Intelligent Character Recognition of Handwritten Forms with Deep Neural Networks

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Abstract. The automatic processing of handwritten forms remains a challenging task, wherein detection and subsequent classification of handwritten characters are essential steps. We describe a novel approach, in which both steps - detection and classification - are executed in one task through a deep neural network. Therefore, training data is not annotated by hand, but manufactured artificially from the underlying forms and yet existing datasets. It can be demonstrated that this single-task approach is superior in comparison to the state-of-the-art two task approach. The current study focuses on hand-written Latin letters and employs the EMNIST data set. However, limitations were identified with this data set, necessitating further customization. Finally, an overall recognition rate of 88.28% was attained on real data obtained from a written exam.

Keywords: Intelligent Character Recognition, Handwritten Character Recognition, Automated Form Processing.