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| ĐẠI HỌC TÔN ĐỨC THẮNG<br>TON DUC THANG UNIVERSITY | KHOA CÔNG NGHỆ THÔNG TIN<br>KỲ THI GIỮA KỲ HỌC KỲ 1<br>NĂM HỌC: 2024 – 2025 |

**ESSAY**: Introduction to Digital Image Processing

**CODE**: 505060

## I. Rules

- Each essay is conducted by a group of **one to three students**.
- The essay consists of 2 parts: the Programming part and the Report part.
- Only use OpenCV library and some basic Python libraries in the Programming part.

## II. Programming part

This part is consist of two programing tasks. Here are the contents of the part:

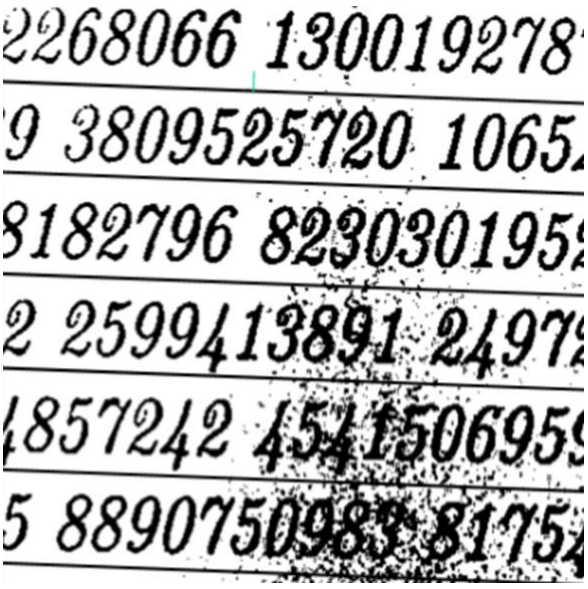
**Programing Task 1 (3.0 points):** Given an input video (attached in the assignment):

Video filename: **task1.mp4**

Draw rectangles surrounding each Traffic sign in all frames of the input video automatically, and save the outputs into a new video file.

- Input: task1.mp4
- Output: another version of the input video "task1.mp4" with rectangles surrounding each traffic sign. A sample output was attached in the assignment ("task1_output_sample.avi").

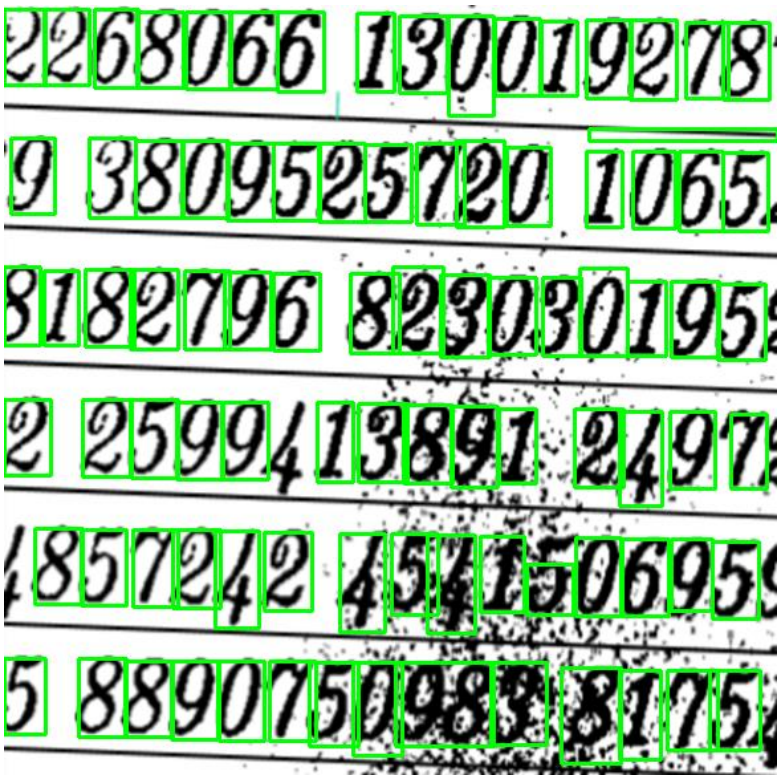
**Programing Task 2 (4.0 points):** Given an input image as follows:



Filename: **input.png**

Draw rectangles surrounding each digit in the input image automatically, and save the output image into a file.

Here is a sample output:



## III. Report part (3.0 points)

1. The report must be submitted in **PDF format**, and the content must be written based on the report/essay format of the Faculty of Information Technology. **In case students do not follow the Faculty's format, they will receive 0 points for the Report part.**
2. The report must include the following contents:
    a. Chapter 1: Methodology of Solving Tasks **(2.5 points)**

    Write a detailed description of the solving methods used in each **task** of the "Programming part" by:

    - Providing a short description of main programming steps in the task
    - Explaining in-detail each programming statement of the source code for the task

    b. Chapter 2: Task results **(0.5 point)**

    Insert all output images of the tasks in the "Programming part" into this section:

- Task 1: three output frames with rectangles surrounding each traffic sign in three different time of the output video (minimum difference of time between two output frames is 8 seconds)
- Task 2: a final output image

The images must be clear, and properly laid out. The images captions and descriptions are also required.

## IV. Submission guideline

- Filenames of the source code and the report files must be the **Student IDs**, for ex.,
  - A group of only one student with student ID 521H1495 will submit a Python source file named **521H1495.py** and a report file named **521H1495.pdf**
  - A group of two students with student IDs 521H1234 and 522H4321 will submit a Python source file named **521H1234_522H4321.py** and a report file named **521H1234_522H4321.pdf**
- Filename of the output video (Task 1) must be the **Student IDs**, and **insert Student IDs** into all frames of the output video.
- Students submit **Python source files, an output video, and a report file** to the "**MidTerm_Essay**" assignment on Elearning website of the practical class.
- Students must ensure that the Python source files are not corrupted during execution. The source code with errors will not be scored.
- Python source files must be saved in the correct format (**file extension is .py**). The source files in the wrong format will not be scored.

## V. Regulations

- The result of this essay will be the Midterm score.
- **Student who copy their friends's essay will be scored 0.**
- **If a student's work shows signs of copying each other, the student will attend an interview with the lecturer.**

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