Learning to Learn Image Classifiers with Informative Visual Analogy

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The shortage of Deep Learning:

Data Hungry

Hard to Learn New Category

Human are far better learners:

Dogs (Already Learned)

Wolves (To be learned)

Similar

After observing only one or a few images, humans could learn wolves better. As humans have a mechanism of visual analogy.

How to learn the parameters of a novel class via visual analogy?
Algorithm – VANER (Training)

VANER: Visual Analogy Network Embedded Regression

Training base classes with VANER

Alex Net →fc7_1

Embedded Regression

Visual Analogy Network

Network Embedding

Dog

Cat
Generalization to a new class

Algorithm – VANER (Generating)
I. Algorithm Performance

II. Insightful Analysis

$$\text{AUC Increasing} = \frac{\text{AUC for VANER} - \text{AUC for LR}}{\text{AUC for VANER}}$$

III. Embedding Similarity

Experiment Settings:
- 800 Base Classes in ImageNet for training VANER
- 200 Novel Classes, each used for binary classification with whole base classes
- Evaluation Metric: AUC / F1 score
THANK YOU

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