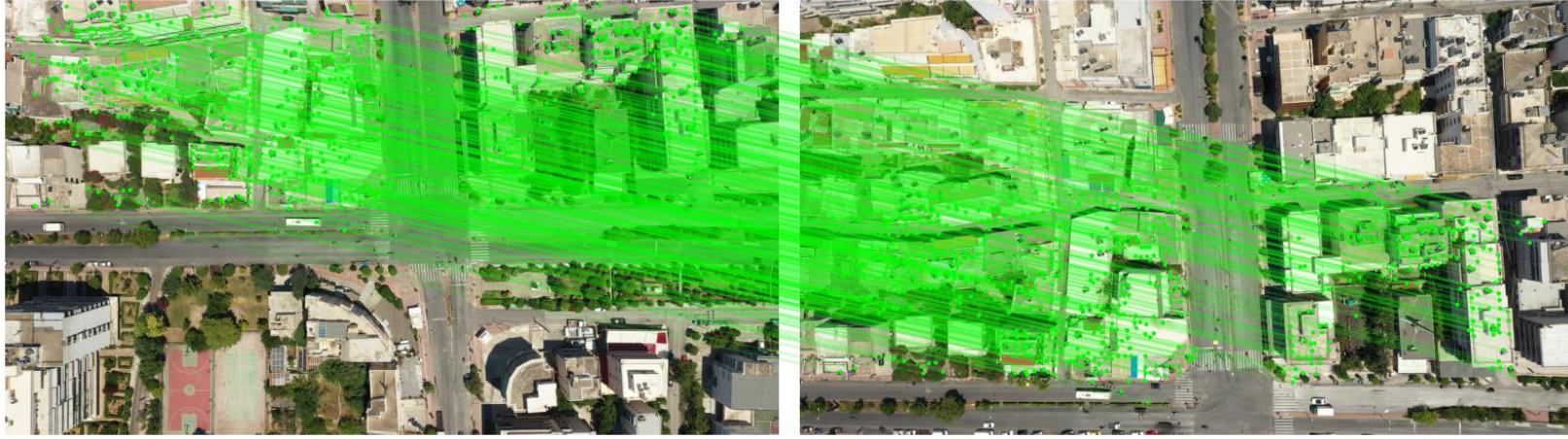


Drone Map Creation and Vehicle Tracking on the Map

Oussama Jaffal

- **Construct a road map** using images from drone footage.
- **Track vehicle trajectories** from drone footage.
- **Integrate vehicle tracking into the constructed map.**

- **LightGlue:**

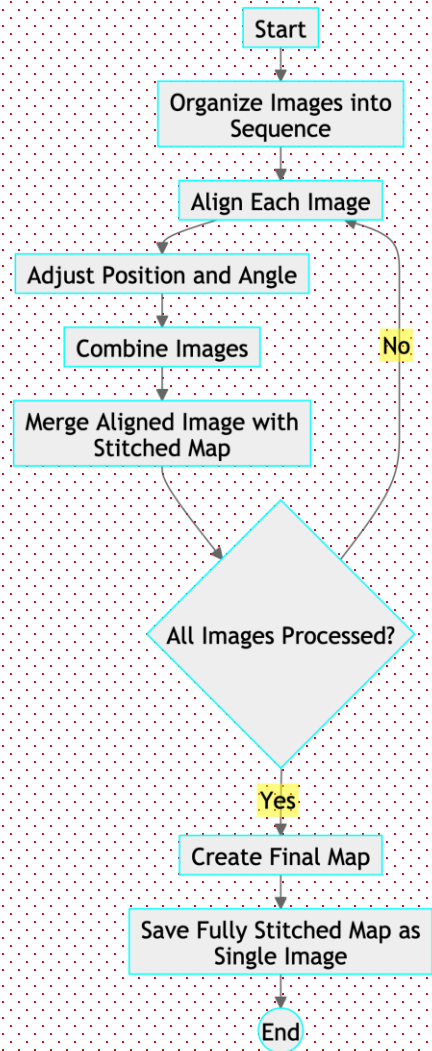


- **BotSort:**



- LaMa:





