University of Tartu, Institute of Computer Science

Course: Introduction to Intelligent Transportation Systems

Project:

Automatic Plate Number Recognition (APNR)

Student:

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APNR: STEPS #1-5

1) Load image
2) Apply ***blur filter*** (to remove noise)
3) Convert blurred image to grayscale
4) Apply ***Sobel filter*** to find vertical edges (car plates have a high density of vertical lines)
5) Apply ***threshold with Ostu's Binarization***

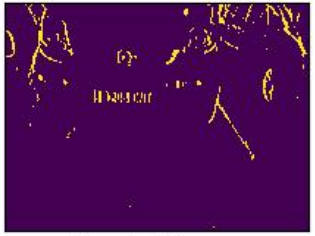
(Ostu's binarization will automatically calculate optimal threshold from image histogram)


Original image


Blurred image

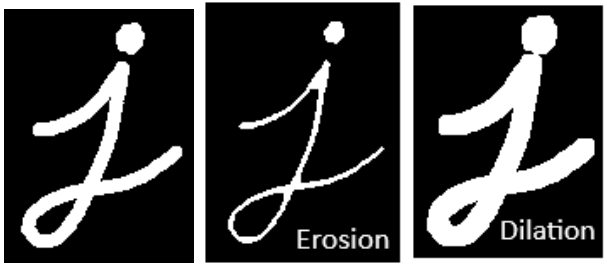

Grayscale image

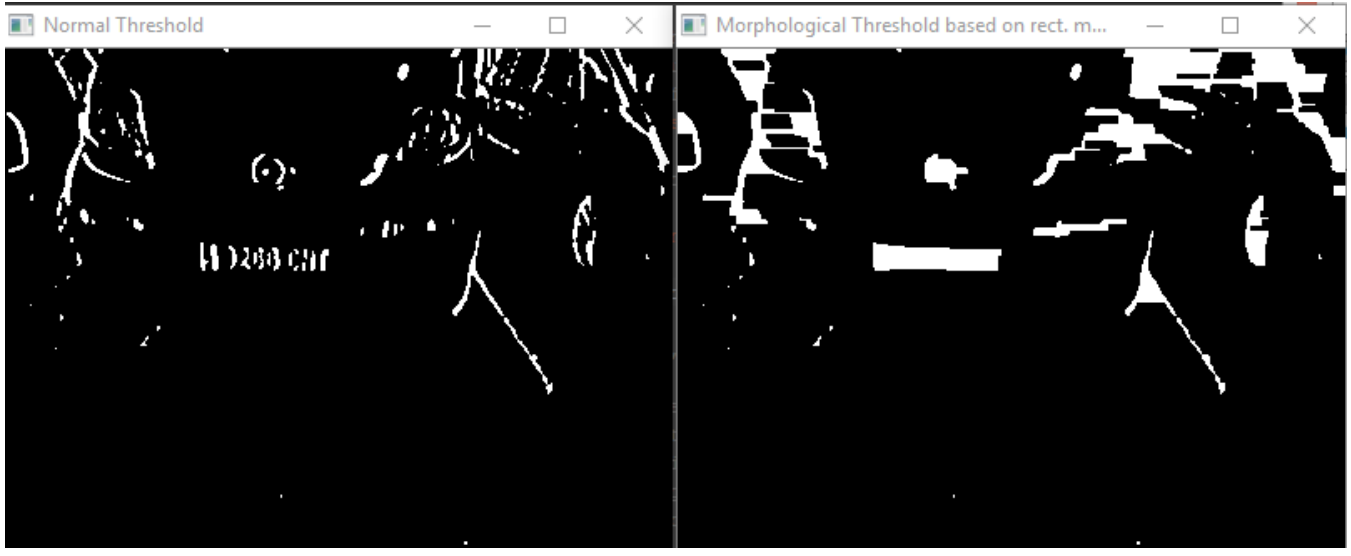

Sobel


Threshold image

APNR: STEP #6 (Morphological filters in OpenCV)

