# here Technologies

## Runtime Terror


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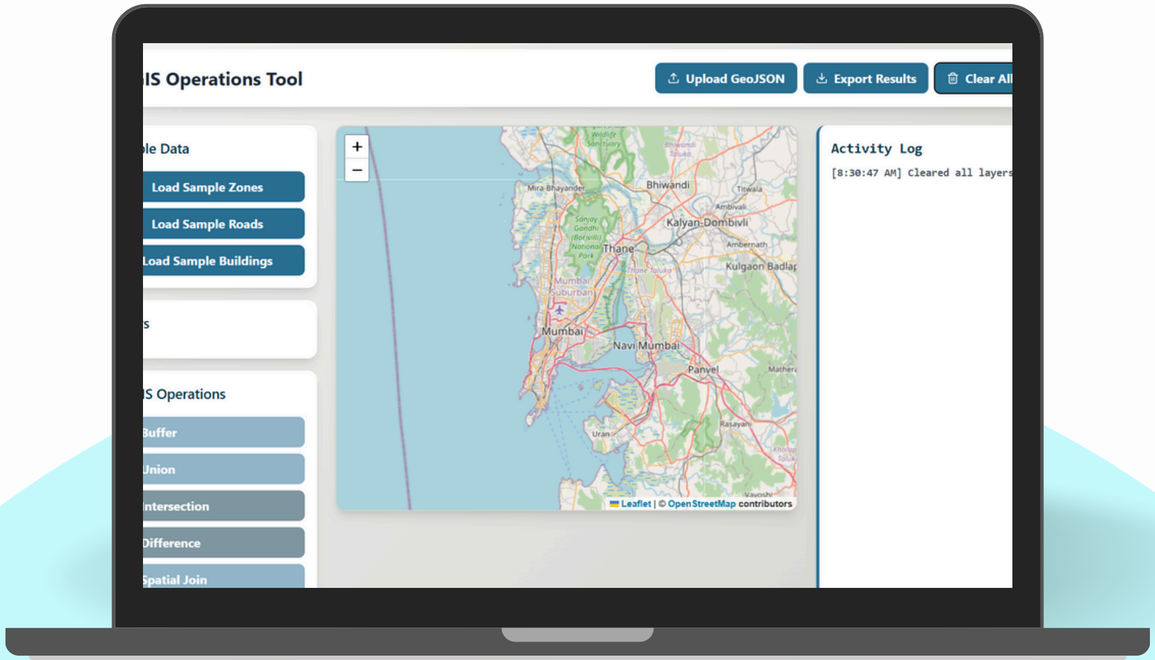


# Problem Statement

## PS - 4

Develop a desktop/web-based GIS tool where you could upload different GIS object perform GIS operation and visualize it.

# Project Objective

Develop a desktop or web-based GIS application that enables users to:

- Upload GIS datasets in .geojson, .shp, or .wkt format.
- Perform core spatial operations on uploaded layers.
- Visualize the data and results interactively on a 2D map.

# Supported GIS Formats

File Types Supported:

GeoJSON

(.geojson): JSON-based vector format

ShapeFile

(.shp): Widely used ESRI format (requires .shp, .shx, .dbf)

WKT

(.wkt): Well-Known Text representation of geometries

Upload Features:

- **Upload** one or multiple files
- **Parse geometry** and display layer **metadata**
- Show **feature** count, geometry type, attributes

