Few-shot Semantic Segmentation with Support-induced Graph Neural Network

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Motivation

(a). Existing few-shot segmentation methods generate support prototypes/features from the support image, then implement feature matching to obtain mask prediction for the query image. However, merely leveraging support information usually fail to work when support and query image exhibits large appearance/scale variance.

(b). Our main idea is to explicitly enrich the query context information with the guidance of support information. In practice, we adopt a support-induced graph convolutional network to achieve this goal.

Contribution

(a) We propose a support-induced graph convolution network (SiGCN), which utilizes the proposed IA and SiGR modules to capture complementary context from the query and the support set, for addressing the appearance variation problem in the FSS task.

(b) We propose a novel graph updating mechanism, in which support prototypes guide the node updating in the query graphs. This mechanism brings a significant performance gain to the proposed SiGCN.

Methodology

(a) A support-induced graph reasoning module to mine context information from query image.

(b) An instance association module to explore information from both support and query images.

Ablations

Components

Table: GCN variants

Experiment Results

Table: Results on PASCAL-5

Table: Results on COCO-20

Visualization

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