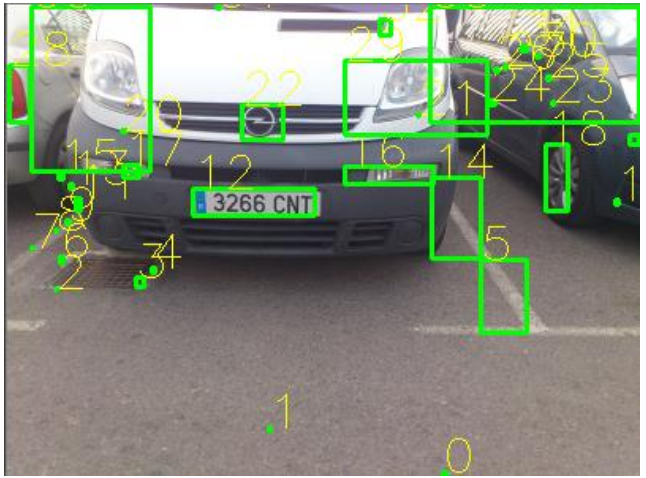
6) Then I created a rectangular mask of size of 17x3 and applied “closing” filter (shown on the right) to detect plate number more clearly



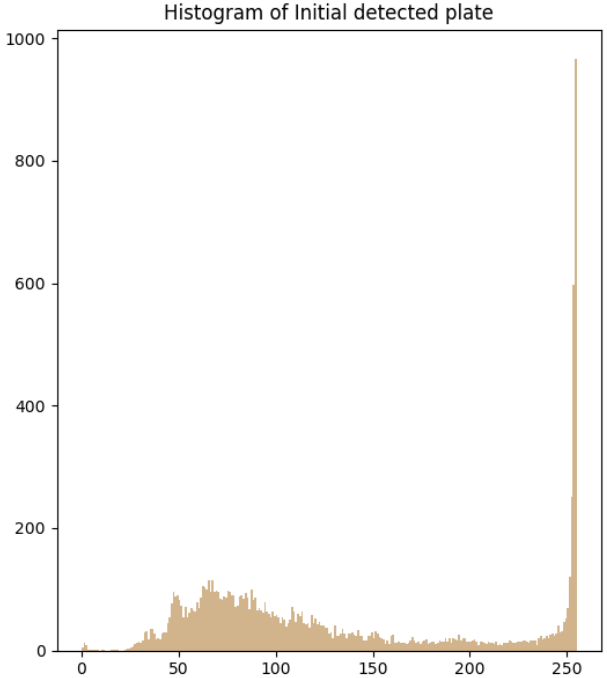


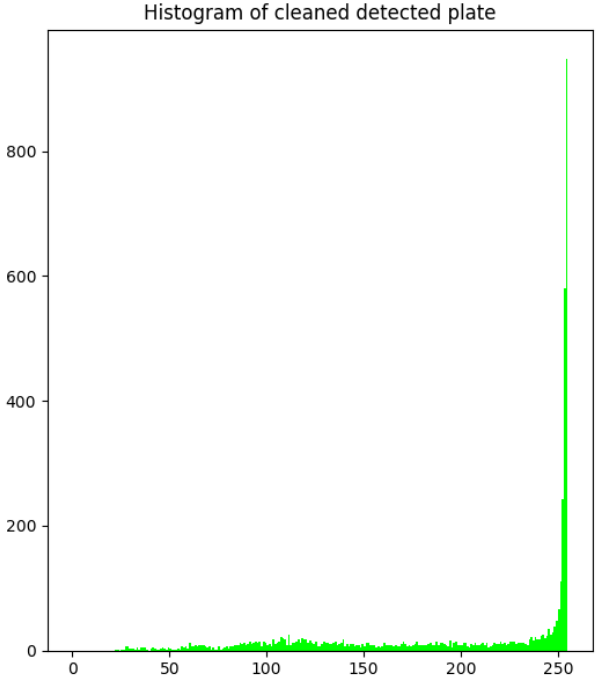
APNR: STEPS #7-9

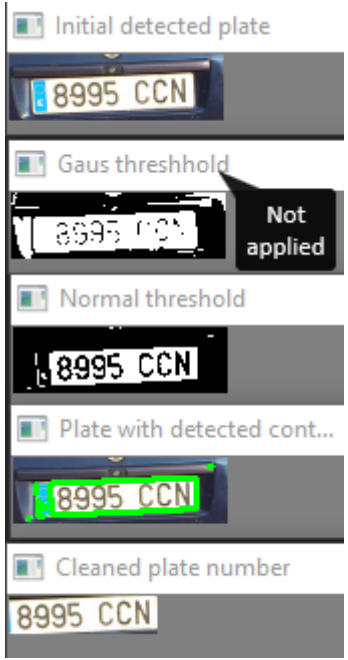
7) Find and fetch contours of possible plates
8) Validate contours and clear out those, that can't be potential plate numbers
   - Is white color dominant?
   - Rotated not more than 15 degrees
   - In Europe, car plate size: 52x11, aspect 4,7272
   - Define min && max area of plate number
9) After (8), apply “dilate” filter and threshold to validated contours to get numbers and characters



