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Spatial Aggregation of Holistically-Nested Convolutional Neural Networks for Automated Pancreas Localization and Segmentation

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### Highlights

- Accurate and automatic organ segmentation from 3D radiological scans is an important yet challenging problem for medical image analysis, especially for small soft organs like the pancreas.
- We present an automated system from 3D computed tomography (CT) volumes that is based on a two-stage cascaded approach – pancreas localization and pancreas segmentation.
- We introduce a fully deep-learning approach, based on an efficient application of holistically-nested convolutional networks (HNNs) on the three orthogonal axial, sagittal, and coronal views.
- Quantitative evaluation is performed on a publicly available dataset of 82 patient CT scans using 4-fold cross-validation (CV). We achieve a (mean std. dev.) Dice similarity coefficient (DSC) of 81.27 6.27% in validation, which significantly outperforms both a previous state-of-the-art method and a preliminary version of this work that report DSCs of 71.80 10.70% and 78.01 8.20%, respectively.

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