NRI: Robotics, Science and Forestry

Pratik Chaudhari (PI, Penn), Vijay Kumar (co-PI, Penn)
Harold Burkhart (PI, VT), Patrick Corey Green (co-PI, VT)
Period of Performance: March 2022 — Feb 2026

Research Goals

Thrust A: Large-scale mapping using multiple UAVs (Lead: Kumar, Co-lead: Chaudhari)

Active mapping to gather actionable information over large areas; Scaling up the autonomy stack to map areas of up to 1000 acres; Heterogeneous teams of humans and robots

Thrust B: Fine-grained semantic understanding of unstructured environments (Lead: Chaudhari, Co-lead: Kumar, Green)

Combining visual and point-cloud data for building representations of the scene suitably tailored for decision making in forestry; Active semantic scene understanding; Scalable annotation of forestry data

Thrust C: Pairing human-collected ground measurements with UAV data (Lead: Burkhart, Co-lead: Green)

Application in managed loblolly pine plantations; Applications in diverse forest cover types

The Problem

Sampling	Coverage Rate	Resolution	Labor
Over the canopy measurements	Fast	Low	Minimal
Under the canopy UAVs	Moderate	Medium	Modest
Ground measurements	Very slow, but necessary	High	High

Our Vision
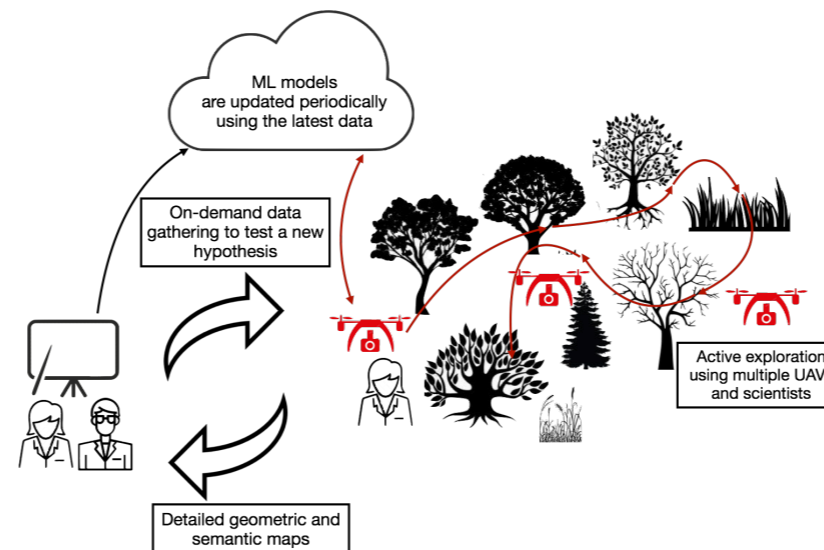
Prior Work

New flying platforms

Yield estimation and mapping

Forest measurements

Regeneration   Crown closure   Post-thinning   Pre-final harvest
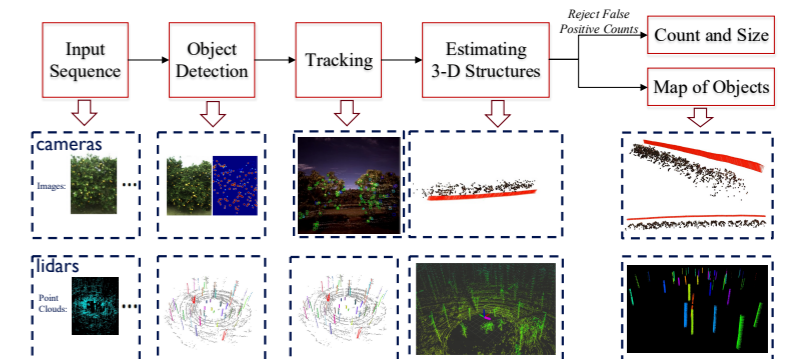
Acknowledgements

External Collaborators

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