EasyIDP: A python package for intermediate data processing in UAV based plant phenotyping

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Introduction

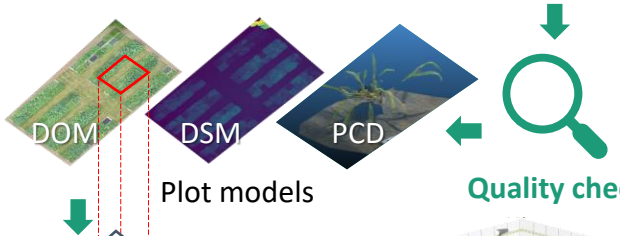
Traditional field survey

Time consuming Labor intensive

Low-throughput

High-throughput workflow

Drone flight → Raw image → 3D reconstruction



Plot models

Quality check

Extract region of interest (ROI)

Traits calculation

Current pain points

Lack **handy tools** for previous **intermediate** processing

- Crop DOM, DSM, & PCD to small parts (ROI)
  - ↓
  - Easier to manage and analyze
- Reverse ROI back on raw drone images
  - ↓
  - Higher quality and resolution

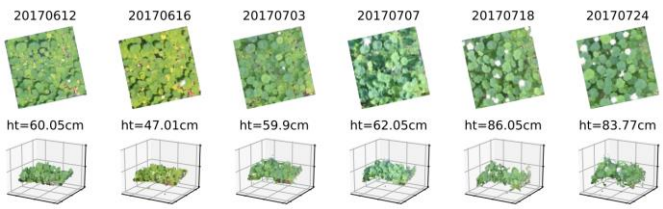
Implementation

Python package → Open source → SCAN ME

Results

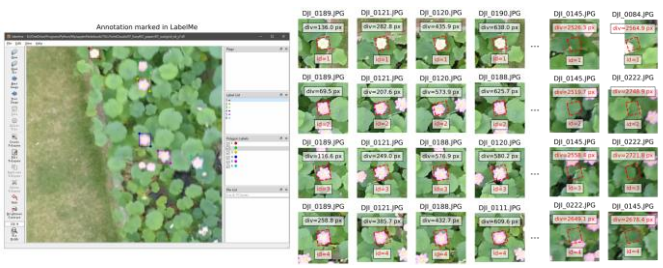
Use Tanashi Lotus field (2017) as example

Time-serious ROI extraction



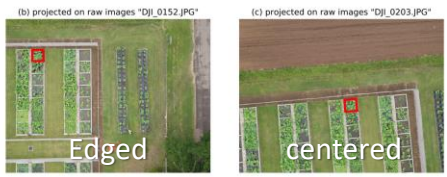
Be able to track the changes of each plot during growth period

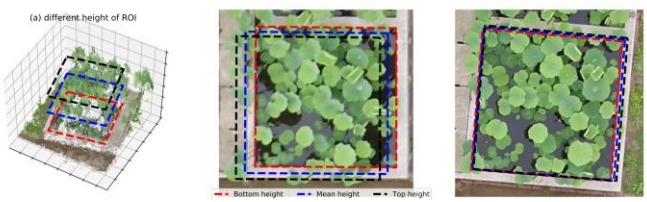
Decrease annotation workload



Mark once, reverse on several raw images

Effects of ROI position & height





To eliminate the effect of ROI height, better to choose those centered raw images

Future work

- ☐ Fit both Pix4D & Metashape, or more software.
- ☐ Examine on more different crops or cultivars.
- ☐ Integrate with practical agriculture applications
  e.g., predict harvest time, lodging analysis, etc.