Demo Abstract: Cost-Effective Rover for Farms

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Motivation & Challenges

- Precision Agriculture
  - Data-driven monitoring
  - Sustainable
  - Can be expensive
- Reduce labor shortages
- High commercial agricultural robot cost, need for an affordable rover
- No detailed cost breakdown in existing rovers for precision agriculture
- Customizable design

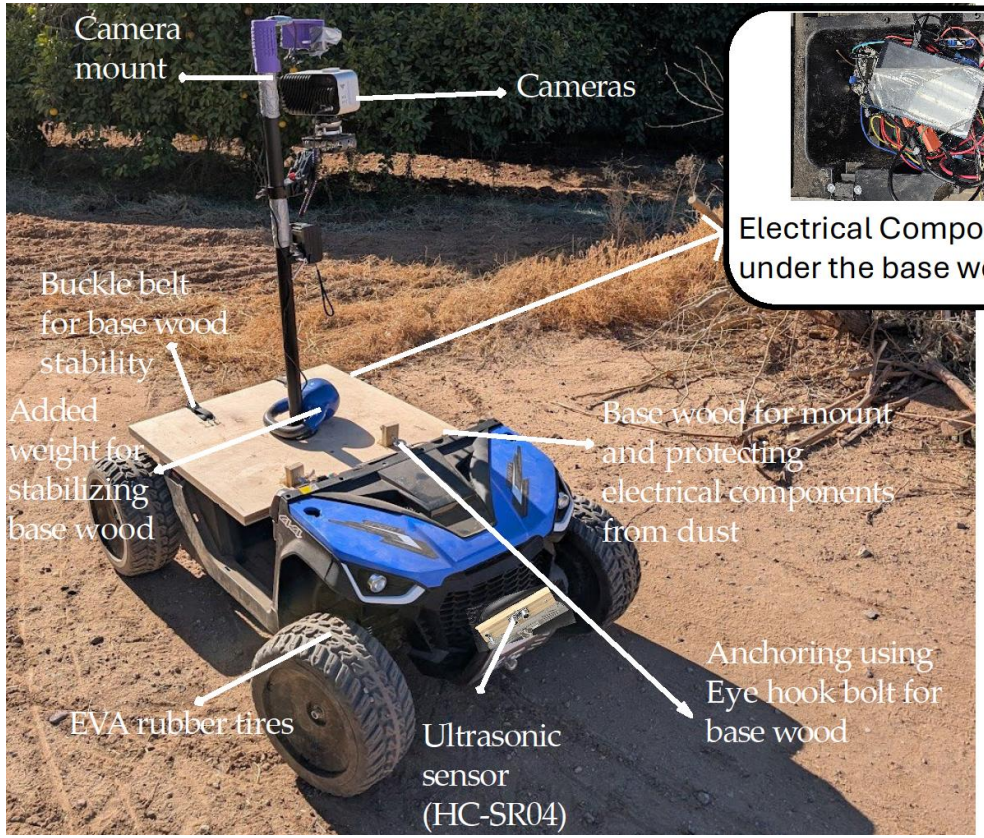
Initial Rover

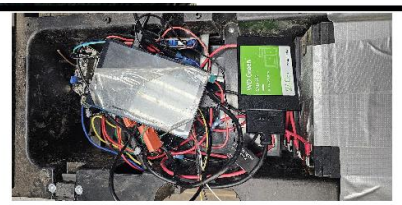
Issues with the initial design:

- Tires wore out too quickly on rough terrain.
- High power consumption.
- Lacked space to add extra batteries

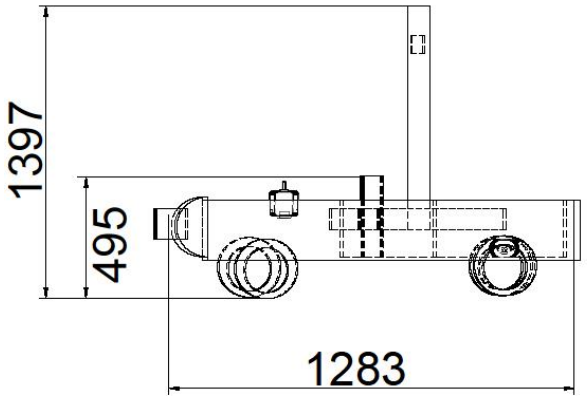
https://humphreymalone.com/wp-content/uploads/2024/01/A-modern-farm-showcasing-precision-agriculture-technology.-The-scene-includes-high-tech-tractors-with-GPS-systems-drones-flying-overhead-surveying-th.webp

