Modified hybrid genetic algorithm for training convolutional neural networks

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Abstract.

This paper presents a modified variant of genetic algorithm for training convolutional architectures which reduces the execution time of the algorithm. Modification is based on changing the evolutional segment of the algorithm by focusing on limiting the training time of each individual and incorporating the learnt knowledge of neuron parameters from the previous generations into each new one. By doing so the evolution is made more efficient, thus reducing the time needed to find the desired architecture.

Additional contribution of this paper is creating new dataset *DoubledMNIST*, which represents a successor of the popular MNIST dataset. Created dataset is doubled with respect to the MNIST dataset both in terms of the number of instances and in terms of the resolution of each individual isntance. Results shown in the paper were obtained using the presented improved method on the created dataset. The paper also shows classification results on the said dataset.

Keywords: genetic algorithm; CNN arhitectures; MNIST dataset; DoubledMNIST dataset

1. Introduction

2. Related work

This section provides background about offline handwritten character datasets and about incorporating genetic algorithms with the learning of CNN architectures, and their training.

2.1. Offline Handwritting Datasets

2.2. Genetic CNN

3. DoubledMNIST Dataset

4. Method

5. Evaluation

6. Conclusion

References

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