Palm Tree Mesh Creation: A Comparative Study

Mahmoud Sunbul

1. Motivation & Objectives

Create detailed **3D palm tree meshes** for agricultural.

Harvest Path Planning	Tree Health Monitoring
Pest Detection	Dataset Creation

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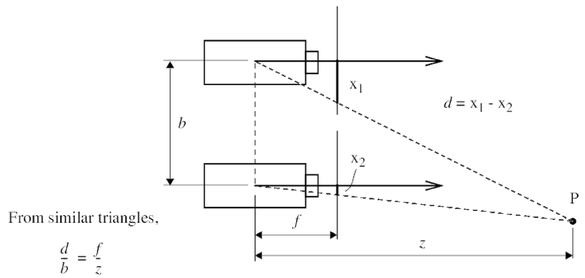
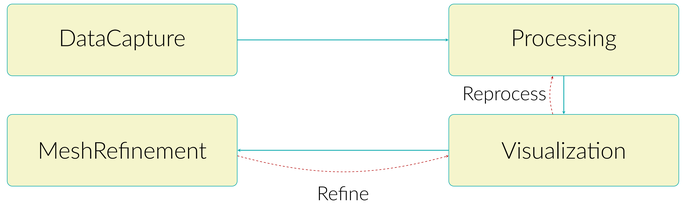
2. 3D Representation Types

- **Mesh:** Surface made of triangles/polygons
- **Point Cloud:** Set of 3D points
- **Primitive Shapes:** Basic geometric forms
- **Voxel/Volumetric:** 3D grid representation
- **Analytical/Implicit:** Mathematical functions
- **Parametric/CAD:** Design-based models

Technology Visualization



3. Methodology & Technology

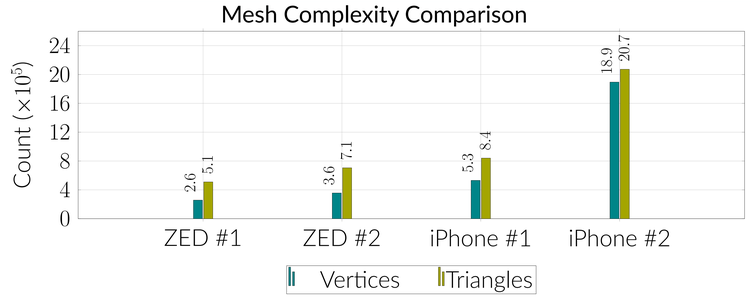


Technology Comparison:

- **ZED Stereo Camera:** Dual lens system, depth mapping
- **iPhone LiDAR:** Active depth sensing, photogrammetry

Figure 1. Experimental setup showing data collection methods

4. Results



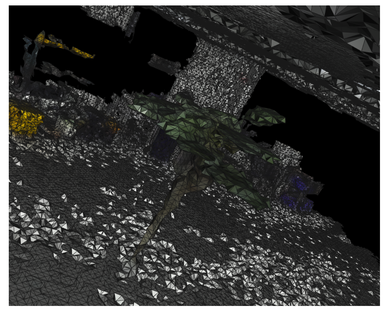


Figure 2. ZED Camera Reconstruction

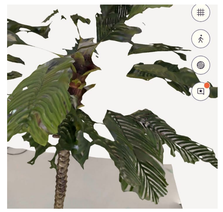


Figure 3. Google Pixel LiDAR Reconstruction

Figure 4. iPhone LiDAR Reconstruction

5. Conclusion

LiDAR: high-detail meshes intuitive workflow Triangulation: rapid, long-range capture at the expense of fine detail