MACHINE LEARNING-BASED SURFACE MATERIAL RECOGNITION SYSTEM

MACHINE LEARNING-BASED SURFACE MA

Technical Documentation and IP Rights

NaviFloor Robotics, Inc.

Document Reference: IP-MLSR-2024-001

Effective Date: January 11, 2024

1. OVERVIEW AND SCOPE

-

1. This document describes the proprietary Machine Learning-Based Surface

-

2. The System comprises the hardware components, software algorithms, tra

2. TECHNICAL SPECIFICATIONS

-

1. **Core Components**

a) Multi-spectral sensor array utilizing 850nm and 1550nm wavelength senso

b) Custom-designed FPGA processing unit (Model NF-2023-X)

c) Proprietary neural network architecture (NaviNet v3.2)

d) Surface material classification database containing 2,500+ material signatures

2. **Processing Architecture**

a) Real-time data processing capability: 120 frames per second

b) Latency: <15ms from capture to classification

c) Power consumption: 12W maximum under full load

d) Operating temperature range: -10°C to 45°C

3. INTELLECTUAL PROPERTY RIGHTS

-

1. **Patents**

-

U.S. Patent No. 11,XXX,XXX: "Method and System for Real-time Surface M

-

U.S. Patent Application No. 17/XXX,XXX: "Advanced Neural Network Arc

-

2. **Proprietary Information**

The following components are maintained as trade secrets:

a) Training dataset compilation methodology

b) Surface material signature preprocessing algorithms

c) Neural network weight optimization techniques

d) Calibration procedures for multi-spectral sensors

4. IMPLEMENTATION AND USAGE

-

1. **Authorized Applications**

The System shall only be implemented in:

a) NaviFloor Series 3000 AMRs

b) NaviFloor Series 4000 AMRs

c) Licensed OEM products as explicitly authorized

-

2. **Usage Restrictions**

The System shall not be:

a) Reverse engineered or decompiled

b) Modified without written authorization

c) Used in non-approved hardware configurations

d) Integrated with third-party navigation systems

5. PERFORMANCE SPECIFICATIONS

1. **Classification Accuracy**

- Overall accuracy: 98.5% under standard conditions
- False positive rate: <0.1%
- Minimum confidence threshold: 95%

2. **Environmental Parameters**

- Ambient light tolerance: 0-50,000 lux
- Humidity range: 10-90% non-condensing

Surface angle deviation tolerance: ±15 degrees

6. CONFIDENTIALITY AND PROTECTION

-

1. All information contained herein is classified as Confidential Information

-

2. Access to System documentation is restricted to:

a) Authorized engineering personnel

b) Designated product development team members

c) Licensed integration partners with executed NDAs

7. MAINTENANCE AND UPDATES

1. The System shall undergo quarterly performance reviews and updates, inc

-

Neural network retraining with expanded datasets

-

Algorithm optimization based on field performance data

-

Hardware firmware updates

-

Classification database expansion

8. COMPLIANCE AND CERTIFICATION

-

1. The System maintains compliance with:

ISO/IEC 27001:2013 Information Security Management

-

UL 1740 Standard for Robot and Robot Equipment

-

CE marking requirements for industrial equipment

9. WARRANTY AND DISCLAIMER

-

1. The Company warrants the System's performance according to the specifi

-

2. THE SYSTEM IS PROVIDED "AS IS" WITHOUT ANY OTHER WAR

EXECUTION

IN WITNESS WHEREOF, this document has been executed by the authoriz

representatives of NaviFloor Robotics, Inc.

By:

Name: Dr. Elena Kovacs

Title: Chief Research Officer

Date: January 11, 2024

By:

Name: Marcus Depth

Title: Chief Technology Officer

Date: January 11, 2024