# End-to-end structural-aware for 3D segmentation of plant tissues

**Anonymous Author(s)**
Affiliation
Address
email

## Abstract

The study of genetic and molecular mechanisms underlying tissue morphogenesis has received a lot of attention in biology. Especially, accurate segmentation of tissues into individual cells plays an important role for quantitative analyzing the development of the growing organs. However, instance cell segmentation is still a challenging task due to the quality of the image and the fine-scale structure. Any small leakage in the boundary prediction can merge different cells together, thereby damaging the global structure of the image. In this paper, we propose the topological loss function, called CavityLoss, to correctly localize the broken connections and encourage the network to enhance the consistency of the segmentation. To demonstrate the usefulness of our method, we apply it to both fixed and live plant organ datasets. Experiment results show that our method outperforms state-of-the-Art for preserving the global topology of the image. The code of CavityLoss is freely available at https://xxxxxxxxxxxxxxxxxxxxxxxxxx.

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