Methods

Map Creation:

Map Creation:



Feature matching between two selected frames

Map Creation:

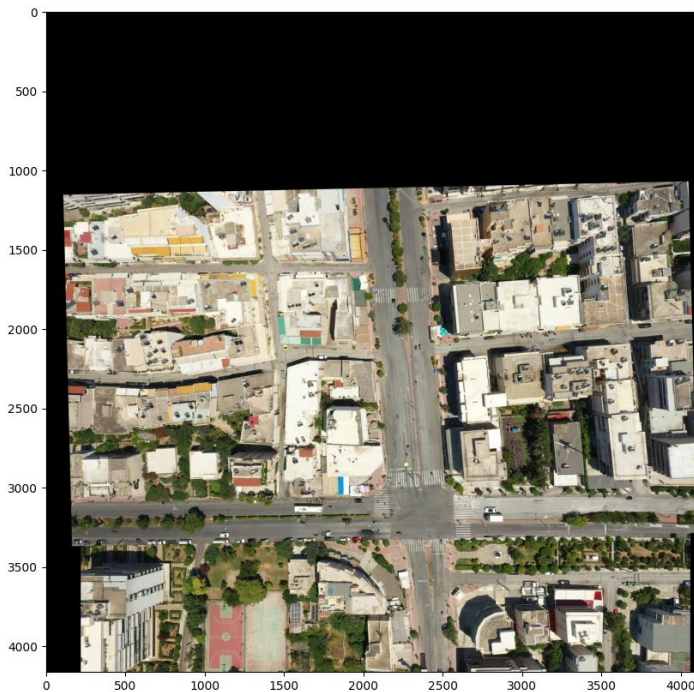


First and second selected frames

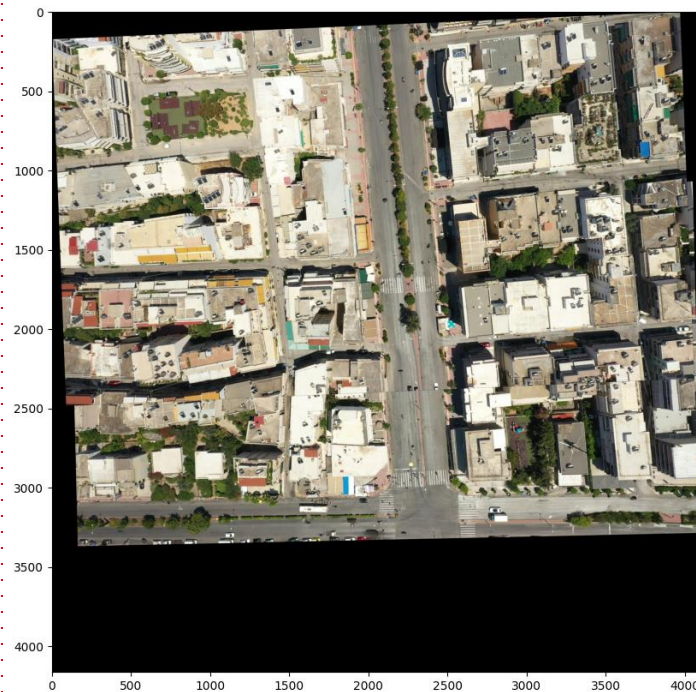


Second and third selected frames

Map Creation:



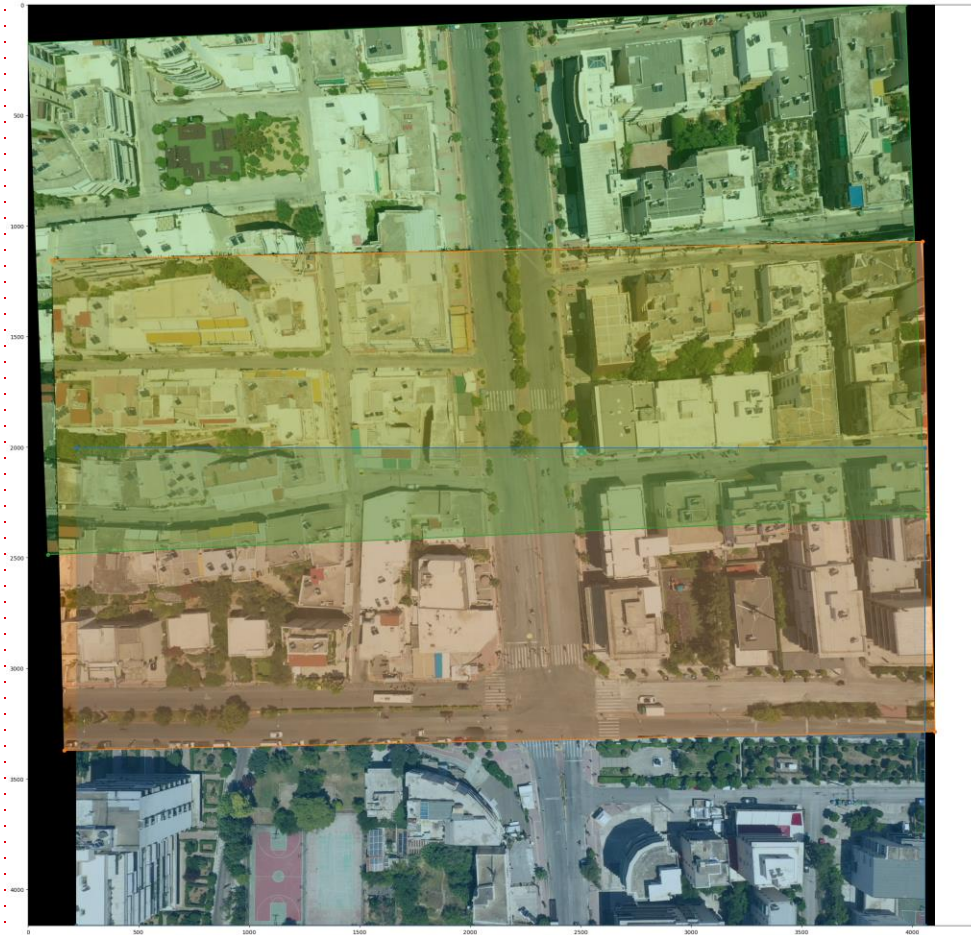
First and second selected frames
with padding added



