

# Assignment-2

December 30, 2025

## 1 Problem Statement

The objective of this assignment is to implement and compare two Optical Character Recognition (OCR) pipelines on a common evaluation task. You are expected to work with both a traditional OCR system and a neural network-based OCR system using transfer learning, and analyze their performance.

### 1.1 OCR using PyTesseract

In this part, you are required to implement an OCR pipeline using PyTesseract. PyTesseract is a ready-to-use OCR engine and does not require training.

**Tasks:**

- Load the provided test image(s) and perform OCR using PyTesseract.
- Apply suitable image preprocessing techniques such as resizing, thresholding, noise removal, or morphological operations.
- Experiment with different Page Segmentation Modes (PSM) and document the chosen configuration.
- Report the recognized text output.
- Compute and report evaluation metrics such as Character Error Rate (CER) and/or Word Error Rate (WER) on the provided evaluation page.

**Note:** No training is required for PyTesseract. The focus should be on preprocessing, configuration, and evaluation.

### 1.2 OCR using Transfer Learning (EasyOCR)

In this part, you will implement a neural network-based OCR system using transfer learning. EasyOCR should be used as the recognition framework.

**Tasks:**

- Use the provided training dataset to fine-tune an EasyOCR recognition model.
- Clearly document the transfer learning strategy used (e.g., freezing layers, partial fine-tuning, learning rate selection).

- Train the model and report training metrics such as loss curves.
- Run inference on the same evaluation image(s) used in Part A.
- Compute and report CER and/or WER for the EasyOCR model.

**Documentation Requirement:** The document must clearly describe:

- What components of the model were fine-tuned.
- What changes were made compared to the default pre-trained setup.
- Why these changes were made.

### 1.3 Common Evaluation and Comparison

To ensure a fair comparison, both OCR systems must be evaluated on the same provided test page.

**Tasks:**

- Present the OCR outputs from both PyTesseract and EasyOCR.
- Compare the quantitative metrics (CER/WER).
- Provide a brief qualitative discussion explaining which method performs better and why.

### Deliverables

- One Colab notebook for Part A (PyTesseract).
- One Colab notebook for Part B (EasyOCR with transfer learning).
- A short written report (1–2 pages) summarizing results and comparison.