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Vehicular Simultaneous Localization and Mapping (SLAM) with Lidar and LTE Fusion

Tech ID: 34085 / UC Case 2019-107-0

BRIEF DESCRIPTION

An innovative approach to vehicle localization and mapping using lidar and cellular LTE data, enhancing accuracy without relying on GNSS signals.

FULL DESCRIPTION

This technology integrates lidar data with pseudoranges from ambient cellular LTE towers, employing an Iterative Closest Point (ICP) algorithm for odometry from lidar scans and a robust feature extraction method. It uses a point registration technique for accurate covariance estimation of odometry errors, enabling precise vehicle localization and mapping in both GNSS-available and GNSS-denied environments through a unique SLAM mode.

SUGGESTED USES

- » Advanced driver-assistance systems (ADAS).
- » Autonomous vehicle navigation and mapping.
- » Mobile mapping systems for urban and indoor environments.
- » Enhanced navigation solutions for ground vehicles in challenging environments.

ADVANTAGES

- » Enhanced localization accuracy using lidar and LTE data fusion.
- » Reliable performance in environments where GNSS signals are unavailable.
- » Efficient feature extraction and point registration for precise mapping.
- » Continuous estimation of cellular transmitter states for improved accuracy.
- » Validation through simulation and experimental results for lane-level localization.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,019,173	06/25/2024	2019-107

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OTHER INFORMATION

CATEGORIZED AS

- » **Communications**
 - » Networking
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- » **Sensors & Instrumentation**
 - » Analytical
 - » Other
 - » Physical Measurement
 - » Position sensors
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