

CS620: Project Outline

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Due: October 23<sup>rd</sup>, 2022

## **License Plate Recognition Program**

### *Objectives*

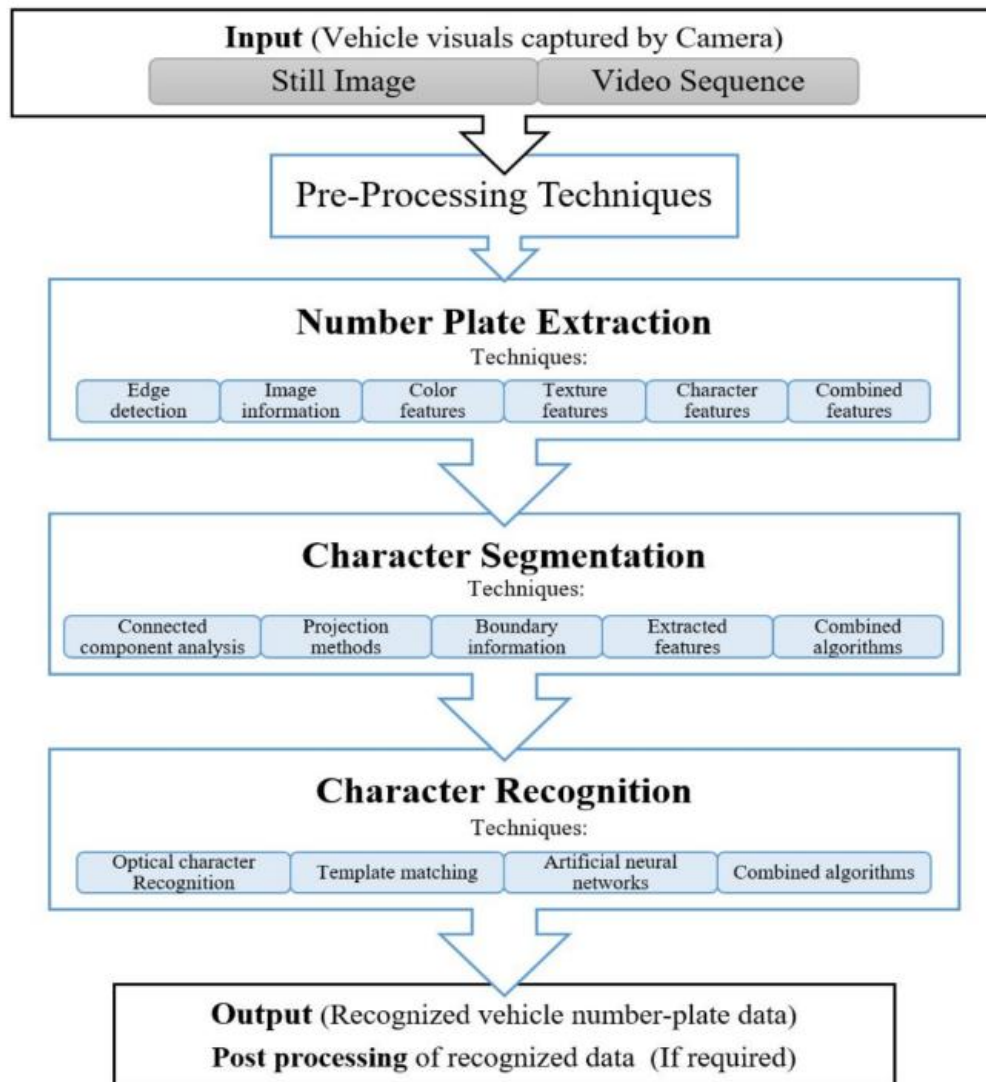
- Create a program that will be able to identify and recognize license plate information in any image or series of images.

### *Background Information*

The goal of license plate recognition is to be able to automatically extract information about the plate just from a stand-alone image. This type of program can be used in law enforcement to capture cars who are speeding, running lights, or involved with a crime. Ideally, captures from video surveillance may be ran through such a program to track down information about the individual involved - or at least the owner of the car.

To accomplish this, many different image processing and machine learning based steps must be put in place. The first step involves pre-processing of the image data input. This may include conversion to grayscale, image thresholding, and extraction of contours to determine any characters in the image via edge detection methods. Areas of possible license plate matches will then be further analyzed by investigating smaller areas surrounding these places in the image and their corresponding contours. Following this, character recognition function will be put in place to ultimately determine which possible plate is the true match. The final license plate will then be recognized, and the plate information will be extracted and printed for the user.

For my project, I plan to use either MATLAB or C++ to write my program. I am very familiar with both languages and have extensive knowledge of an image processing library called OpenCV which I have used with C++ programming. I found a paper by Gilly & Raimond from 2013 that provides a very detailed overview of a License Plate detection process that I plan to utilize and follow through writing my program. The flowchart from this paper is included on the next page in Figure 1. It provides more information on the aforementioned steps that I plan to take in order to accomplish license plate recognition in image data. I plan to use these steps as more of a guide rather than following them exactly, but it is a good starting point to reach the goals of the project. I would like this program to be computationally efficient and simple, but will maximize accuracy and effectiveness.



**Fig.1** License Plate Recognition Diagram Outline from Gilly & Raimond 2013 [1]

I imagine that there will be some roadblocks on the way during this process. For example, if the license plate data is too small in the image it may be neglected accidentally by the program. As well, if the plate is very similar to the background it may be challenging to detect and/or identify the location and information on the plate. This is where image pre-processing will be important because different types of illumination or contrast in images may cause issues in the processing.

Ultimately, I think that this project has many different applications in the real world, and I am excited to try something new in scientific computing that I have not attempted before – Machine Learning and recognition.

### *Timeline*

**OCT.23:** Project Outline Due

**OCT 30:** Fine tune the steps of the algorithm and complete literature review

**NOV.6:** Gather Image Data for Project and begin coding

**NOV.13:** Finish implementing Pre-Processing Code and begin the rest of the code

**NOV.30:** Finish writing the program and run test images

**DEC.1:** Complete any finishing touches to the code and begin writing final report

**DEC.9:** Final Project Due

### *References*

[1] Gilly, D., & Raimond, K. (2013). A survey on license plate recognition systems. *International Journal of Computer Applications*, 61(6)

[2] Lee, E.R., Kim, P.K., & Kim, H. (1994). Automatic recognition of a car license plate using color image processing. *Proceedings of 1st International Conference on Image Processing*, 2, 301-305 vol.2.