Enhanced Feature Pyramid Network for Semantic Segmentation

Mucong Ye, Jingpeng Ouyang, Ge Chen, Jing Zhang*, Xiaogang Yu
College of Software, Beihang University, Beijing, China

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Observation

1. Semantic gap between shallow and deep features
   - Shallow feature layers contain low-level appearance information (e.g., edges, lines, and corners)
   - Deep layers contain more semantic information to distinguish different classes

2. In the encoder-decoder architecture, a skip connection is frequently used to aggregate multi-scale context information
   - The semantic difference between the shallow features and the deep features hinders the effective fusion of the different features
   - Simply combining the shallow feature with the deep feature will bring some background "noise", which will affect the robustness of the feature

Networks

- **Enhanced Feature Pyramid Network (EFPN)**: To bridge the semantic gap and realize the effective fusion of multi-layer features

- **Global fusion model (GFM)**: Remedy the drawback of U-shape networks that top-down signals are gradually diluted

- **Semantic Enhancement Module (SEM)**: Enhance the shallow features

- **Edge Extraction Module (EEM)**: Based on attention

- **Context Aggregation Module (CAM)**: Better aggregation

Experiment & Conclusion

- First, it is verified that the direct use of jump connections to fuse shallow features and deep features will affect the robustness of features

- Second, the effectiveness of global fusion module in encoder branch is further evaluated

- Finally, we prove the effectiveness of EFPN in bridging the semantic gap through experiments