# GIS Operations Supported

### Union

Merge overlapping geometries

### Intersection

Find common areas between layers

### Difference

Subtract one layer from another

### Buffer

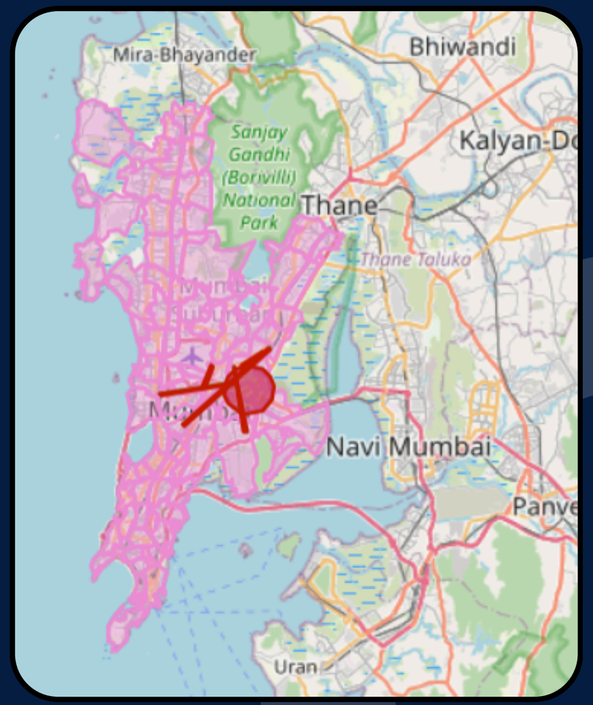
Create zones around features

### Spatial Join / Point-in-Polygon

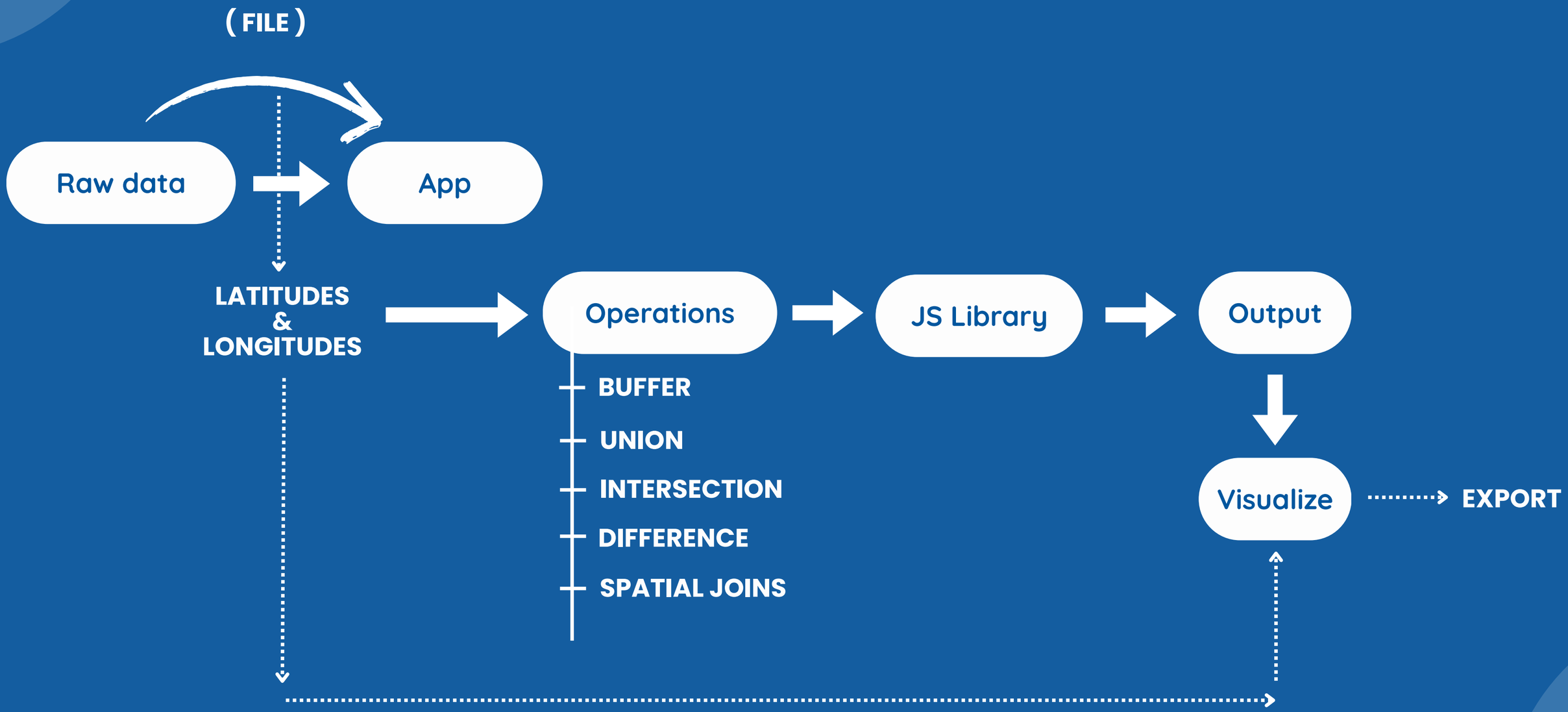
Attach data from one layer to another based on location

