

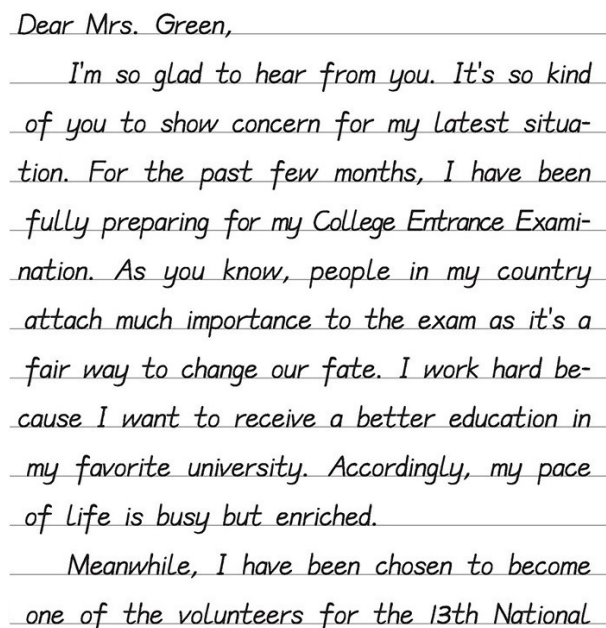
## Project 2: Handwritten Text Recognition

### 1 Background

Text recognition, also known as Optical Character Recognition (OCR), is the process of converting printed or handwritten text into a machine-readable format. This technology is pivotal for transforming script from physical or digital images into editable text, enabling automated data entry, historical document digitization, and enhanced accessibility for handwritten inputs. The significance of text recognition lies in its ability to extract meaningful information from physical documents, supporting applications such as document digitization, text data analysis, and improved accessibility. In this project, you will implement text recognition on handwritten text.

Through text recognition, you should be able to identify text in images, for example: In Fig. 1:

Dear Mrs Green ...  
Im so glad to hea...  
(No requirement for punctuations (like "," "&" "-").)



The image shows a handwritten English composition on lined paper. The text is written in a cursive script. The first line is 'Dear Mrs. Green,' followed by a horizontal line. The next line is 'I'm so glad to hear from you. It's so kind of you to show concern for my latest situation. For the past few months, I have been fully preparing for my College Entrance Examination. As you know, people in my country attach much importance to the exam as it's a fair way to change our fate. I work hard because I want to receive a better education in my favorite university. Accordingly, my pace of life is busy but enriched.' This is followed by another horizontal line. The final line is 'Meanwhile, I have been chosen to become one of the volunteers for the 13th National'.

Dear Mrs. Green,

I'm so glad to hear from you. It's so kind of you to show concern for my latest situation. For the past few months, I have been fully preparing for my College Entrance Examination. As you know, people in my country attach much importance to the exam as it's a fair way to change our fate. I work hard because I want to receive a better education in my favorite university. Accordingly, my pace of life is busy but enriched.

Meanwhile, I have been chosen to become one of the volunteers for the 13th National

Figure 1: Handwritten English composition

## 2 Goal

In this project, you need to determine the position of the characters in the image, perform segmentation and recognition, and then calculate the recognition accuracy. **Attention: Please try to avoid calling built-in functions of your core algorithms, otherwise your rating will be negatively affected. Deep learning algorithms are prohibited.**

## 3 Checkpoints

- (1) How do you eliminate the influence of lines and noise? (20 points)
- (2) How do you segment the images for character recognition? (20 points)
- (3) How do you recognize the characters? (neural networks are not allowed to use) (30 points)
- (4) You should show the recognition accuracy rate of your program. (30 points)

$$\text{The recognition accuracy rate} = \frac{\text{Number of characters correctly extracted and recognized}}{\text{Total number of characters}}$$