AI-Based Handwriting Recognition and Text Improvement

Overview

This project is a Streamlit web application that uses AI and OCR to recognize handwritten text from uploaded images. It not only extracts the text but also provides spelling correction and basic grammar suggestions. The app supports both user-uploaded images and samples from the IAM handwriting dataset.

Key Features

- Handwriting Recognition using EasyOCR
- Text Improvement (Spelling & Grammar using TextBlob)
- Image Preprocessing with OpenCV: Adaptive thresholding & denoising
- IAM Dataset Integration for sample testing
- Visual Output Comparison: Raw vs Improved vs Ground Truth
- Accuracy Metrics with similarity scoring
- Interactive Web Interface built using Streamlit

How it Works

1. Upload handwritten image or select from IAM dataset
2. Preprocess image using thresholding & denoising (optional)
3. Extract text using EasyOCR
4. Improve text with spelling and grammar fixes
5. Show comparison with ground truth (if available)
6. Display accuracy, suggested improvements, and processed image

AI Tools & Libraries Used

- EasyOCR (OCR Engine)
- TextBlob (Text Correction)
- OpenCV (Image Processing)
- Streamlit (Web UI)
- HuggingFace Datasets (IAM)
- Matplotlib (Visualization)

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Installation Guide

1. Clone the repository
2. Create virtual environment (optional)
3. Install dependencies: pip install -r requirements.txt
4. Run the app: streamlit run app.py
5. Open browser: http://localhost:8501

Use Cases

- Digitizing handwritten notes
- Assisting people with learning disabilities
- Improving OCR quality in scanned forms
- Creating assistive tools for education

Custom Settings Available

- Toggle preprocessing view
- Enable/Disable text improvement
- Switch between Upload Mode and Sample Mode

Dataset Used

IAM Handwriting Dataset - Contains labeled handwritten text samples useful for OCR training and testing.

License & Contributions

- License: MIT (Open Source)
- Contributions: Welcomed via GitHub pull requests or issues

Best Practices for Input Images

- Clear, high-resolution handwriting
- Good contrast between text and background
- Avoid glare, blur, and uneven lighting