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## Multiple Convolutional Neural Network Training for Bangla Handwritten Numeral Recognition

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### Abstract

Recognition of handwritten numerals has gained much interest in recent years due to its various application potentials. The progress of handwritten Bangla numeral is well behind Roman, Chinese and Arabic scripts although it is a major language in Indian subcontinent and is the first language of Bangladesh. Handwritten numeral classification is a high dimensional complex task and existing methods use distinct feature extraction techniques and various classification tools in their recognition schemes. Recently, convolutional neural network (CNN) is found efficient for image classification with its distinct features. In this study, three different CNNs with same architecture are trained with different training sets and combined their decisions for Bangla handwritten numeral recognition. One CNN is trained with ordinary training set prepared from handwritten scan images; and training sets for other two CNNs are prepared with fixed (positive and negative, respectively) rotational angles of original images. The proposed multiple CNN based approach is shown to outperform other existing methods while tested on a popular Bangla benchmark handwritten dataset.

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