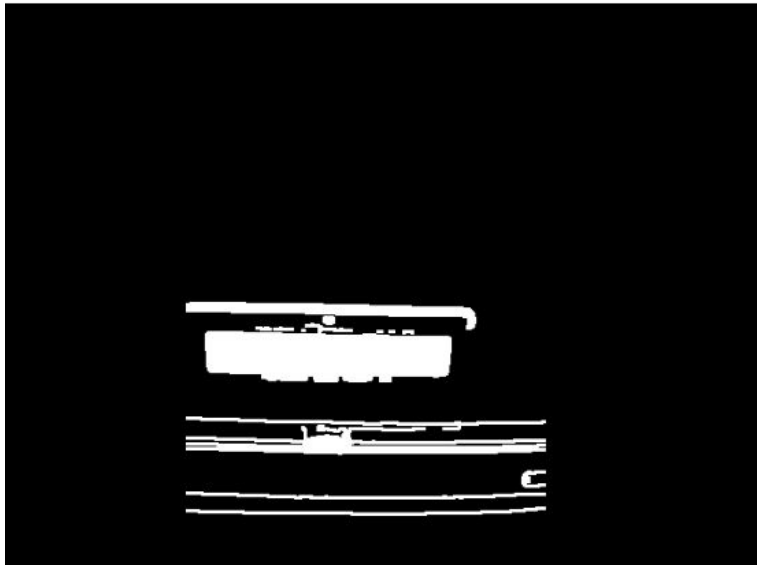


borders detection (canny method with fixed threshold)

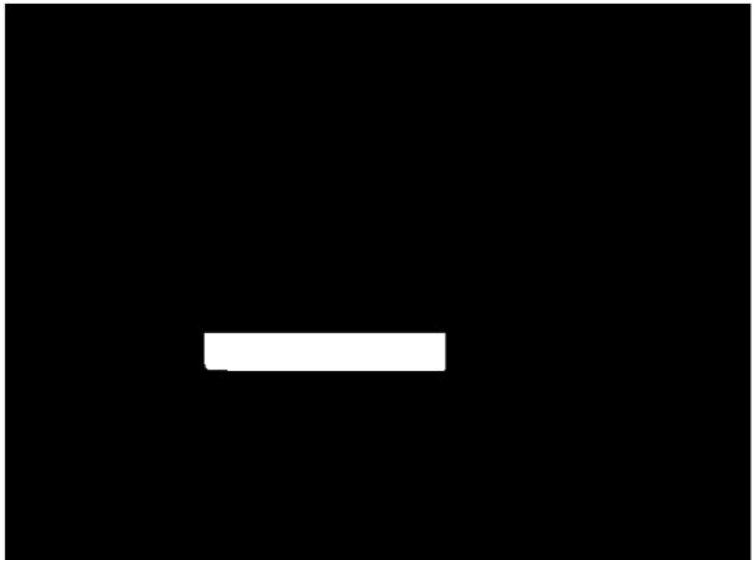


More cuts to improve the results in the next step

First task



Vertical and horizontal dilations and holes filling.



Vertical and horizontal opens to remove unwanted parts

First task - Results

- Worst case: 0.5997;
- Best case: 0.9827;
- Average: 0.8508;

Worst case

Best case

Second Task

Second task - Process

General image resizing, grayscale conversion, gaussian filter and histogram equalization;

Image binarization with fixed threshold and closing;

Second task - Process

Image negative (inversion) and horizontal/vertical dilation, unnecessary parts removal, dilations and erosions for letter completation;

Quantification with four threshold values (5 classes), closing, inversion, dilation and erosion for letter enlargement

Second task - Process

Sum of the two images

Object detection with bwlabel and region segmentation;

Second task - Results

- 37/40 correct identifications;
- 2 wrong due to the mix of ‘O’ and ‘0’;
- Some letter/numbers were not connected;
- Example:

Third Task

Third task - Results

- 1/10 in the first task;
- 0/10 in the second task

Conclusion