

Individual Lab Report II

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1 Individual Progress

1.1 Mitigate over-segmenting by re-labeling data

Previously there was an issue of over-segmenting, but it was resolved by re-labeling 500 data this week. The significance of this work lies in the fact that holes area over leaves area is an important metric for farmers, because its invariant to the stage of plants, and therefore provides a better sense to farmer about the pest pressure. Below is a picture illustrating the result after re-labeling the data. The left work is clearly over-segmented while the right one has masks nicely fitted to the holes.

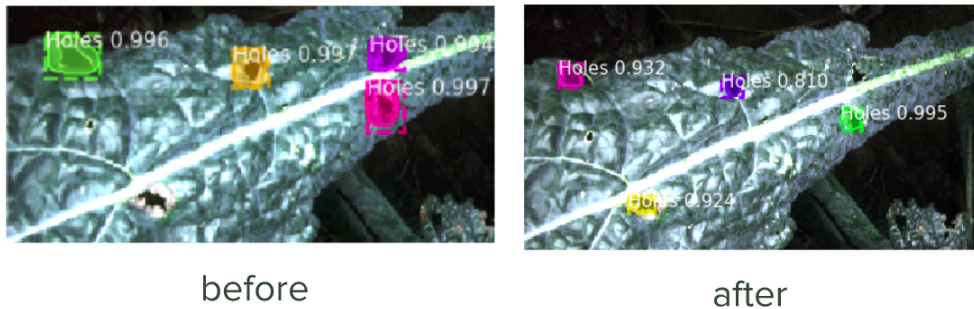


Figure 1: over-segmented(left) vs improved version (right)

1.2 Increase 50% labeling productivity

One major bottleneck of the development process was labeling speed. It's estimated to take around 2000 labels to achieve reasonable good result. This week, the process was streamlined with scripts and standardize process to increase the productivity by 50%. Specifically, scripts were written to give distinct color to each patch. Distinct colors were required to count the number of disease patches and holes, which is another metric that farmers are interested.

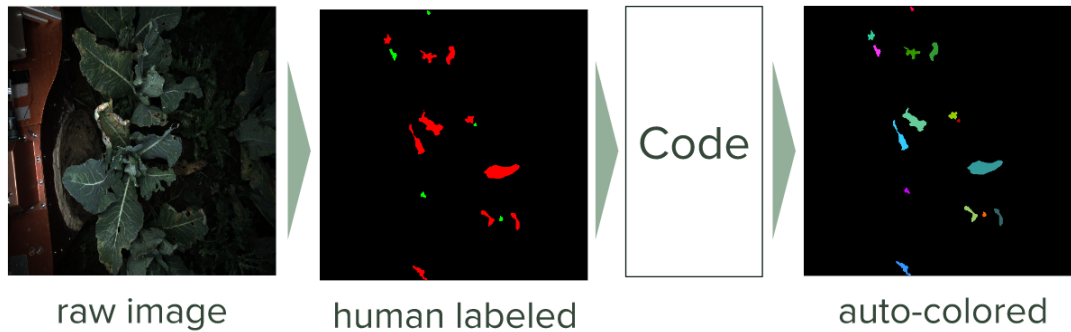


Figure 2: illustration of streamlined process

1.2.1 Challenge: Many False Negative in Disease

There is a much lower performance in recall for disease, that being said we have a lot of false negative. Further lowering the confidence does not really help, but more quantitative analysis is needed. However, doing manually takes a lot of time (*i* 1hr/dataset), hence the goal of next week is to generate an automating script to finish this task.

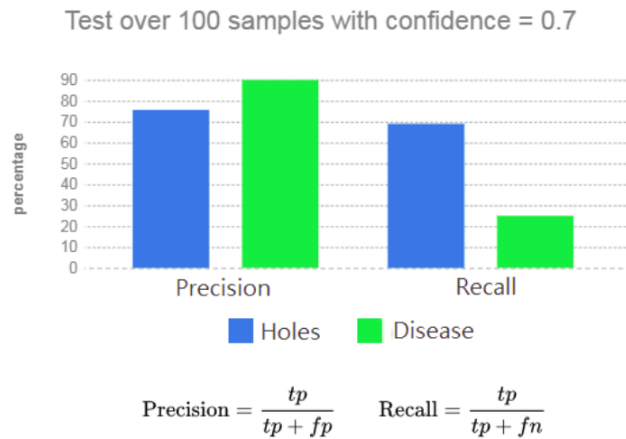


Figure 3: result of recall and precision

2 Teamwork Distribution

2.1 sensor motor lab

1. John: integration and GUI
2. Aaditya: DC motor and infrared sensor
3. Hillel: servo motor and slot sensor
4. Dung-Han: stepper and ultrasonic
5. Aman: DC motor and temperature

2.2 MRSD Project

1. John: Localization in the field
2. Aaditya: Building map base on sensory data
3. Hillel: Design the weeding cultivator
4. Dung-Han: Relabel data and retrain Mask-RCNN
5. Aman: Design machine parts, setup motors

3 Future Plan

In order to nail down the actual underlying problem, and quickly test the performance of a trained network, a script shall be written to automate the quantitative analysis process.

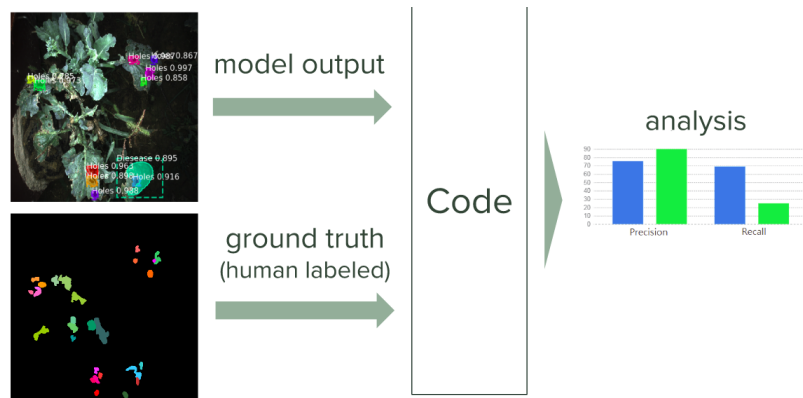


Figure 4: illustrate automation pipeline