A Survey on Semi-, Self- and Unsupervised Learning for Image Classification

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Abstract

While deep learning strategies achieve outstanding results in computer vision tasks, one issue remains: The current strategies rely heavily on a huge amount of labeled data. In many real-world problems, it is not feasible to create such an amount of labeled training data. Therefore, it is common to incorporate unlabeled data into the training process to reach equal results with fewer labels. Due to a lot of concurrent research, it is difficult to keep track of recent developments.

In this survey, we provide an overview of often used ideas and methods in image classification with fewer labels. We compare 25 methods in detail. In our analysis, we identify three major trends. 1. State-of-the-art methods are scaleable to real-world applications based on their accuracy. 2. The degree of supervision which is needed to achieve comparable results to the usage of all labels is decreasing. 3. All methods share common ideas while only a few methods combine these ideas to achieve better performance. Based on all of these three trends we discover future research opportunities

Survey Paper Link: https://arxiv.org/abs/2002.08721