IJARSCT

International Journal of Advanced Research in Science, Communication and Technology



International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal





Modi Script Character Recognition Using Convolutional Neural Networks and Attention-Based CNN Architecture

Shweta Kolte and Dr. Brijendra Gupta

Department of Information Technology, Siddhant College of Engineering, Sudumbre, Pune, India shwetarane215@gmail.com and gupbrij@rediffmail.com

Abstract: Handwritten Modi script recognition, a cursive and ancient script used to script Marathi traditionally, is challenging because of its style variations and high visual similarity of characters. This work proposes a deep learning-based handwritten Modi character recognition from a baseline Convolutional Neural Network (CNN) and improved Attention-Based CNN architecture. Two test datasets are utilized: a public dataset from IEEE DataPort and a specially designed dataset of 46 distinct Modi characters. The Attention-Based CNN model described herein uses spatial and channel attention mechanisms, allowing the network to attend to the most informative areas of each character image. Experimental results indicate that the Attention-Based CNN performs better than the baseline CNN model with a validation accuracy of 94.60% instead of 87.25% for the CNN. The attention mechanism dramatically enhances recognition performance, especially for characters with similar strokes and cursive writing. This work shows the effectiveness of deep learning algorithms with attention to improving handwritten character recognition for ancient scripts, which provides a reasonable basis for future word-level recognition and automatic script digitization systems.

Keywords: Modi script recognition, Handwritten character recognition, Convolutional Neural Network (CNN), Attention-based CNN, Deep learning, Optical Character Recognition (OCR), Transfer learning, Historical script digitization, Pattern recognition

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DOI: 10.48175/IJARSCT-25309



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