EE/CprE/SE 491 WEEKLY REPORT 09

11/8/2024 - 11/14/2024

sdmay25-21

Distributing a Fleet of Drones over an Area with No-Fly Zones

Trajcevski, Goce Advisor

Nicholas Kokott Team Organizer
Melani Hodge Algorithm Design/Implementation
Cole Stuedeman Testing
Everett Duffy Component/Module Design
Ken Schueman Advisor Communication
Samuel Russett Research Discovery and Testing

Algorithm Updates

Project Description

The sweep line axis is provided by the user (backend constant). The partitioning direction (vertical/horizontal) is determined by a specified metric.

Input Processing:

- Accepts a list of polygons
- Polygons created from counter-clockwise point sequences
- KD-Tree splitting based on cartesian point location after sweep line execution
- Takes in number of drones
- Takes in region from user that the no-fly zones are drawn on

The Assembly Library feature usage for section splitting needs clarification.

Action Items

1. Review Materials:
    - Examine the Overlay section from "Area and Perimeter based experiments and proofs," particularly slide 99
    - Reference previous senior design document for formatting: sdmay23-34 design document
    - Research FAA regulations for inclusion
    - Review "Drone-Based Delivery Systems: A Survey on Route Planning" for citations
2. Priority Tasks:
    - Continue working on the prototype for our upcoming demonstration

Weekly Summary

We reached a significant milestone with the receipt of the core algorithm information, enabling us to:

- Initialize backend development
- Begin pipeline integration with frontend
- Finalize and proceed with frontend design implementation

- Continue PostgreSQL and Python implementation for server/application state management

Team Member Contributions

- Sam: Framework research and KD/BAR trees study (4 hrs) | Total: 6 hrs
- Cole: Data transfer optimization research (3 hrs) | Total: 2 hrs
- Nick: Frontend-backend communication implementation (4 hrs) | Total: 5 hrs
- Everett: Frontend functionality exploration (3 hrs) | Total: 4 hrs
- Melani: PostgreSQL service evaluation (3 hrs) | Total: 5 hrs
- Ken: Full-stack development (16 hrs) | Total: 6 hrs

Challenges

Primary: Resolved Received flight path algorithm information

Pending:
Clarification is needed on additional algorithms from PhD student
Data structure implementation decisions

Next Week's Goals

1. Frontend Development:
    - Continue UX/UI experimentation
    - Implement frontend rework
2. Backend Development:
    - PostgreSQL integration
    - PhD student algorithm implementation
3. New Feature:
    - Develop no-fly zone plotting functionality

Recent Advisor Meeting Outcomes

Key discussion points:
- Frontend design experimentation
- PostgreSQL integration strategy
- Algorithm implementation approach
- No-fly zone plotting requirements