

App Description

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Background

Large buildings must be inspected in order to ensure safety. Specifically, buildings such as sports arenas must have the ceiling trusses inspected. Each “joint/node” where the truss meets must be visually inspected for defects. Traditionally, this has been done by using scissor lifts and continually going up/down many times in order to cover the entire space. This obviously is very inefficient and slow. Due to the difficult nature of the task, it was not uncommon for these inspections to be skipped altogether. With the advent of modern drone technology, the task of inspecting large buildings has been streamlined.

With that being said, flying drones is a difficult task. It is very much subject to human error and crashes may occur frequently when flying in difficult or unfamiliar environments. Additionally, in indoor environments there is little or no GPS signal, and so flights must be manual. Given that flying in unfamiliar indoor environments is difficult, it would be beneficial to provide some medium for training and familiarizing novice pilots to fly in a particular space before making the flight on-site. That is, to familiarize and train people to repeat or perform a similar flight path to that of a path taken during an inspection by an expert drone pilot.

App Idea

This app seeks to provide a method of visualizing drone flights used in interior building inspections, or wherever autonomous GPS-driven flights are not feasible. This visualization will enable drone pilots to better understand the flight paths of professional pilots who have conducted simulated inspections within the space. Delivering this functionality is contingent on communicating spatial flight path data intuitively within a 3D space.

App Users

The primary users of the app will be drone pilots who have not conducted inspections within an indoor space.

The secondary users of the app may be construction managers, building inspectors, or experienced pilots explaining the current path data to the primary users. Generally, users that do not necessarily have experience with drones.

App Workflow

1. User uploads and/or selects a building space (.glb), drone flight paths (.txt), and inspection points (.txt)
2. User selects to display, up to several, drone flight paths

3. User navigates the 3D environment
 - a. User analyzes drone flight paths, position, and rotation data
 - b. User analyzes inspection points
 - c. User analyzes trouble areas
4. Repeat steps 2-4 until comfortable with performing a drone inspection
5. Close App

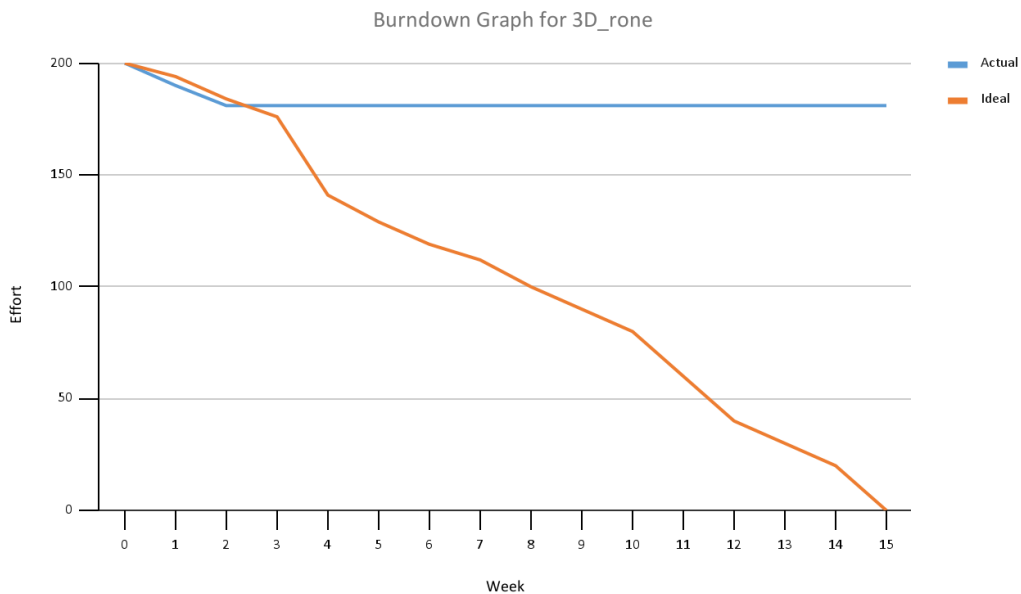
App Data Types

Drone Flight - Collected from a VR drone simulation, and provided as txt files. These contain the position and orientation of the drone along with a timestamp. Velocity, angular velocity, acceleration, and angular acceleration may be derived from this data and packaged as a JavaScript object.

Space - A 3D model representing the intuition to be inspected. Will be provided as a .glb file.

Inspection points - A txt file containing the coordinates of all inspection points. These inspection points will be superimposed over the uploaded space model.

Visualization - The main data output of the app is an easy to digest visual representation of the drone flights uploaded. This visualization must communicate drone position, speed, orientation, and time at any given point of the drone flight.



Burn Down Chart

Project:	3D_rone															
Burndown Table																
		Timeline														
	Estimated Effort	Week														
Product Backlog Inventory (PBI)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Enter tasks in this column	Task Estimate															
Project Sign up and Skills Survey	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Team Formation and Charter	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scientist Pre-interview Notes – 1	5	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0
App Description and Burn Down Chart	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Scientist Pre-interview Notes – 2	5															
App Description – 2	3															
Team Website	20	1	2													
Interaction Design	15															
Cognitive Walkthrough	10															
Cognitive Walkthrough Feedback	2															
Design Review	5															
Design Changes after Walkthrough	5															

Initial GitHub Commit	2															
Domain Commit	5															
Usability Test Scheduling	10															
UX Consultants Topic Presentations	2															
First Deployment	30															
Final Design Presentation	25															
Final Design Feedback	5															
Design Changes after Final Design Presentation	10															
Usability Testing Practice	5															
Usability Testing	15															
Final Review with Client	5															
Implementation Review	5															
Remaining Effort	200	190	181	181	181	181	181	181	181	181	181	181	181	181	181	181
Target:	200	194	184	176	141	129	119	112	100	90	80	60	40	30	20	0