CoPPNet: A Cosegmentation-Based Deep Learning Network for Accurate Foreground Segmentation in Plant Imagery

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Cosegmentation is a recent and rapidly emerging and rapidly growing extension of segmentation, which aims to detect the common object(s) in a group of images. Current cosegmentation methods are ideal and effective only for certain dataset types with limited features that still produce errors making it difficult to obtain detailed metrics of object parts. We propose to build a unified, trainable framework that incorporates multiple features of a high-throughput dataset's segmented images from multiple algorithms using cosegmentation. Specifically, we propose a novel Cosegmentation for Plant Phenotyping Network (CoPPNet) that utilizes a Fully Convolutional Neural Network with a K-Means Clustering feedback loop for optimal temporal loss. The results from this study will set the benchmark for a novel advancement in computer vision segmentation accuracy and plant phenomics to better understand a plant's environmental interactions for maximal resilience and yield.