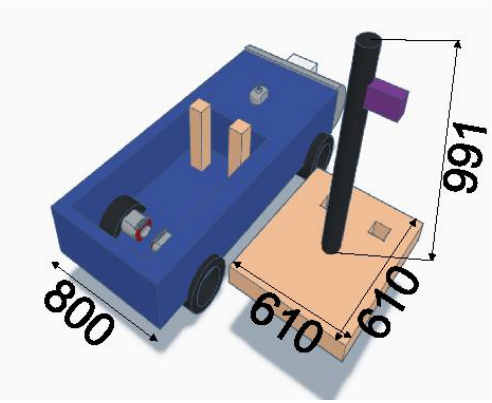
Proposed Prototype Rover





Electrical Components connected under the base wood





Dimensions (in mm) of our rover.

Proposed prototype rover

- It has ethylene vinyl acetate (EVA) tires.
- It has an emergency braking feature.
- It can be controlled using Android App or webpage

Challenges

- Wood was chosen as the pole mount for its availability and sustainability.
- The camera's weight made the structure unstable at higher speeds.
- To ensure stability, the wood had to be processed further before securing it to the rover.

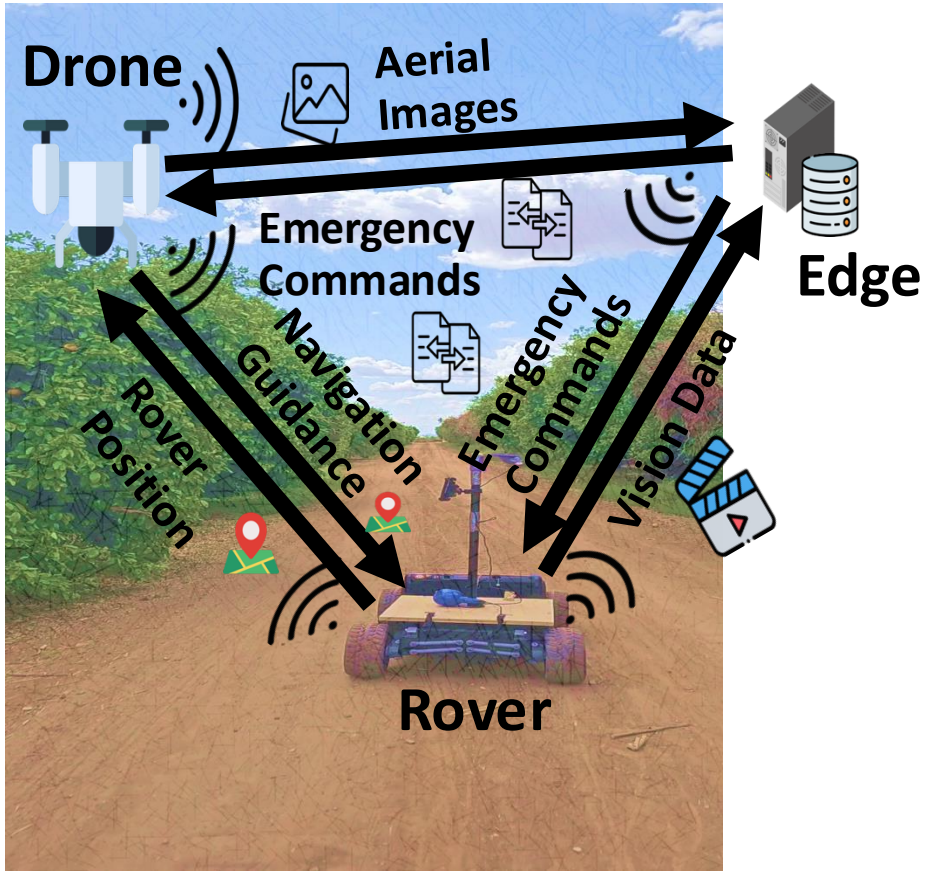
Challenge encountered with the prototype

Example Application

Example application using YOLO

Remaining Challenges

- Low traction
- Too bulky
- Obstacle sensitivity
- Limited visibility
- Lack of generalized training data



Future Work

- Autonomous navigation
- Speed control
- Deploy drones
- Design space exploration