Second and third selected
frames with padding added

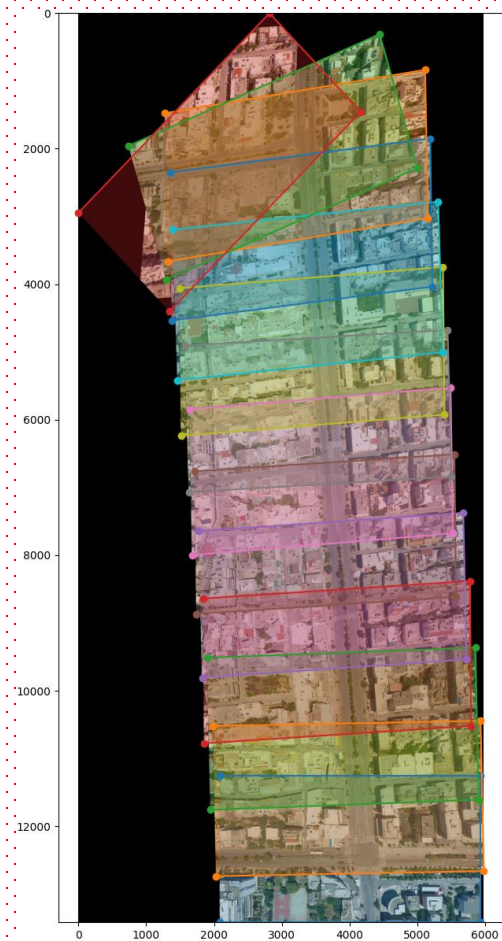
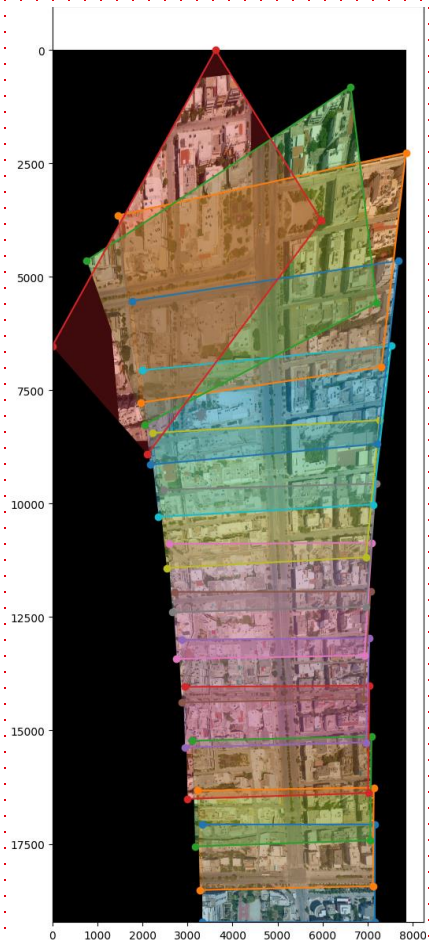
Map Creation:

Merging of both images with padding by applying a mask to detect the zone of interest



Map Creation:

Modifying the 3x3 Transformation Matrice



Map Creation:

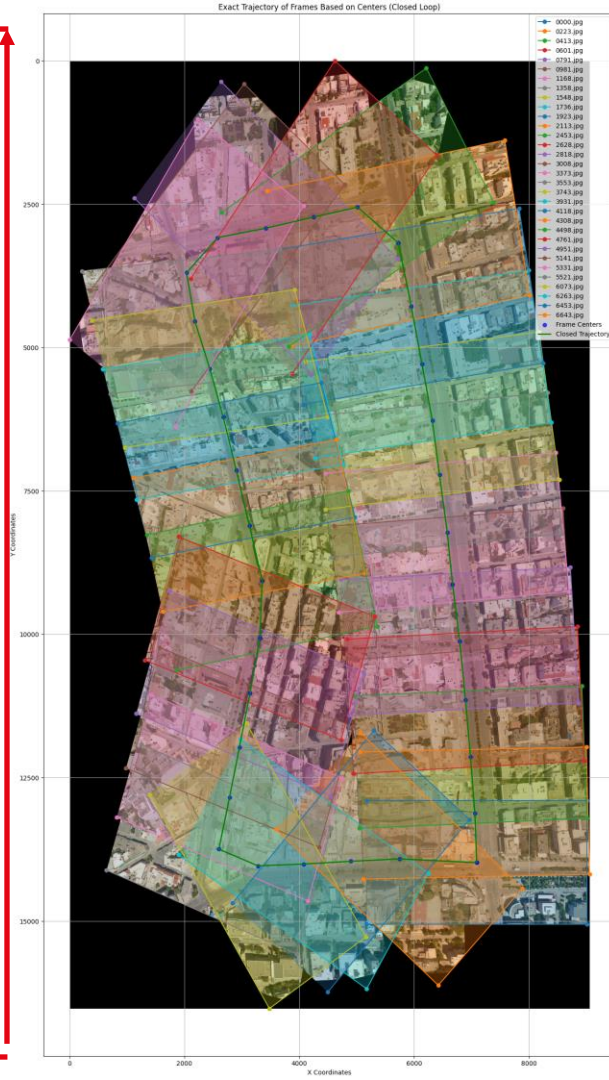
One Way Stitching



Methods

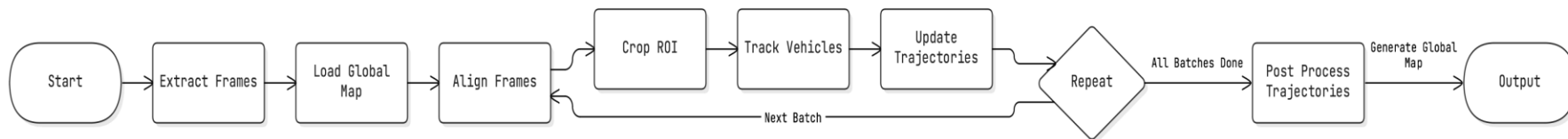
Map Creation:

Two Way Stitching

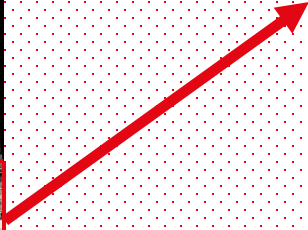


Methods

Vehicle Tracking:



Vehicle Tracking:

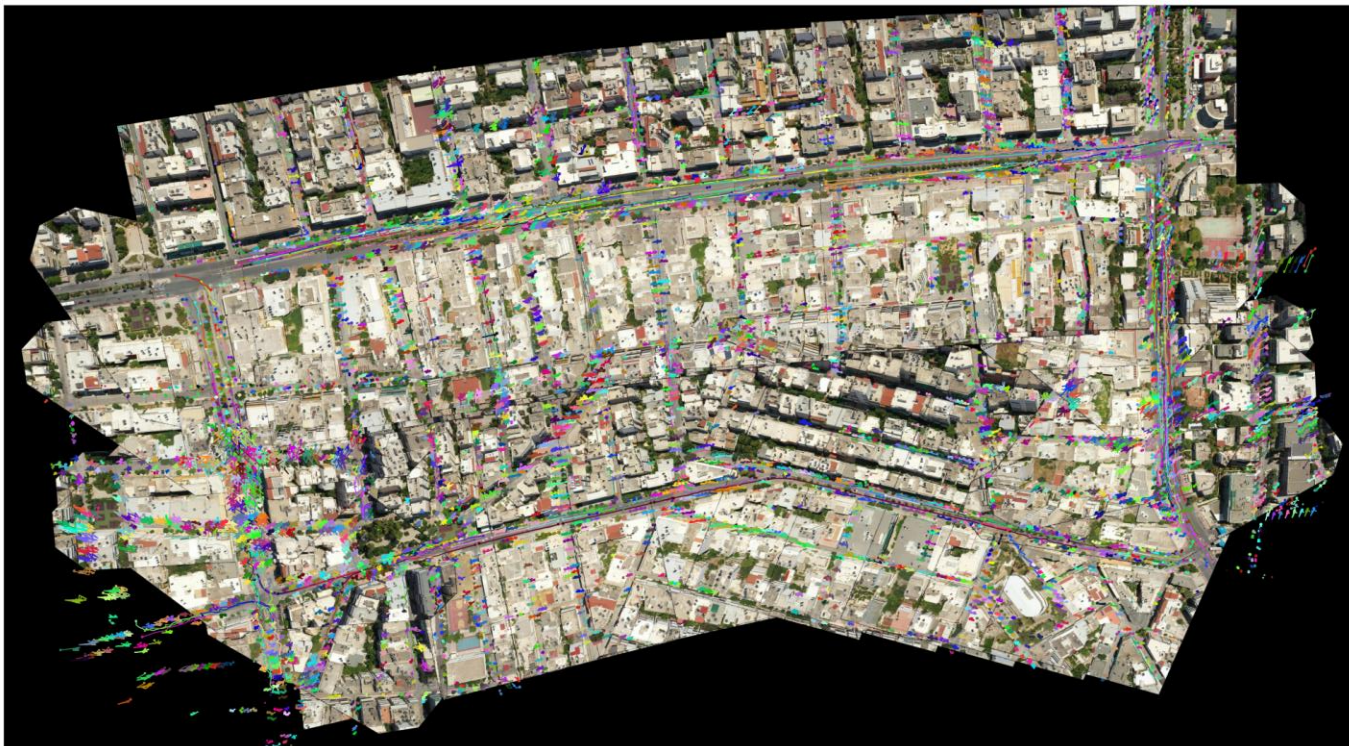




Vehicle Tracking:

