

Text Recognition Approaches: A Review of Trends, Models, and Future Directions

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Abstract:

This review presents recent advancements in real-time text recognition, with a focus on modern models, techniques, and applications. It highlights the use of deep learning (DL) methods such as Convolutional Neural Networks (CNNs), Bidirectional Long Short-Term Memory (LSTM) networks, and Support Vector Machines (SVMs) in state-of-the-art recognition systems. The study compares different models that achieve over 70% accuracy in tasks like recognizing identity documents, digitizing old manuscripts, and detecting multilingual text in natural scenes. Findings from the OCR-Bench dataset reveal that general-purpose large multimodal models (LMMs) perform less effectively than specialized OCR engines, exposing a key limitation. The review further identifies performance trends and accuracy gaps, suggesting that improvements can be made through self-supervised learning and dataset expansion. Bringing together key insights, this work serves as a valuable reference for researchers and practitioners aiming to develop more accurate, efficient, and generalizable text recognition systems. Additionally, it introduces a novel technique called Smart Self-Supervised Text Recognizer (S3-Text), inspired by the literature review, to enhance real-world document processing.

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