Use Cases:

- Overlay roads on administrative zones
- Identify buildings within flood zones
- Generate buffer zones around critical infrastructure

# System Architecture



# Map Visualization Features

## Click to inspect features and metadata

Sample Data

Load Sample Zones

Load Sample Roads

Load Sample Buildings

Layers

mumbai

GIS Operations

Buffer

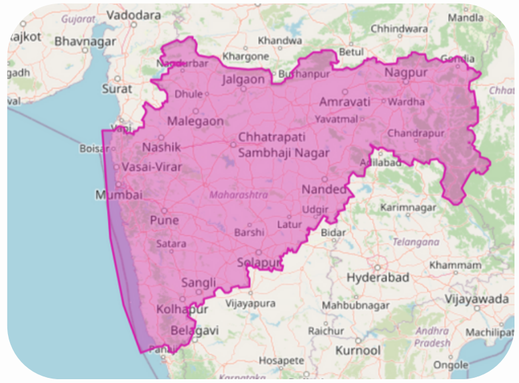
Union

Intersection

Difference

Spatial Join

## Distinct coloring per layer




## Toggle layer visibility

Layers

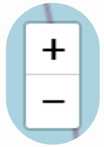
maharashtra

Sample Roads

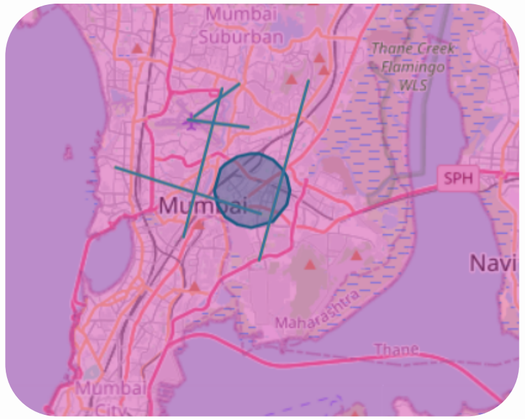
Sample Buildings

Sample Zones

## Zoom and pan across layers



## Display results from spatial operations with highlights



# Future Scope

01

## Attribute-Based Querying

- Add support for filtering features using attribute conditions (e.g., population > 1000, type = 'residential').

02

## Real-Time Data Streaming

- Support for ingesting live GIS data (e.g., GPS, IoT-based spatial feeds).
- Real-time rendering and updates on the map canvas.

03

## Enhanced Visualization Tools

- Implement thematic mapping (choropleths, heatmaps).
- Add 3D visualization for terrain and buildings.

04

## Manual Additions

- Implement the visualization such that the addition of roads and probe points should be possible and would be reflected in the .json file.

# Conclusion

- Functional GIS tool for uploading, analyzing, and visualizing spatial data.
- Supports key operations: union, intersection, buffer, difference, spatial join.
- Handles multiple formats: GeoJSON, Shapefile, WKT.
- Built using Java with GeoTools and JTS libraries.
- Interactive map with zoom, pan, and layer control.
- Modular and extensible for future enhancements.

# THANK YOU!