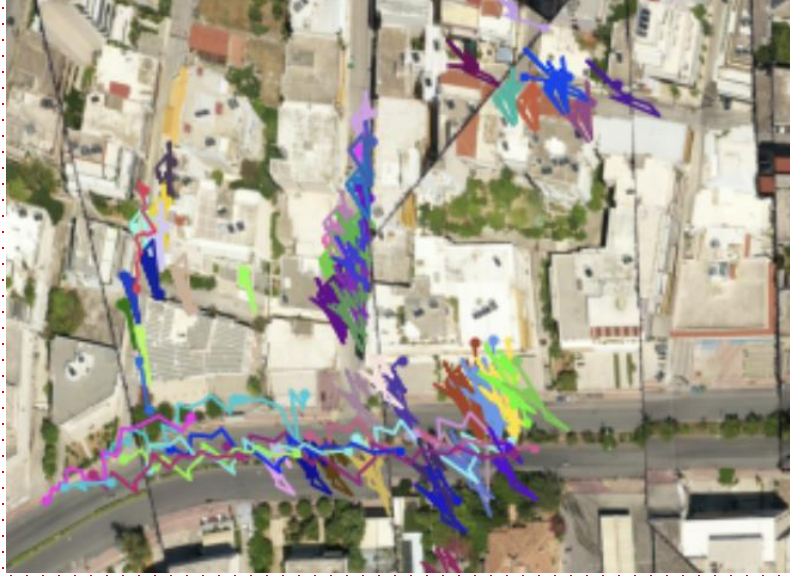
- Select all frames in between with a step size configurable
- Feature matching between those selected frames and the cropped image
- Apply the transformation matrix on the tracked points

Vehicle Tracking:

