Abstract

Title	Neural Networks for Tool Image Classification
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The augmented reality market is estimated to reach 83.5 billion USD by 2021.[1] According to Boston Consulting Group, Accenture, Mc Kinsey, and others, augmented reality solutions for field workers are an important field within that market.[2] An augmented reality solution for field workers requires software perceiving the environment of field workers. A sub-task of that perception is to classify tools of different classes. This paper determines the best-performing neural network for tool image classification. The best-performing neural network for tool image classification is determined in the course of an experiment. The experiment trains and evaluates state-of-the-art neural networks for image classification on a dataset constructed by this paper. The state-of-the-art neural networks for image classification are determined in the course of a literature review conducted by this paper. This paper found that, in general, not only one neural network is suitable for tool image classification, but several neural networks are suitable for tool image classification. Especially, ResNet-152, ResNeXt-101, and DenseNet-264 were proven to be suitable for tool image classification. Furthermore, this paper introduces a novel dataset for tool image classification called Tool Image Classification Dataset (TIC Dataset). This paper hopes to foster further research in the field of computer vision by providing the TIC Dataset publicly available under the Creative Commons Attribution Share Alike 4.0 International License.

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[1] Statista 2019.

[2] Ernst & Young 2019a; Ernst & Young 2019b; Detzel et al. 2018; Shook and Knickrehm 2017; Guy et al. 2019.