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Towards Long-Range Pixels Connection for Context-Aware Semantic Segmentation

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Abstract : Deep learning has recently achieved enormous response in semantic image segmentation. The previously developed U-Net inspired architectures operate with continuous stride and pooling operations, leading to spatial data loss. Also, the methods lack establishing long-term pixels connection to preserve context knowledge and reduce spatial loss in prediction. This article developed encoder-decoder architecture with bi-directional LSTM embedded in long skip-connections and densely connected convolution blocks. The network non-linearly combines the feature maps across encoder-decoder paths for finding dependency and correlation between image pixels. Additionally, the densely connected convolutional blocks are kept in the final encoding layer to reuse features and prevent redundant data sharing. The method applied batch-normalization for reducing internal covariate shift in data distributions. The empirical evidence shows a promising response to our method compared with other semantic segmentation techniques.

Keywords : deep learning, semantic segmentation, image analysis, pixels connection, convolution neural network
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