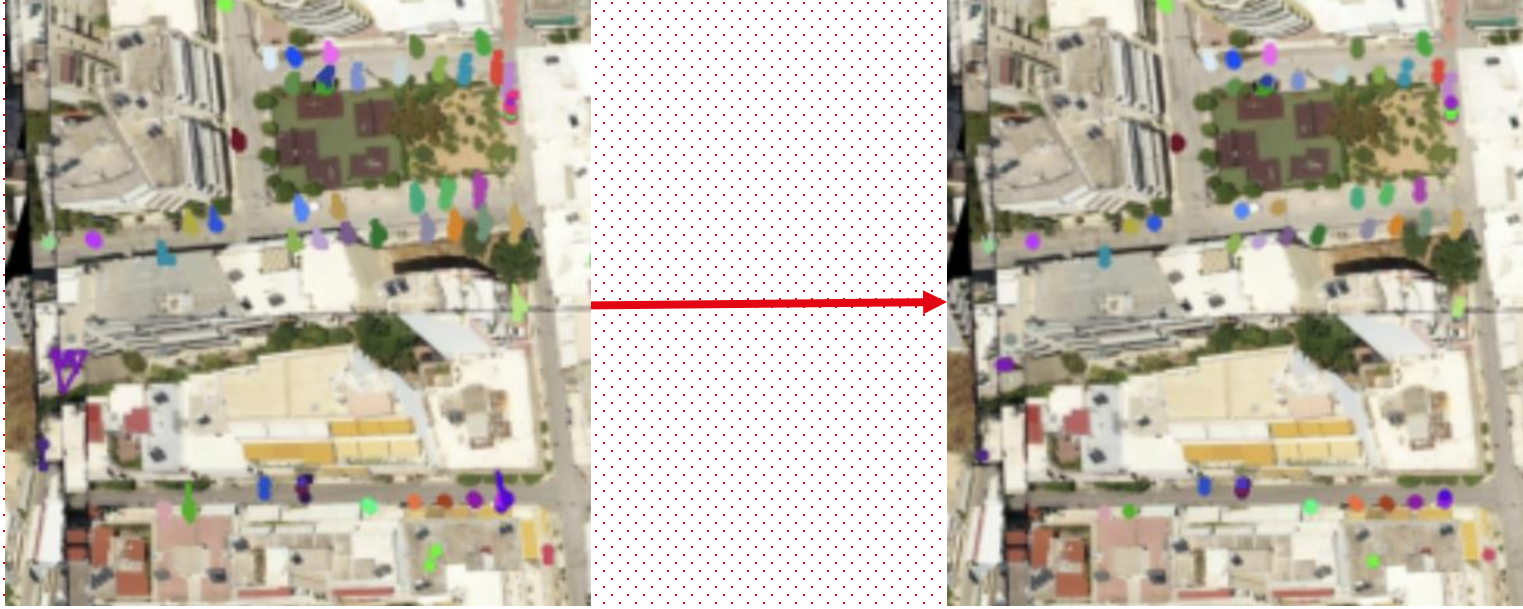


**Before Post
Processing**

Vehicle Tracking:



Vehicle Tracking:



Vehicle Tracking:

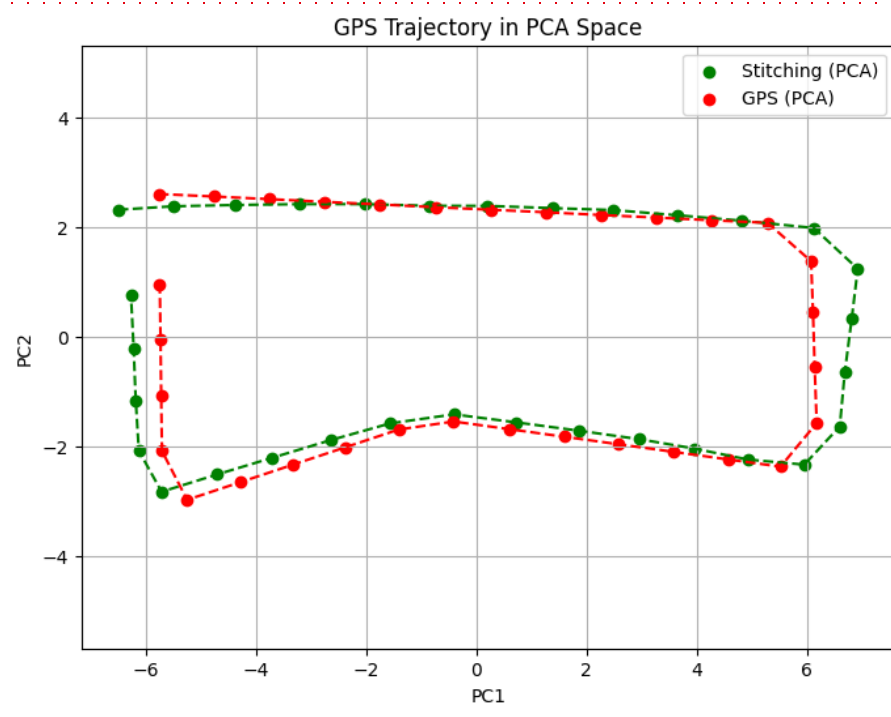


After Post
Processing

■ Stitching:



■ Stitching:



Similarity (MED-based): 98.63%

Similarity (RMSE-based): 98.48%

- Tracking:

By comparing the number of total vehicles tracked with the number of vehicles shown we can have an evaluation metric for tracking

$$Score = \frac{Vehicles_{shown}}{Vehicles_{total}} = \frac{8159}{8550} = 95.42 \%$$

- The map is constructed successfully
- The tracking module is added to the map
- Maybe better performance using OmniGlue (new Library for stitching) ?

