NAAN MUDHALVAN

MACHINE LEARNING TO GENERATIVE AI PROGRAM

PROJECT TITLE

HANDWRITTEN TEXT RECOGNITION SYSTEM USING PYTHON

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ABSTRACT

Handwritten Text Recognition (HTR) systems play a vital role in digitizing handwritten documents, enabling efficient information retrieval and analysis. In this project, we present a Python-based HTR system capable of recognizing handwritten text from various sources. Leveraging the advancements in deep learning and computer vision, our system employs Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) for feature extraction and sequence modeling.

The process begins with pre-processing steps including image normalization, binarization, and noise reduction to enhance the quality of input images. Subsequently, the processed images are fed into a CNN-based feature extractor, which learns hierarchical representations of the handwritten text. The extracted features are then passed to a bi-directional Long Short-Term Memory (LSTM) network, which captures the temporal dependencies and context information within the sequences. To train our HTR model, we utilize large-scale handwritten text datasets, employing techniques such as data augmentation and regularization to mitigate overfitting and improve generalization. The model is trained using the Connectionist Temporal Classification (CTC) loss function, enabling end-to-end training without the need for explicit alignment between input images and their corresponding transcripts. Following training, the HTR system undergoes evaluation on a separate test set to assess its performance in terms of accuracy and robustness. Additionally, we conduct experiments to analyze the impact of varying architectural configurations and hyper parameters on the system's performance.

Overall, our Python-based Handwritten Text Recognition system presents a promising solution for automating the transcription of handwritten documents, contributing to the advancement of information retrieval and accessibility technologies.