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A hybrid CNN-SVM model for Tamil handwritten character recognition

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Recognizing offline Tamil handwriting is a very challenging task because of the complex linguistic structures used by writers, and similarities in the appearance of Tamil characters and individual differences observed in the handwriting of the same person. In this paper, we propose a hybrid system that combines Support Vector Machines and Convolutional Neural Networks for multi-class classification to recognize offline handwritten Tamil vowel characters. The proposed hybrid CNN-SVM model is developed by replacing the final output layer of the CNN model with an SVM classifier. The classifier is a fully connected layer with trained softmax which uses an end-to-end approach. In this model, the support vector machine is piled on top by deleting the final fully connected softmax layer. A dataset consisting of 12 handwritten Tamil vowel characters with 580 samples per vowel is considered for the experiment. SVMs using the RBF kernel give an accuracy of 97.13%, the CNN model 98.00%, and the hybrid CNN-SVM model 98.54%. Based on this experiment, it can be concluded that the proposed hybrid CNN-SVM model achieves better results compared to the SVMs and the CNN model.

Keywords: CNN, CNN-SVM, HOG, OCR

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