Alphataraxia

ISABELLA PEDRAZA PINEROS

Problem Statement

Create a Python application that takes in a list of FAA (Federal Aviation Administration) Airport Identifiers and a list of latitude/longitude coordinates that define the outer boundary of geographic polygon, and **determines whether each airport is located within the polygon**.

Inputs & Outputs

list[str]

list[list[float]]

list[bool]

Assumptions

FAA AIRPORT IDENTIFIERS

Identifiers for American airports and will not be inputted erroneously.

AIRNAV.COM

Always be correct, up to date, and never change HTML structure.

COORDINATES

Always listed as latitude, longitude, all in decimal degrees.

VALID POLYGON

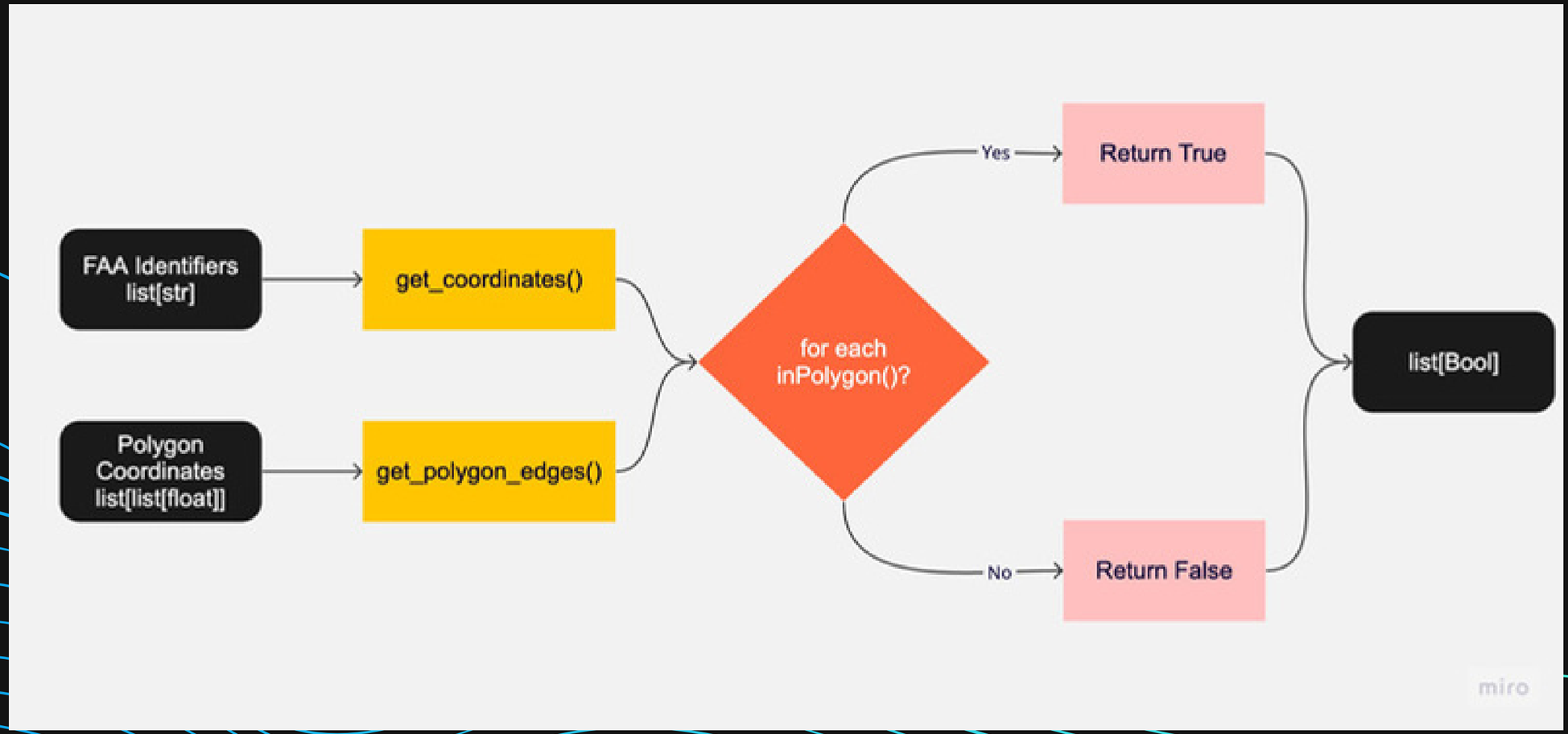
Simple or *self-intersecting* [added later] polygon.

IN POLYGON

For an airport to be inside of a polygon, it must lie within the polygon, on one of it's edges, or on a corner of the polygon.

Pipeline

Initial Planning



Challenges

POINT IN POLYGON

Even-Odd v.s. Winding Number

BESPOKE VS THIRD PARTY

Designing bespoke implementation v.s. using third party packages

GENERALIZABILITY

web_scraper.py, simple and/or complex polygons

SCALABILITY

polygon_checker.py, robustness beyond assumptions

CLIENT

How should I design my interface for a pleasant user experience?

Demo

GITHUB REPO:

HTTPS://GITHUB.COM/ISABELLAPEDRAZA/AIRPORT-POLYGON-VERIFIER

Future Work

Reliability, Efficiency, Generalizability

Python Client

AGENDA

We will discuss the development of the Python client for the Alphataraxia Project. This client plays a crucial role in inputing, fetching, testing, and visualizing data.

Key Files

main.py

requirements.txt

/app

/venv

main.py

FLASK

Python web framework that allows developers to create web applications and APIs with ease and simplicity.

AST

Python package that facilitates the creation and manipulation of Abstract Syntax Trees for source code.

BEAUTIFULSOUP

Python library for web scraping, simplifying the extraction of data from HTML and XML documents.

SHAPELY

Python library for geometric operations, enabling spatial analysis and manipulation.

LEAFLET

JavaScript library for interactive web maps.

main.py

requirements.txt


/app


/venv

app.yaml