University of South-Eastern Norway

Drone-Assisted Orchard Monitoring: Navigation, Tracking, and Apple Detection

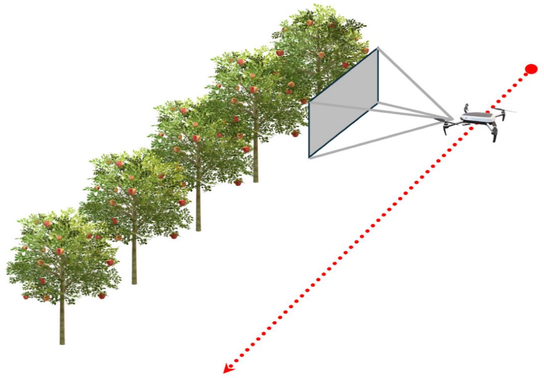
Purpose & Aim

Manual apple counting is labour-intensive, inconsistent, and unscalable. This project builds an autonomous UAV pipeline for orchard monitoring, tested in a simulated replica of a real orchard (Unreal Engine + AirSim).

- Digital twin environment with GPS-matched tree placement
- Waypoint navigation with tree-facing flight paths
- YOLOv7-based deep learning apple detection
- Multi-object tracking & georeferenced apple counting

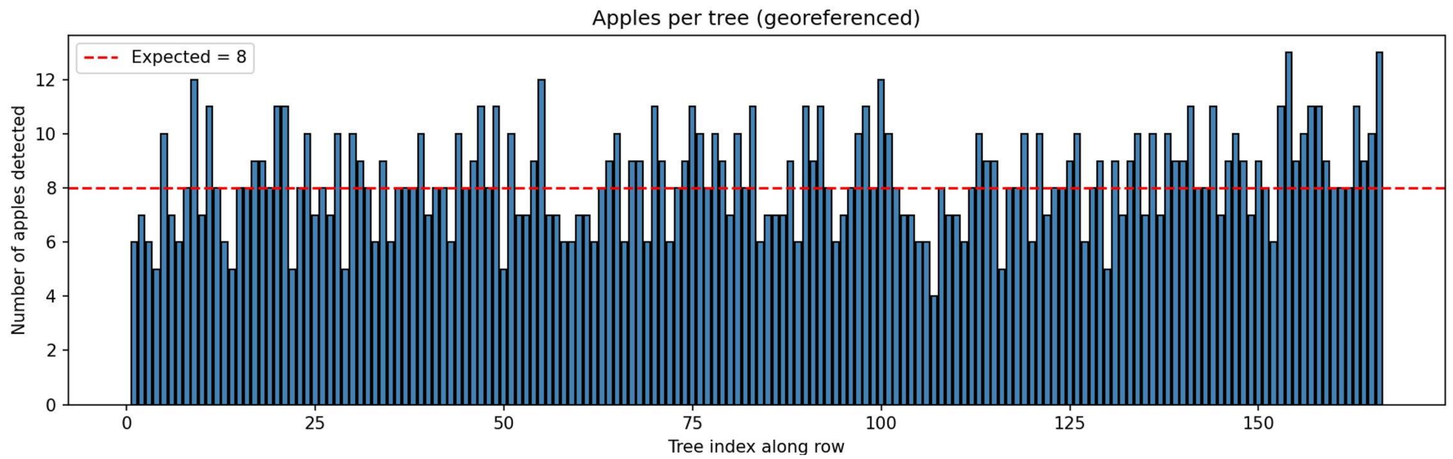
Results & Key Findings

Heightmap of the apple orchard



UAV waypoint navigation along tree rows

YOLOv7 apple detection on simulation



Apple count per tree in simulation

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