

RumexLeaves: Can we increase robustness using depth?

RumexLeaves is a new and unique dataset with fine-grained plant annotations. It contains in total 809 images with 7747 annotations of *Rumex obtusifolius* leaves. For each leaf, a pixel-wise leaf blade annotation as well as a polyline annotation of the stem --- if visible --- and vein were manually created. We differentiate between two types of datapoints: (1) 690 *iNaturalist* datapoints that have been downloaded from the plant publisher iNaturalist and (2) 119 *RoboRumex* datapoints that have been collected with an agriculture robotics platform and is complemented with additional depth images of the plant. Example images are shown in the following. For more information, please refer to the website of the dataset: <https://dtu-pas.github.io/RumexLeaves/>.

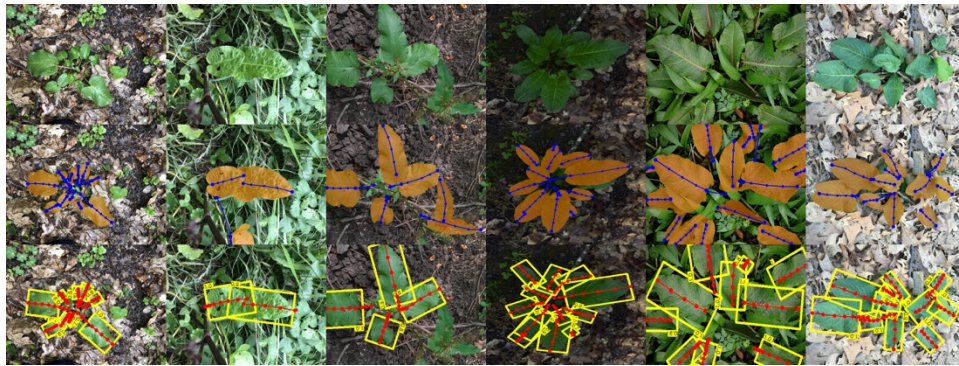


Figure 1: *iNaturalist* datapoints

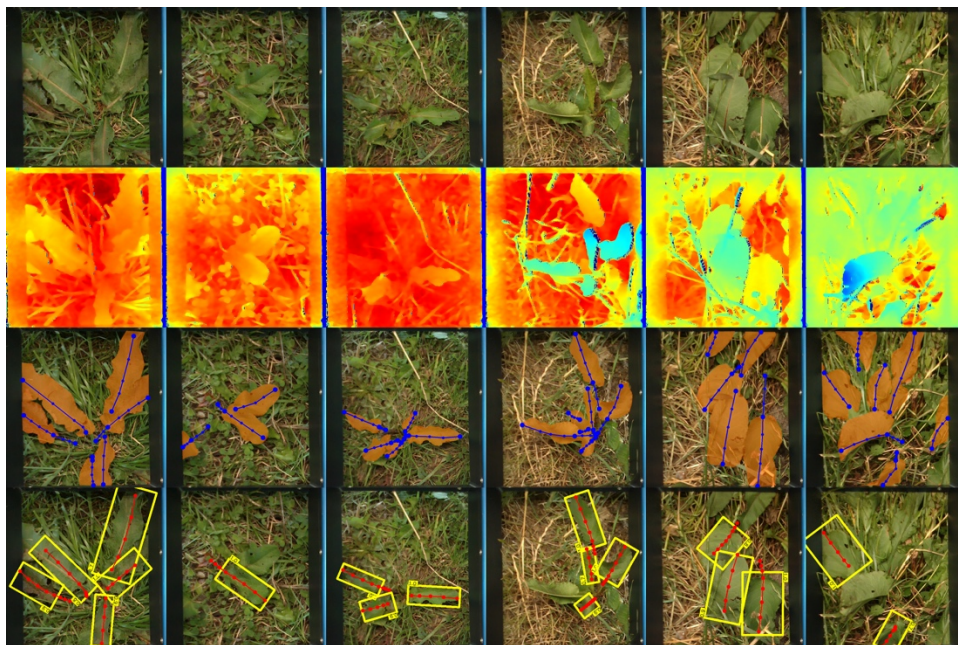


Figure 2: *RoboRumex* datapoints

We have some baseline results and code available where we train a CenterNet model to extract the fine-grained plant traits (bottom row in the images above). However, the model is solely trained on *iNaturalist* datapoint, and validated on both datapoint. The validation results reveal that the model performs significantly worse on *RoboRumex* datapoints. In this project, we want you to additionally consider the depth images available for the RoboRumex domain and see if the performance can be increased by considering multi-modal input (RGB+depth).

Keywords: Domain Adaptation, Multi-modal learning, Few-shot Learning

Related Work:

Centernet on RumexLeaves <https://arxiv.org/abs/2312.08805>

Required Level: Master student with experience in computer vision, deep learning, and pytorch. You should have performed a computer vision deep learning project before.

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