

Character recognition method and application

Phongsavanh Rattanaovong

Abstract: This thesis presents a comprehensive study of character recognition methods and their practical applications. The research systematically analyzes both traditional optical character recognition (OCR) techniques and modern deep learning-based approaches, including convolutional neural networks (CNNs) and recurrent neural networks (RNNs). A novel hybrid recognition framework is proposed, integrating feature extraction methods such as Histogram of Oriented Gradients (HOG) with attention-based sequence-to-sequence models to enhance accuracy for both printed and handwritten text. The methodology is evaluated on multiple benchmark datasets, including MNIST, SVHN, and a custom Vietnamese text corpus, achieving a recognition accuracy exceeding 98.5%. Furthermore, the thesis explores real-world applications, focusing on automated document digitization, license plate recognition, and assistive technology for visually impaired users. Experimental results demonstrate that the proposed system significantly reduces error rates in noisy and low-contrast environments compared to conventional methods. The findings contribute to advancing robust character recognition solutions, with implications for improving data entry automation and accessibility in diverse linguistic contexts.

Keywords: OCR, character recognition, application, Vietnamese