AUTONOMOUS INDOOR HELICOPTER

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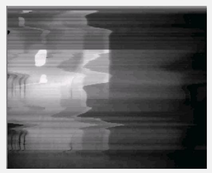
Autonomous indoor helicopter flight using a single on-board camera

Capabilities

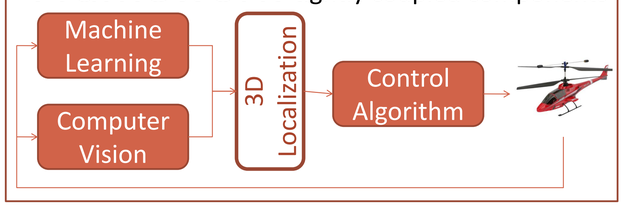
- Autonomous flight in indoor settings
- Maneuver sharp corners autonomously
- Follow user-defined trajectory in narrow corridors
- Stable hover capability
- GUI framework for system interface
- Virtual controller for simulating flight

Challenges



- High presence of obstacles
- Poor image quality
- Small payload capacity
- Real-time response
- Vibrations and turbulence

Framework tightly coupled components

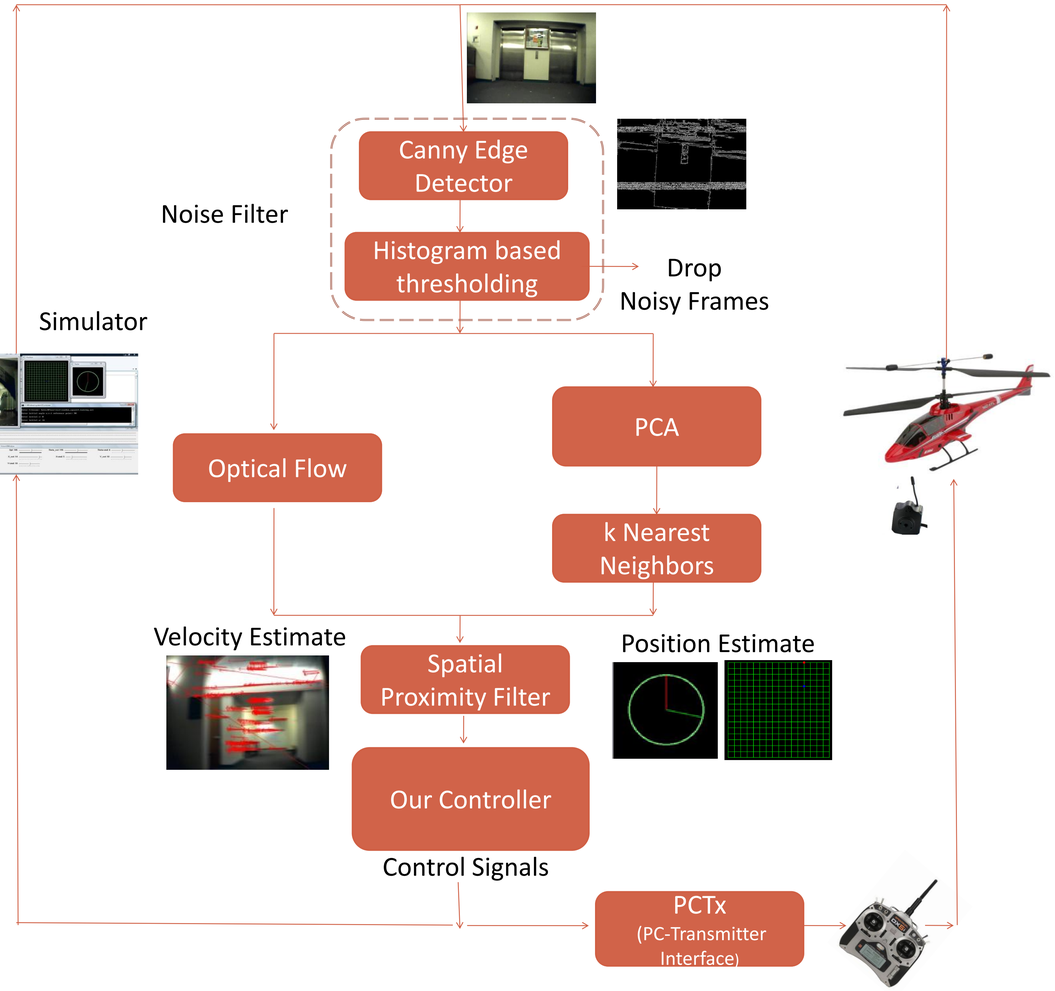


Platform

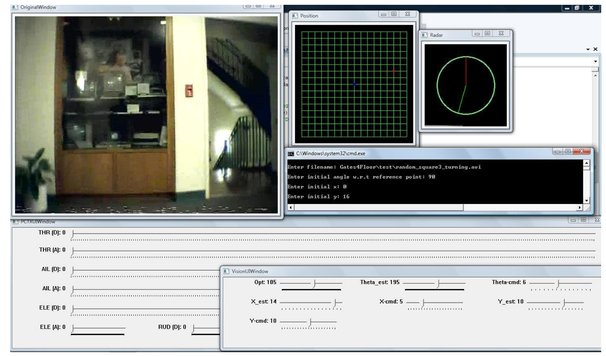
- Blade CX2 RC helicopter
- Spektrum DX6i Transmitter
- Endurance PCTx PC interface
- 2.4 GHz wireless camera

Training Procedure

Test Procedure



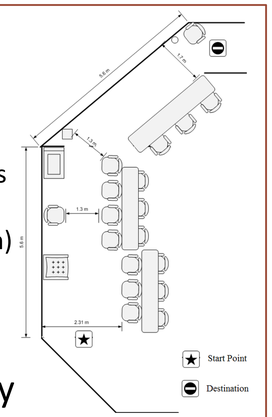
Navigating sharp corners autonomously



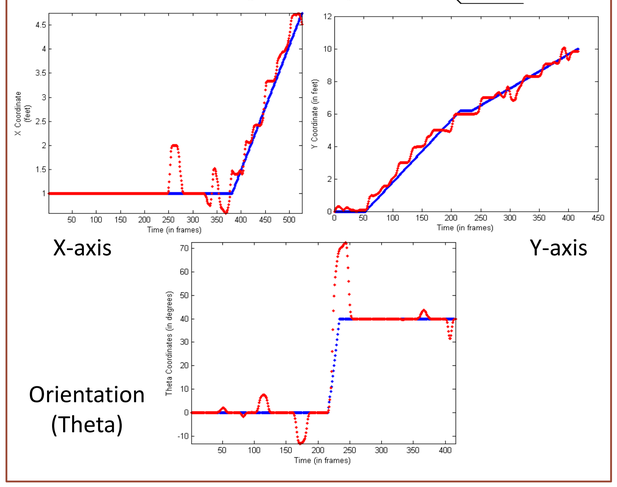
Controller Interface

Results

- Floor plan of test environment
- Several autonomous flights from Start to Destination
- Narrow corridor (1.3m min) and sharp turns (45°)



Simulated Trajectory



Future Work

- Obstacle detection and avoidance
- More robust rudder control