



Drone Data Acquisition of Cotton Crop in an Agricultural Cycle: Dataset Development for Smart Farming

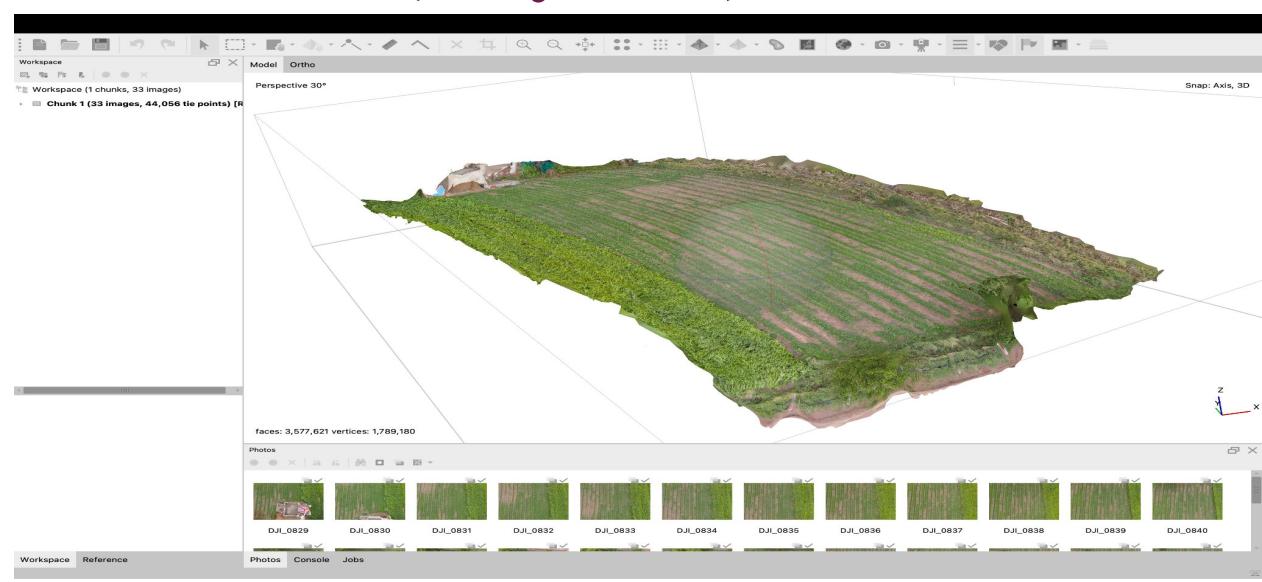
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Motivation:

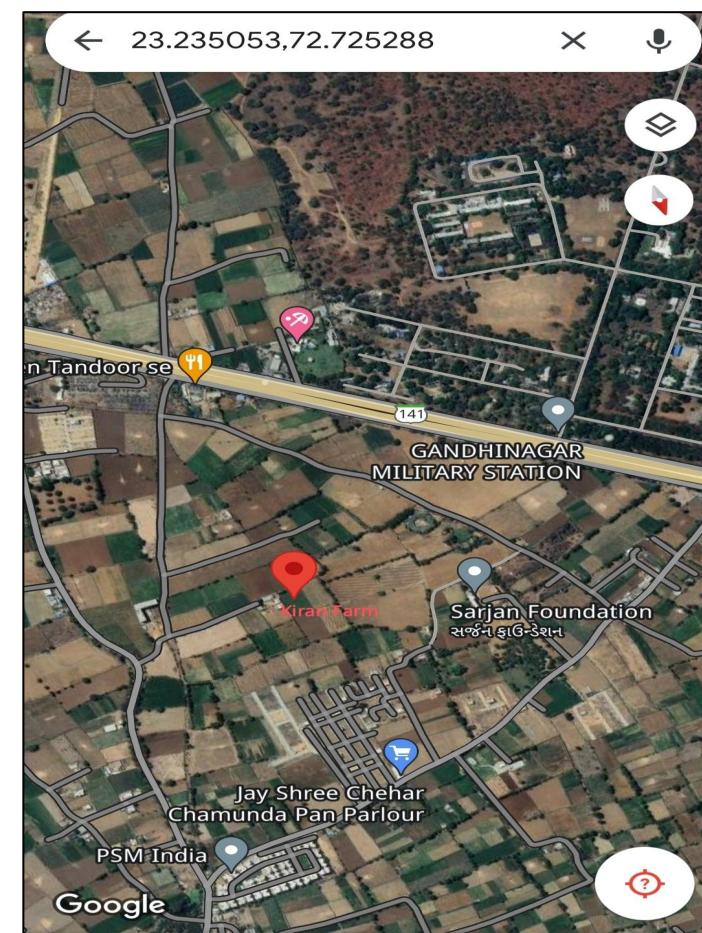
- Precision Monitoring
- Cotton Field Inspection
- Disease Monitoring
- Cotton Yield Monitoring
- Prototype Development for Education Purpose

