LIO-SAM: Tightly-coupled Lidar Inertial Odometry via Smoothing and Mapping

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A brief intro to LIO-SAM

- A lidar-based simultaneous localization and mapping (SLAM) framework.

- Based on Lidar Odometry and Mapping (LOAM).

- A framework of tightly-coupled lidar inertial odometry via smoothing and mapping

Motivation

Optimize the LOAM method, which suffers from Loop closure detection problem and drift in large-scale tests.
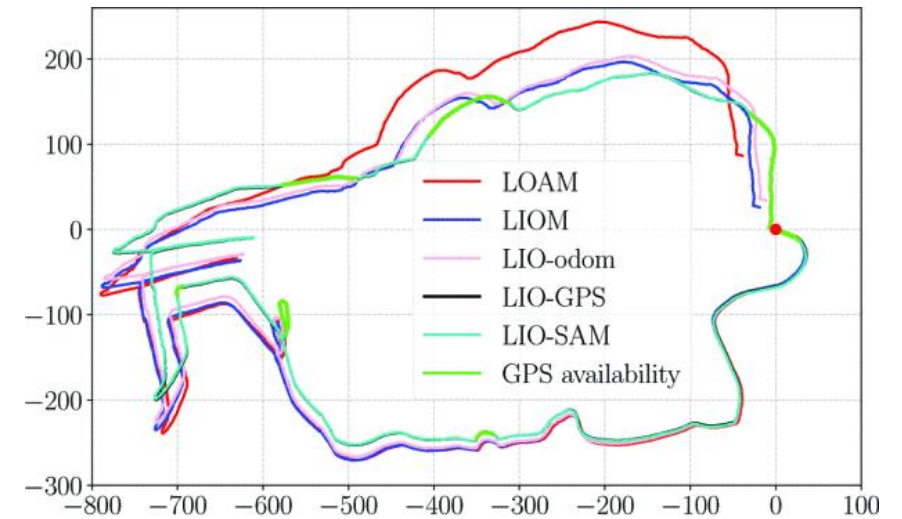
What makes LIO-SAM stand out?

Results comparing with LOAM and LIOM

- More precise and less drift
- Fusion of absolute measurements
- Map correction in real-time
- Fast loop closure detection

(a) Trajectory comparison

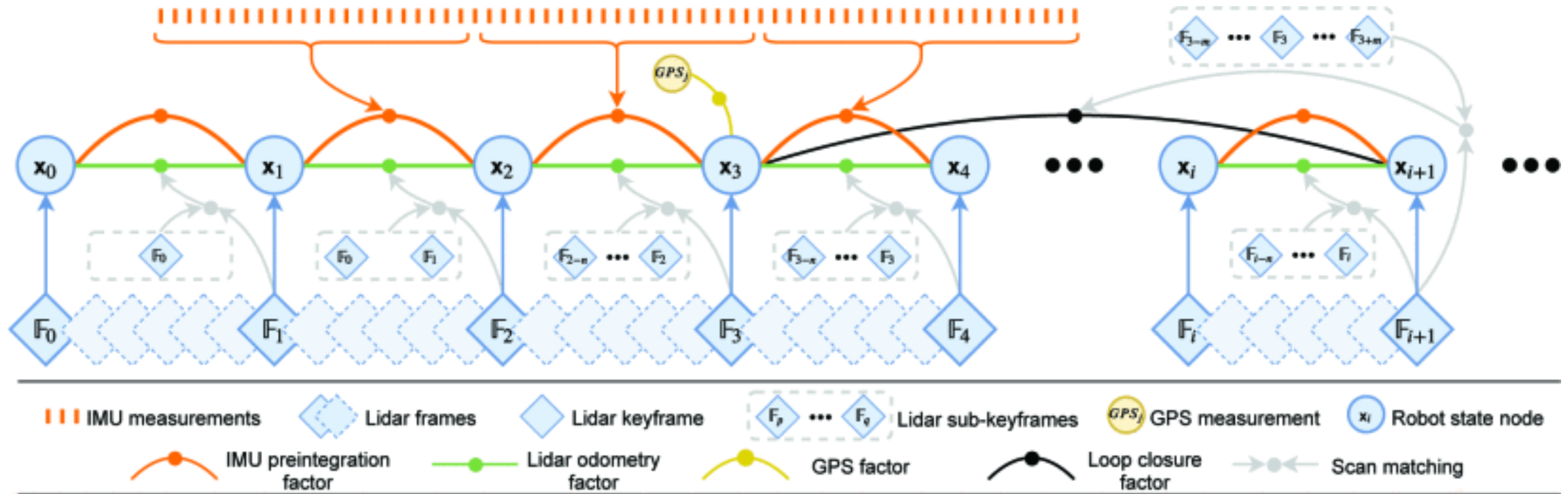| Dataset	LOAM	LIOM	LIO-SAM	Stress test
Rotation	83.6	Fail	41.9	13×
Walking	253.6	339.8	58.4	13×
Campus	244.9	Fail	97.8	10×
Park	266.4	245.2	100.5	9×
Amsterdam	Fail	Fail	79.3	11×

Runtime of mapping for processing one scan (ms)
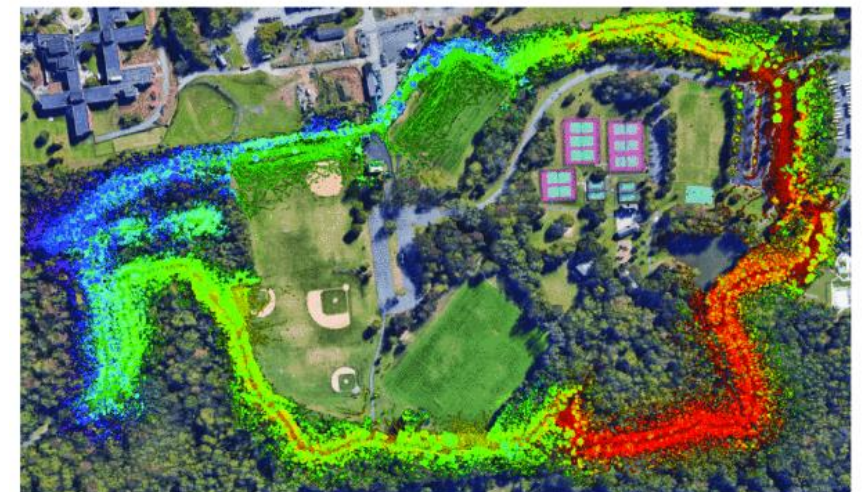
(b) LIO-SAM map aligned with Google Earth

Method explain:

The system structure of LIO-SAM

Thanks for Watching!

Resources of this paper:

[LIO-SAM paper on IEEE](#)

[LIO-SAM experiment results on YouTube](#)

[LIO-SAM framework code on GitHub](#)