Mine the Fine: Fine-Grained Fragment Discovery

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Goal

- Learn discriminative fragments of an object, given bounding box around the object (no part annotations)
- Learn fine-grained classifier based on fragments

Motivation

Algorithm

Algorithm 1: Discover Discriminative Fragment Sets

Data: T: Train Set for Category i \( \in \{1, \ldots, n\} \)
Data: V: Validation Set for Category i \( \in \{1, \ldots, n\} \)
Result: \( D^* \) Top \( r \) most discriminative fragment sets from each category

for \( i = 1, \ldots, n \) do
    \( F_2 = \) Extract fragments for training set \( i \);
    \( F_3 = \) Extract fragments for validation set \( i \);
    for \( f \in F_2 \) do
        \( S_1 = \{ f \} \) Initialize the set with the fragment;
        for \( t=1, \ldots, T \) do
            \[ \hat{W}^{W} \rightarrow \text{train \& evaluate} \] \( S_1 \);
            \[ \sum_{j=1}^{T} \hat{W}_{j} \rightarrow \text{detect \& add top \( m \) \( \{W_{j}, F_{j}, m\} \)}; \]
            \( AUC_{f} = \text{compute AUC on val} \( \{W_{j}, F_{j}\} \) \)
        \( D = \{ \} \) Discovered Discriminative Fragment Sets;
        for \( i = 1, \ldots, n \) do
            \( D^{*} = \) Add top \( r \) sets with least \( AUC_{f} \) where
            \[ f \in F_{3} \]
    Return \( D \)

Experiments

Preprocessing

(a) Original
(b) GrabCut Mask
(c) Best Rectangle
(d) Oriented rectangle
(e) Oriented mask.

Motivation

Note that often, even for bad mask, the alignment by the best oriented rectangle is acceptable.

Global Information

Context Captures Habitat

Experiments (contd.)

Sparrows

Illustration of top-3 mined fragments based on area under class entropy vs top-k retrievals curve. Lower area is desired for higher precision.

Contributions & Future Work

- Method to discover discriminative fragments
- Reduce/eliminate redundant discovered parts

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