APNR: STEP #9 in details



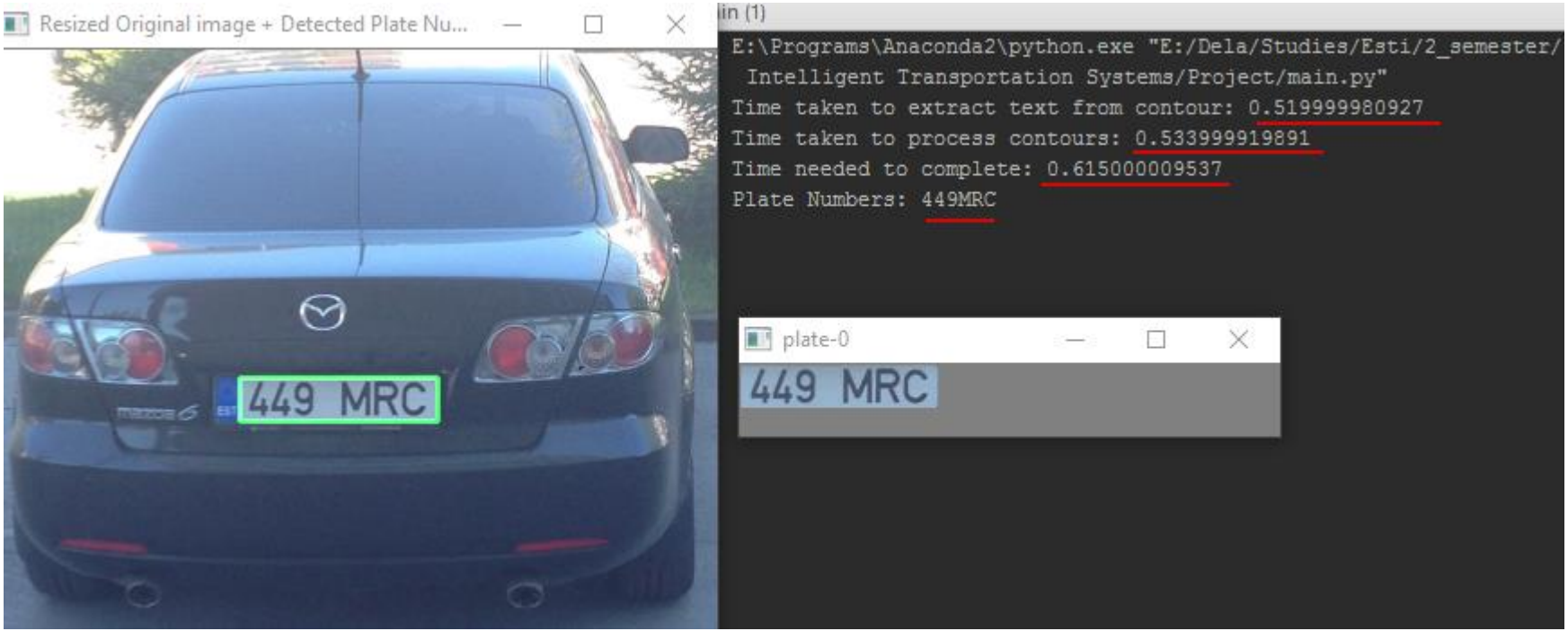




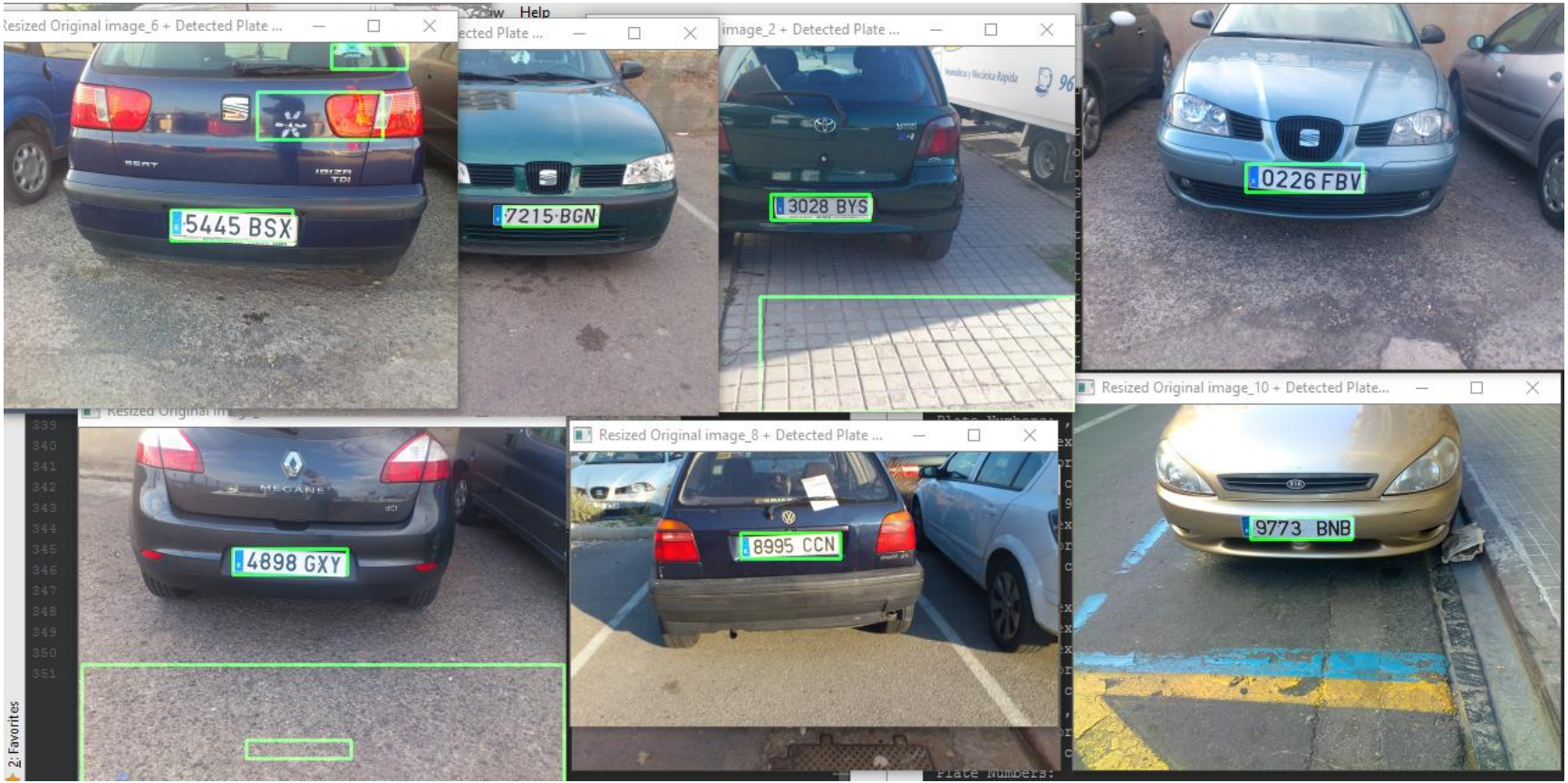
APNR: STEP #10 (parse plate number from image)

10) Apply Tesseract to extract plate number as a text.

Tesseract is an optical character recognition (OCR) engine sponsored by Google



APNR: Final Result



Thank you for attention!