ADIAT - Overview

Automated Drone Image Analysis Tool

August 31, 2023

Automated Drone Image Analysis Tool

- Developed by Charlie Grove from TEXSAR as an opensource project for the Search & Rescue community.
- Leverages color detection capabilities provided by <u>OpenCV</u>
- Designed to be modular so that detection algorithms can be added later.
- Windows application is available for download <u>here</u>.
- Codebase is available for download <u>here</u>.

Interface Walkthrough

Main Interface

- Input Folder: Location from which images will be sourced
- **Output Folder:** Location where images with "areas of interest" identified will be stored
- Min Object Area: The size, in pixels, that the object must meet or exceed to be flagged as an "area of interest."
- **Object Identification Color:** The color that will be used to circle "areas of interest."
- **Max Threads:** The number of images that will be processed at the same time.
- **Algorithm:** Which detection technique will be used. More info available <u>here</u>.
- **Pick Color:** Launches the color selector where the base color is selected.
- **Red, Green, Blue:** Allowed deviation from the selected base color for each color component.
- Color Range: Visualization of the selected color range.
- Start!: Starts the analysis process
- View Results: Launches the image viewer after analysis has been completed

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Image Viewer



Training Exercise

August 30, 2023

Search Area and Articles

- Date/Time: August 30, 2023 16:30-17:20
- Location: Liberty Hill, TX
- Lighting/Weather Conditions: Full sun and light winds
- Search Area: Open field with heavy, dry weeds 3-4ft high





UAV and Flight

UAV – DJI Mavic Air 2s

- Weight: 595g
- Dimensions: 183×253×77 mm (length×width×height)
- Camera: 20 MP 1" CMOS
- Price: \$1,000

Flight

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- Control Application: Maven
- Method: Pre-defined Waypoint Misson
- Flight Path: 16 Waypoints, 3,262 ft
- Flight Time: 6 minutes 45 seconds
- Height: 150ft above ground
- Gimble Pitch: -90 degrees
- Interval Photo Shot: Every 20ft
- Photos Taken: 158





Red Hoodie



- Fairly easy to find given the bright color that contrasts with surroundings
- Even with a larger min object area and reduced color range it was found in 30 images with zero false positives

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Dark Blue Shirt



- Started with a darker blue base target color, but there were a significant number false positives with rocks and shadows
- There are a few images where the light blue shirt was identified in this scan so it will work without a precise color

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Light Blue Shirt



- There were a few false positives with rocks/shadows in this color range, but the search article was the most common positive match
- There are a few images where the dark blue shirt was identified in this scan so it will work without a precise color

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Maroon Shirt



- Increased the min object area and reduced the range for green and red to cut out false positives.
- The red hoodie and orange shirt were not identified in this scan.

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Orange Shirt



Notes

 The way the shirt was sitting up in the weed made the color highly variable between shadows and direct sunlight. Because of this it didn't get picked up on the scans until the color ranges were increased and min object area decreased.

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Yellow Shirt



- Very tricky to find a color range that would capture the shirt, but not a ton of false positives with the dried grass and brush
- The color variability from the lighting conditional also made this a tough find





