

# Mid Term Project: Details and Guidelines

## Instructions for the Project:

- The project may consist of designing experiments, implementing algorithms, and analyzing the results for an image processing problem.
- You should work in groups of 3 (**or less**). Please fill in your group details [here](#) and download appropriate test cases from [here](#).
- Group members should have individual unique contributions to the project (which must be stated clearly in your final report), and yet, be aware of what the other group members did.
- You will be required to submit a report and appear for a viva during which you will demo your project, and answer questions about it. The final report should clearly but briefly describe the problem statement, a description of the main algorithm(s) you implemented, a description of the datasets on which they were tested, a detailed description of the results followed by a conclusion including an analysis of the good and bad aspects of your implementation or the algorithm.
- You may use any packages or library for your project. But merely invoking calls to someone else's software is not substantial enough. You should have your non-trivial coding component.

## Due date:

- Midterm Report: 18<sup>th</sup> March 2022
- Final Report: 29<sup>th</sup> April 2022
- Final Demo/Video: 29<sup>th</sup> April 2022

## Grading:

- The project is worth 25% of your course grade, broken down as follows:
  - Midterm Project Report (4 Page): 20%
    - Title, Author(s)
    - Introduction: this section introduces your problem and the overall plan for approaching your problem
    - Problem statement: Describe your problem precisely specifying the dataset to be used, expected results, and evaluation
    - Technical Approach: Describe the methods you intend to apply to solve the given problem
    - Intermediate/Preliminary Results: State and evaluate your results up to the current date
    - Font: Arial/Calibri, Font size: 10, Spacing: 1.5 lines
    - Upload to given submission link in pdf format (Group#\_midReport.pdf)
  - Final Project Report (10-15 Page): 30%
    - Title, Author(s)
    - Abstract: It should not be more than 300 words
    - Introduction: this section introduces your problem and the overall plan for approaching your problem
    - Background/Related Work: This section discusses relevant literature for your project
    - Approach: This section details the framework of your project. Be specific, which means you might want to include equations, figures, plots, etc
    - Experiment: This section begins with what kind of experiments you're doing, what kind of dataset(s) you're using, and what is the way you measure or evaluate your results. It then shows in detail the results of your experiments. It must include both quantitative evaluations (show numbers, figures, tables, etc) as well as qualitative results (show images, example results, etc).

- Conclusion: What have you learned? Suggest future ideas.
- References: This is necessary.
- Font: Arial/Calibri, Font size: 10, Spacing: 1.5 lines
- Upload to given submission link in pdf format (Group#\_finalReport.pdf)
- Supplementary Material is not counted toward page limit (e.g. Codes, etc)
- Final Project Demo: 50%
  - The contents of the demonstration should be similar to the contents of the final project report, with more emphasis on your approach and results. A rough suggested allocation of time is the following:
    - Introduction: Introduce the motivation and your problem, and then relevant prior work and approaches for this problem (3 minutes)
    - Approach: Provide an overview of your approach and highlight the key technical aspects you worked on. (5 minutes)
    - Experiments and evaluation: Explain the experimental setup and summarize the quantitative results (numbers, figures, tables, etc) and qualitative results (images, example results, etc). (7 minutes)
  - Grading
    - The rubric will be split into the following categories:
      - 10% for the problem statement, motivation, and background
      - 30% for technical approach
      - 40% for sufficient and informative quantitative and qualitative results
      - 10% for the visual style
      - 10% for addressing questions raised during Q&A
      - Grades for each category will be assigned on a standard scale out of 4.
  - Upload the video to given submission link in pdf format (Group#\_Demo.xxx)

## Honor Code

- You may consult any papers, books, online references, or publicly available implementations for ideas and code that you may want to incorporate into your strategy or algorithm, so long as you cite your sources in your code and your writeup. However, under no circumstances may you look at another group's code or incorporate their code into your project.

## Project

- Design basic License/Number Plate Recognition (NPR) system using OpenCV and Python
- Steps:
  - Step #1: Detect and localize a license plate in an input image/frame
  - Step #2: Extract the characters from the license plate
  - Step #3: Recognize the extracted characters (Three/Two English letters/numbers and four proceeding numbers)
- Assume that these number plates are affected by one or a combination of several degradations (e.g. low light conditions, shadowing, reflection, blurring, motion defects, rotation, etc)
- Each group is given three [test frames](#) to check your implementation
- An additional set of test images will be used during the evaluation to test your implementation
- You may use any available image processing or computer vision techniques to implement this project
- Data Set (Sri Lankan number plate):
  - [https://drive.google.com/open?id=1SHdx1cshWtsCpAwnHIWfq-Py0UkLmT7I&authuser=upuljm%40eng.pdn.ac.lk&usp=drive\\_fs](https://drive.google.com/open?id=1SHdx1cshWtsCpAwnHIWfq-Py0UkLmT7I&authuser=upuljm%40eng.pdn.ac.lk&usp=drive_fs)
  - Optional to decode province code