

SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) FOR INDOOR ROBOT NAVIGATION

SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) FOR INDOOR ROBOT NAVIGATION

TECHNICAL DOCUMENTATION AND IP RIGHTS DOCUMENT

NaviFloor Robotics, Inc.

Document Reference: IPR-SLAM-2024-001

Effective Date: January 11, 2024

1. PROPRIETARY TECHNOLOGY OVERVIEW

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1. This document describes the proprietary Simultaneous Localization and Mapping (SLAM) technology developed by the Company.

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2. The SLAM technology described herein encompasses the following core components:

- a) Multi-surface terrain mapping algorithms
- b) Real-time localization processing
- c) Dynamic obstacle avoidance systems
- d) Environmental feature extraction protocols
- e) Path optimization methodologies

2. INTELLECTUAL PROPERTY DECLARATIONS

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1. The Company declares ownership of the following intellectual property related to the technology described herein:

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1.1. Patents:

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US Patent No. 11,234,567: "Method for Real-time Environmental Mapping U

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US Patent No. 11,345,678: "System for Autonomous Robot Navigation in D

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Patent Application No. PCT/US2023/012345: "Multi-Surface Terrain Classifi

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1.2. Trade Secrets:

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Proprietary sensor fusion algorithms

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Custom LiDAR data processing methodologies

- - 3 -

Machine learning training datasets for surface recognition

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Calibration procedures for multi-sensor arrays

3. TECHNICAL SPECIFICATIONS

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1. Core System Architecture:

The SLAM system implements a distributed computing architecture utilizing

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Primary processing unit: NVIDIA Jetson AGX Xavier

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Secondary processing units: Intel NUC11TNKi5

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Sensor array: Velodyne VLP-16 LiDAR, Intel RealSense D455

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Custom-designed circuit boards: NFR-SLAM-001 through NFR-SLAM-004

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2. Performance Parameters:

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Mapping accuracy: $\pm 2.5\text{mm}$ at 10m range

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Localization update rate: 100Hz

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Maximum mapping speed: 2.5m/s

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Environmental feature detection threshold: 98.5%

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Power consumption: 45W nominal

4. IMPLEMENTATION METHODOLOGY

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1. The SLAM system employs the following proprietary methodologies:

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1.1. Initialization Protocol:

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Environmental baseline scanning

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Sensor calibration and synchronization

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Initial position reference establishment

- - 6 -

Feature database population

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1.2. Operational Sequence:

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Continuous environmental scanning

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Real-time feature extraction and matching

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Position estimation and refinement

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Map update and optimization

5. CONFIDENTIALITY AND USAGE RESTRICTIONS

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1. All information contained herein is classified as STRICTLY CONFIDENTIAL

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2. Access to this document is restricted to:

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Authorized Company personnel

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Licensed technology partners

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Legal representatives

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Due diligence professionals under NDA

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3. Unauthorized disclosure, reproduction, or use is strictly prohibited and may

6. WARRANTY AND LIABILITY

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1. The Company makes no warranties, express or implied, regarding the SLAM technology described herein.

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2. Implementation of the SLAM technology must comply with Company-provided specifications.

7. CERTIFICATION AND VALIDATION

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1. The SLAM technology described herein has undergone:

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Internal validation testing

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Third-party safety certification

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Performance verification by TÜV SÜD

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ISO/IEC 27001:2013 compliance audit

8. DOCUMENT CONTROL

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1. This document is controlled under NaviFloor Robotics' ISO 9001:2015 ce

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2. Document History:

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Version 1.0: Initial release (2024-01-11)

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Author: Dr. Elena Kovacs, Chief Research Officer

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Approved by: Marcus Depth, CTO

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Legal Review: Wilson & Associates, LLP

9. EXECUTION

IN WITNESS WHEREOF, the undersigned hereby certifies the accuracy and completeness of this technical documentation.

NAVIFLOOR ROBOTICS, INC.

By:

Dr. Elena Kovacs

Chief Research Officer

Date: January 11, 2024

[CORPORATE SEAL]

