DMBR-Net: Deep Multiple-Resolution Bilateral Networks for Real-Time and Accurate Semantic Segmentation

Authors : Pengfei Meng, Shuangcheng Jia, Qian Li

Abstract : We proposed a real-time high-precision semantic segmentation network based on a multi-resolution feature fusion module, the auxiliary feature extracting module, upsampling module, and atrous spatial pyramid pooling (ASPP) module. We designed a feature fusion structure, which is integrated with sufficient features of different resolutions. We also studied the effect of side-branch structure on the network and made discoveries. Based on the discoveries about the side-branch of the network structure, we used a side-branch auxiliary feature extraction layer in the network to improve the effectiveness of the network. We also designed upsampling module, which has better results than the original upsampling module. In addition, we also re-considered the locations and number of atrous spatial pyramid pooling (ASPP) modules and modified the network structure according to the experimental results to further improve the effectiveness of the network. The network presented in this paper takes the backbone network of Bisenetv2 as a basic network, based on which we constructed a network structure on which we made improvements. We named this network deep multiple-resolution bilateral networks for real-time, referred to as DMBR-Net. After experimental testing, our proposed DMBR-Net network achieved 81.2% mIoU at 119FPS on the Cityscapes validation dataset, 80.7% mIoU at 109FPS on the CamVid test dataset, 29.9% mIoU at 78FPS on the COCOStuff test dataset. Compared with all lightweight real-time semantic segmentation networks, our network achieves the highest accuracy at an appropriate speed.