HANDWRITTEN TEXT RECOGNITION AND DIGITAL CONVERSION SYSTEM

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ABSTRACT:

This project was developed to apply theoretical concepts of Deep Learning of Artificial Intelligence and Machine Learning (AIML). The Handwritten Note Recognitionand DigitalConversionSystem is designed to efficientlytransform handwritten content into a digital format, offering a high degree of accuracyand automation. The system combines advanced image processing techniques and state-of-the-art machine learning algorithms to achieve seamless handwritten text recognition. The process begins with the Information Collection Module, which gathers handwritten images from various sources while ensuring high quality and relevance. Once the images are collected, they undergo preprocessing through the Preprocessing Module, which normalizes the image size, deskews the text, removes noise, and applies binarization to enhance clarity and improve recognition performance. After preprocessing, the Feature Extraction Module utilizes Convolutional Neural Networks (CNNs) to extract important features from the images, starting with simple edges and textures and advancing to more complex patterns. The output fromthis module is then fed into the Sequence Modeling Module, where Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) networks are employed to handle the sequential nature of handwritten text. These models capture temporaldependencies, allowingthe systemto understand the structure of sentences and phrases, which is crucial for recognizing sequential content.

The Output Decoding Module uses the Connectionist Temporal Classification (CTC) loss function to align input and output sequences. This approach enables the model to map unsegmented handwritten input to output without needing explicit segmentation, making it effective for recognizing various handwriting styles and complex content. It generates digital outputs in formats like text files, PDFs, or Word documents while preserving the original layout. This reliable solution minimizes manual intervention and transcription errors, making it ideal for academic, professional, and personal use, allowing users to easily convert handwritten materials into editable and searchable formats.