Unsupervised Learning via Meta-Learning

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- Unsupervised learning is commonly used as pre-training for downstream learning.
- We improve upon this by incorporating knowledge about the downstream task type: image classification.
- **Unsupervised meta-learning**: meta-learning over tasks constructed from unlabeled data.
- Experiments
  - Meta-test time: human-specified tasks from labeled data.
  - 4 image classification datasets, 4 unsupervised representation learning methods, 2 meta-learning algorithms, varying downstream task difficulty.
  - Results: better downstream learning than fair comparisons, but worse than supervised meta-learning.
- Future work: enable unsupervised meta-learning for other task modalities, e.g. reinforcement learning.
  - Why? Hand-specifying meta-training task distribution is cumbersome and error-prone.