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

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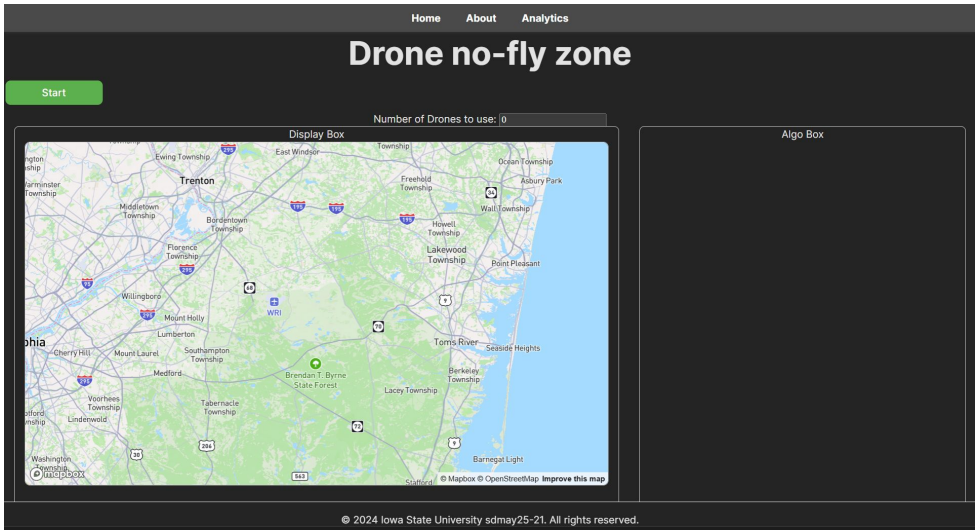
Project Overview

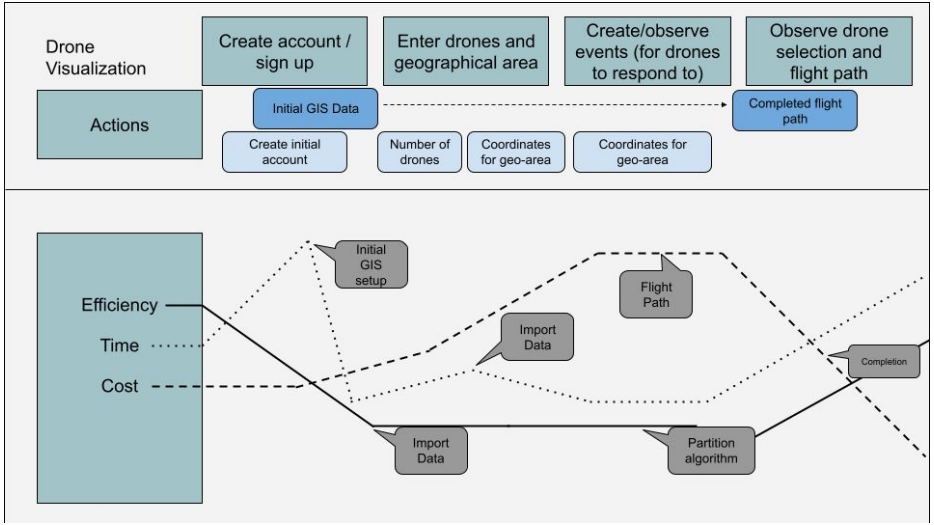
- Goals:
  - To be able to give a UI to users that displays their drones interacting with their points of interest for whatever reason they have given.
  - Have drones fly in a shortest path to certain events while ensuring that they get around no-fly zones.
- Importance:
  - Many drone users currently have to manually use them to respond to events, we will automate this so that drones can instantly perform the jobs needed.
  - Rather than users controlling drones one by one they can now have all of them move at the same time assuming there are multiple events happening simultaneously.



Artifacts: Journey Map

The current solution addresses the user needs very well by leveraging the ability to map around no fly zones and see the drones move in real time.

The only changes that could be made currently would be to make the UI easier to interact with than what we currently have. Allowing for points to be plotted directly on our map for no fly zones would be very helpful



Artifacts: Pros/Cons table

The current solution we have improves upon the existing solutions by allowing the users to use much larger regions as well as avoid no-fly zones in flights. None of the other products on the market are able to do this in an effective manner.

The only current drawback is that this is currently only a visualization and not able to be put into actual drones yet. However, this may be addressed in the future. For our project however the whole goal is just to make a visualization of how this works and not fully coordinate to actual drones.

	FlyNow Hub	Drone Deploy	Skybrush	Our Solution
Pros:	-Completely autonomous use - Tracking and auto landing stations - Visualization of test field through application.	- ease of use - customer support - easy sharing - daily use	I-Easy to coordinate the drones -It looks really cool when put together	-Map our own fly zones -Use a custom number of drones -Partition areas to reduce response time
Cons:	-Video resolution is low on drone feed -Customer support can be slow to respond	- expensive - missing features - slow processing - limited access - upload issues	-Very expensive as it requires many drones and lots of software -If one malfunctions the rest get confused	-More drones could mean more computation and more latenancy -The number of drones could result in high cost

Artifacts: Technical Complexity Analysis

Internal Complexity:

- A frontend that utilizes typescript and javascript with react and vite frameworks.
- A backend that utilizes python scripting with PostgreSQL and PostGIS
    - Both of these together will have high complexity in terms of data compressions and transmissions, as well as the overall algorithm computations for the drones pathing.

External Complexity:

- Compared to other items on the market, our design will be more comprehensive and easier for our users to be able to access and add events to. This will be vital for many different real world applications that many current designs cannot match.