3D Model (Day 140) :

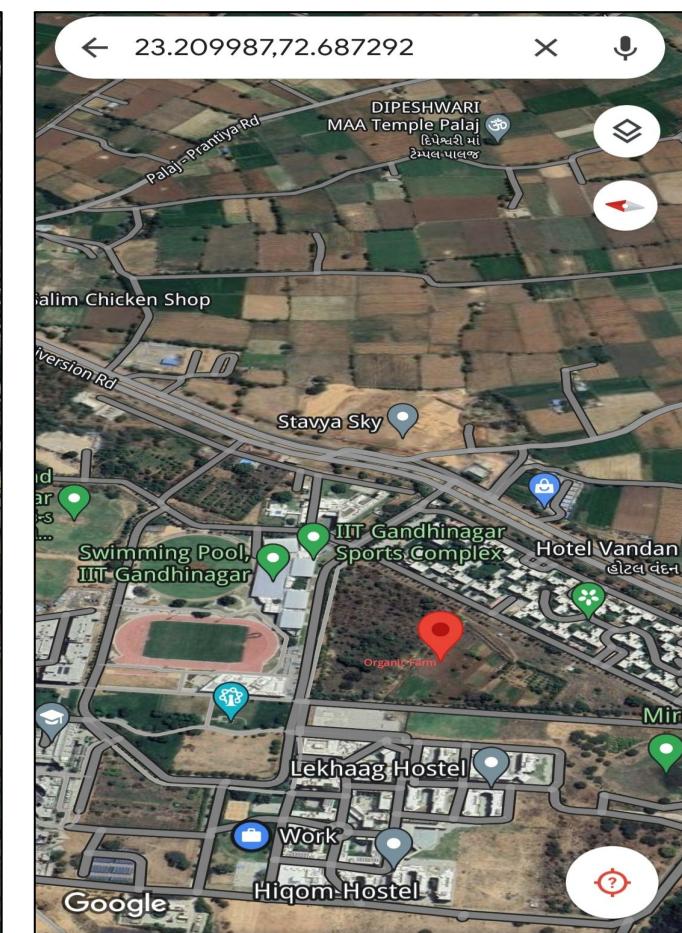


Location:

Kiran Farm



Organic Farm



Data Collection:



Specifications:

- Drone for Aerial Image Acquisition
 - Model: DJI Drone Mavic Air 2
 - Camera: 48 MP
 - Altitude: 10m, 15m and 115m
- Drone Image Processing Software:
 - Agisoft Metashape
 - Version: 2.0.3, Standard Edition
 - Operating System: Mac/Linux

Methodology:

- Alternate-week data collection using the Drone from Date 01/07/2023 to 20/11/2023
- Aerial Image Acquisition with 40% side overlap and 40% forward overlap
- Workflow in Agisoft Metashape: Data upload, Excessive Image Elimination, Aligning Images, Building Point Cloud, Building Texture, Generating Texture, Exporting Results
- For detection and segmentation we used YOLO Algorithm

Conclusion:

Regular aerial surveys using Unmanned Aerial Vehicles (UAVs) will help watch how crops grow, guess how much we'll get, and understand the soil better. The data we collected will help create smart algorithms for better cotton farming.

Future Use:

Using drones regularly can make farming smarter. We can make algorithms that guide farmers to grow better cotton, helping them understand their fields and crops even more.

References:

1. Awokuse, Titus O., and Ruizhi Xie. "Does agriculture really matter for economic growth in developing countries?." *Canadian Journal of Agricultural Economics/Revue canadienne d'agroéconomie* 63.1 (2015): 77-99.
2. Shafi, Uferah, et al. "Precision agriculture techniques and practices: From considerations to applications." *Sensors* 19.17 (2019): 3796.
3. Pierce, Francis J., and Peter Nowak. "Aspects of precision agriculture." *Advances in agronomy* 67 (1999): 1-85.
4. Puri, Vikram, Anand Nayyar, and Limesh Raja. "Agriculture drones: A modern breakthrough in precision agriculture." *Journal of Statistics and Management Systems* 20.4 (2017): 507-518.