

Documentation

Handwritten Text extraction from Image and Text Correction System Documentation

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1. Introduction

The Image-to-Text Conversion and Text Correction System is developed to accurately convert written text from uploaded images into digital text and automatically correct spelling and grammar errors in the converted text. This documentation provides an overview of the system, its implementation details, setup instructions, and usage guidelines.

2. System Overview

The system combines Optical Character Recognition (OCR) with Natural Language Processing (NLP) techniques to process images containing written text. It consists of three main components:

- **Image Preprocessing:** This code increases contrast of an image by normalizing pixel values, converting them back to uint8 format, then applies erosion morphological operation using a 3×3 kernel.
- **OCR Implementation:** This component extracts text from images using the PaddleOCR library.
- **Text Correction Module:** This component corrects spelling and grammar errors in the extracted text using the PySpeller library.
- **Integration and Testing:** The components are integrated into an end-to-end system, and testing is performed to ensure accuracy and functionality.

3. Technologies Used

The following technologies were used in the development of the system:

- **Python:** Programming language used for implementation.
- **PaddleOCR:** Library used for Optical Character Recognition.
- **PySpeller:** Library used for spelling and grammar correction.
- **GitHub:** Platform used for version control and code hosting.

4. Implementation Details

4.1 OCR Implementation

The OCR implementation utilizes the PaddleOCR library to extract text from uploaded images. The process involves the following steps:

1. Image Upload: Users upload images containing written text.
2. Text Extraction: PaddleOCR processes the uploaded image and extracts the text.
3. Output: The extracted text is displayed to the user.

4.2 Text Correction Module

The Text Correction Module uses the PySpeller library to correct spelling and grammar errors in the extracted text. The correction process includes:

1. Text Input: The extracted text is passed to the PySpeller library for correction.
2. Correction: PySpeller identifies and corrects spelling and grammar errors in the text.
3. Output: The corrected text is displayed to the user.

4.3 Integration and Testing

Integration involves connecting the OCR implementation and Text Correction Module to provide seamless functionality. Testing is performed to validate the accuracy and performance of the system.

5. Setup and Usage

5.1 Setup

1. Install necessary dependencies (PaddleOCR, cv2,pyspellchecker, matplotlib, scikit-Image,etc.).
2. Ensure Python environment compatibility.

5.2 Usage

1. Upload an image containing Handwritten text.
2. Wait for the text extraction and correction process to complete.
3. View the extracted and corrected text on the user interface.

6. Testing

Testing was performed to evaluate the accuracy and functionality of the system. Test cases were created to cover various scenarios, including different types of images and text content. The system demonstrated satisfactory performance in extracting text accurately and correcting spelling and grammar errors.

7. Conclusion

The Image-to-Text Conversion and Text Correction System provides a reliable solution for converting written text from images into digital text and correcting spelling and grammar errors automatically. By combining OCR with NLP techniques, the system offers improved accuracy and readability, benefiting users in various domains.

8. Future Improvements

- Implement advanced NLP techniques for more accurate text correction.
- Enhance the user interface for better user experience.
- Explore integration with other OCR and NLP libraries for comparison and optimization.

9. References

- PaddleOCR Documentation: [<https://github.com/PaddlePaddle/PaddleOCR>]
- pyspellchecker Documentation: [<https://pyspellchecker.readthedocs.io/en/latest/>]