CDS540 Assignment 1 - Text Detection from Images Using OpenCV

**Task objective**

The objective of this assignment is to use Google Colab, Jupyter Notebook, or any other suitable tool to detect text from images using OpenCV. This will help you understand the concepts of fundamental Computer Vision algorithms and techniques, evaluate the efficiency and effectiveness of computer vision systems, and apply and implement these tools and techniques. **Task description:**

1. **Setup Environment**:
   * Use Google Colab, Jupyter Notebook, or any other platform you are comfortable with.
   * Ensure that OpenCV and other necessary libraries are installed.
2. **Load an Image**:
   * Load a sample image containing text. You can use images from various sources like scanned documents, street signs, or any image with clear text.
3. **Pre-process the Image**:
   * Convert the image to grayscale.
   * Apply necessary image processing techniques like thresholding, blurring, or edge detection to enhance text visibility.
4. **Text Detection**:
   * Use OpenCV's text detection methods such as the EAST text detector, or any other OpenCV-compatible methods.
   * Draw bounding boxes around detected text areas.
5. **Extract and Display Text**:
   * Use OCR (Optical Character Recognition) tools like Tesseract to extract text from the detected regions.
   * Display the extracted text and the annotated image with bounding boxes.
6. **Efficiency and Effectiveness Evaluation**:
   * Measure the performance of your text detection system.
   * Discuss the efficiency (speed) and effectiveness (accuracy) of your approach.
   * Suggest potential improvements.

**Rubric**

| **Criteria** | **Points** |
| --- | --- |
| **Understand the concepts of fundamental Computer Vision algorithms and techniques** | 10% |
| - Demonstrates a clear understanding of image pre-processing techniques |  |
| - Explains the chosen text detection method and its working |  |
| **Evaluate the efficiency and effectiveness of computer vision systems** | 10% |
| - Measures and reports the speed of the text detection system |  |
| - Evaluates the accuracy of detected text |  |
| - Provides a discussion on the system's strengths and weaknesses |  |
| **Apply and implement the computer vision tools and techniques** | 20% |
| - Successfully loads and processes the image |  |
| - Implements text detection and draws bounding boxes correctly |  |
| - Uses OCR to extract and display text from images |  |
| - Code is well-organized, commented, and follows best practices |  |
| **Total Points** | 40% |

**Deliverables**

1. A Jupyter Notebook (or equivalent) with your code and in-line explanations.
2. Images used for testing.
3. A brief report (1000-2000 words) evaluating the performance of your text detection system.

Submission Details:

1. You must ensure that all your project files used for this task and the report sit in a directory called “Assignment 1 – Your Name”.
2. All files are required to be uploaded and a link to the “Assignment 1” directory submitted to Moodle.
3. Please make sure that unit Instructor and TA have access to the folder.
4. A link to the demo video of your app running **must be submitted**.
5. It would be great if you could submit your GitHub link.
6. This is an **individual** assignment, and you should submit it **by 8 pm, Friday, Week 7**.

Reference

[**How to Record the Screen on Your Windows PC or Mac?**](https://www.geeksforgeeks.org/record-the-screen-on-windows-pc-or-mac/)

[**How to upload videos on YouTube**](https://youtu.be/VtF2AgFSLAw?si=eeGwLISELcrUgwq9)

[**Sample video**](https://youtu.be/6DjFscX4I_c?si=7KygwIz7pjoFLb_t)