

Tree cataloging from mass plantation aerial imagery

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Project Proposal

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- ❖ Proposal on 9th Sep, 2018 (8-months)
 - ❖ Underlined text indicates task completion

Proposed Methodology *

How will you do this?

The project's scope isn't particularly fixed yet and is subject to change. However the basic idea is to get an off the shelf drone and equip it with a camera that allows capturing of pictures of an area of interest manually. Followed by, the stitching of these pictures together and being glued together with a real time map. The pictures shall serve as input for the processing to be performed inorder to determine the count of plants and their health. There is clearly no intent to reinvent the wheel thus any and every available resources and products will be utilized to make a viable technology.

Unmanned Aerial Vehicle

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- ❖ Ryze Tello Quadcopter Drone
 - ❖ 5 MP camera
 - ❖ 720p, 30 FPS video
 - ❖ FOV - Oblique (87°)
 - ❖ 13 minutes flight time



Initial Data Set

- ❖ 3 distinct types of images
- ❖ Total images : 126

- ❖ Manual annotation of trees in each image
- ❖ Varying dimensions



Oblique to ground (87°)



Parallel to ground (180°)



Perpendicular to ground (90°)

Enhanced dataset

- ❖ Total images : 1260
- ❖ Labels preserved of initial dataset
- ❖ Data augmented via two main ways

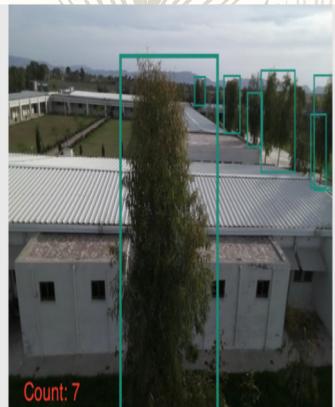
1. Axis of rotation	2. Filters	
❖ Horizontal Flip	❖ Blur	❖ Shady
❖ Vertical Flip	❖ Motion Blur	❖ Snow
❖ Horizontal – vertical Flip	❖ Rain	❖ Sunny
	❖ Salt & pepper	

Image Stitching

- ❖ Drone video at 30 FPS
- ❖ Frame extraction
- ❖ Stitching together frames to form panorama shot



Tree detection



Cloud Solution

- ❖ Nanonets
- ❖ Image annotation
- ❖ Training
- ❖ Tree detection
- ❖ Tree count

Cloud Solution Sample

Machine Solution

- ❖ Faster RCNN + Resnet 50
- ❖ Training
- ❖ Tree detection & count





Future Work

- ❖ Frontend Interactive App
- ❖ GPS mapping of detected trees
- ❖ Physical tagging of tree via robot
- ❖ Using hyperspectral sensors to determine plants health i.e. VI, NDVI

Thank You!

Taking Questions, if any?

HOW TO DEBUG YOUR CODE

