Drone Flight Visualization Dashboard - Summary

This project focuses on parsing drone flight metadata from .SRT type files and visualizing the extracted data using Python libraries including pandas, regex, and Dash by Plotly.

1. Data Source and Extraction

The .SRT files contain metadata blocks for each frame, which include:

- Timestamp (e.g., 2024-08-07 11:57:05.745)
- GPS Coordinates (latitude, longitude)
- Altitude Data (rel_alt, abs_alt)

Regex patterns are used to extract these values from the raw text. The parse_srt_data() function scans each file line-by-line and constructs a pandas DataFrame with columns for the extracted fields, source file name, and computed time values (time, time_adj).

2. Data Handling

The metadata is stored in a structured pandas DataFrame. The adjusted time (time_adj) column accounts for gaps in data by resetting large pauses. This makes the visualization timeline continuous and more intuitive. Optional export to Excel is supported via a command-line flag (--excel-out).

3. Visualization Interface

Using Dash and Plotly, the create_dash_app() function builds an interactive dashboard with:

- A map displaying:
    - Full drone path (gray)
    - Progress up to the selected time (blue)
    - Current drone position (red marker)
- A slider to navigate through the timeline of the flight.
- An altitude plot showing the drone's relative altitude with a moving red dot.

4. Execution

The drone_script.py file acts as the entry point. It uses argparse to support custom data directories, Excel output, and port specification. Upon execution, it:

- Parses .SRT files.
- Summarizes the data (number of points, files, total flight time).
- Optionally saves to Excel.
- Launches the interactive Dash server.

5. Results

The final output is a dynamic web app that overlays the drone's flight path on a map and displays altitude changes over time, enabling both geographic and temporal analysis of the flight.

This project effectively bridges raw metadata and rich, interactive visual analytics — making it a valuable tool for reviewing drone footage with spatial context.