Bank of Weight Filters in CNNs: A Case for Life Long Learning with Memory

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Presentation Abstract Summary We present a possible framework for life-long learning (LLL) for convolutional neural networks (CNNs) using the concept of Bank of Weight Filters. Training of CNNs is both data and computation intensive. One way to tackle this is to employ transfer learning where we adapt
a pre-trained CNN for the new target task. However this leads to forgetting of the source task. (If we restrict adaptation to retain source task, performance on target task becomes suboptimal). While we can always store the original CNN, such a strategy would eventually lead to a new CNN for every classification task though most such tasks should be able to share features. This problem can be addressed using the concept of Bank of Weight Filters (BWF) introduced by us earlier. A BWF consists of a set of non-redundant and diverse bank of filters pooled from a number of prelearnt CNNs. Sampling from this bank to find the right filters while trying to adapt to a new target task can allow for life long learning without catastrophic forgetting. Here we present the idea along with some prelimenary empirical results.

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