JD AI Research at Visual Domain Adaptation Challenge 2018 — Open-set Image Classification

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JD AI Research
Outline

• Task
• Framework
• Results
Task — Open-set Image Classification
• Two-stage system
  • Assign pseudo labels to unlabeled target samples
  • Fine-tune the classification module over labeled source data and target samples with pseudo labels
Classification Module

- Backbone: SE-ResNeXt101 (ImageNet pre-trained)
- AM-Softmax \(^{[1]}\): Learn large-margin feature representations
- Noise adaptation layer \(^{[2]}\): Make the classifier resistant to the noise of pseudo labels
- Generalized cross entropy loss \(^{[3]}\): Further make the optimization procedure more robust to noisy labels.

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Pseudo Label Assignment

• Initial iteration: Train the Assign and Transform Iteratively (ATI) model \([4]\) on open-set training data and achieve the pseudo labels of target samples through ATI

• Next iterations: Directly predict the pseudo labels through the fine-tuned classification module

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• A clustering based strategy for filtering the pseudo labels.
  - K-means is firstly leveraged to produce 500 clusters over the whole target domain.
  - For each cluster, only the target samples with the same pseudo label whose proportion in this cluster is larger than a threshold are selected for training.

Results

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- Source only: 27.5%, Full system: 92.3%
- Involving more iterations with pseudo labels tends to achieve better performance.
THANKS!