Ghods, Alireza; Cook, Diane J.
A survey of deep network techniques all classifiers can adopt. (English) Zbl 1472.68173

Summary: Deep neural networks (DNNs) have introduced novel and useful tools to the machine learning community. Other types of classifiers can potentially make use of these tools as well to improve their performance and generality. This paper reviews the current state of the art for deep learning classifier technologies that are being used outside of deep neural networks. Non-neural network classifiers can employ many components found in DNN architectures. In this paper, we review the feature learning, optimization, and regularization methods that form a core of deep network technologies. We then survey non-neural network learning algorithms that make innovative use of these methods to improve classification performance. Because many opportunities and challenges still exist, we discuss directions that can be pursued to expand the area of deep learning for a variety of classification algorithms.

MSC:
68T07 Artificial neural networks and deep learning
62H30 Classification and discrimination; cluster analysis (statistical aspects)

Keywords:
deep learning; deep neural networks; optimization; regularization

Software:
AlexNet; MultiMin; MNIST; AutoAugment; DeepFace; darch; C4.5; ImageNet; Adam; DNdisorder; Ada-Grad; CIFAR; GNMT

Full Text: DOI

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