DEEP LEARNING MODEL FOR SURFACE RECOGNITION

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TECHNICAL SPECIFICATION AND IP DOCUMENT

NaviFloor Robotics, Inc.

Document Version: 2.3

Last Updated: January 11, 2024

Classification: CONFIDENTIAL

1. OVERVIEW AND SCOPE

1. This document describes the proprietary deep learning model ("Surface Re

2. The Model constitutes protected intellectual property of the Company and

2. TECHNICAL SPECIFICATIONS

1. Model Architecture

Primary Framework: TensorFlow 2.4

Architecture Type: Convolutional Neural Network (CNN) with custom atten

Input Channels: LiDAR point cloud data, RGB-D sensor feeds

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Output Classes: 16 distinct surface classifications

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2. Core Components

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Surface Pattern Recognition Module (SPRM-v3.2)

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Dynamic Terrain Mapping Engine (DTME-2024)

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Real-time Environmental Analysis System (REAS)

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Adaptive Navigation Decision Framework (ANDF)

3. Performance Metrics

- Surface Classification Accuracy: 99.7%
- Real-time Processing Latency: <5ms
- Environmental Adaptation Time: <100ms
- Memory Footprint: 245MB

3. INTELLECTUAL PROPERTY PROTECTION

- 1. Patent Status

U.S. Patent Application No. 17/234,567

- Filing Date: March 15, 2023
- Status: Pending
- Priority Claim: Provisional Application No. 63/198,765

- 2. Trade Secret Protection

The following components are maintained as trade secrets:

- Training data preprocessing algorithms
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Surface feature extraction methodologies

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Weight optimization techniques

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Environmental adaptation parameters

4. DEVELOPMENT HISTORY

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1. Original Development

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Development Initiated: June 2019

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Principal Developers: Dr. Elena Kovacs, Marcus Depth

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Initial Release: v1.0 (February 2020)

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2. Major Iterations

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v2.0: Enhanced surface pattern recognition (July 2021)

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v2.5: Integration of marine technology algorithms (January 2022)

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v3.0: Multi-surface adaptive capabilities (September 2022)

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v3.2: Current production version (December 2023)

5. IMPLEMENTATION REQUIREMENTS

1. Hardware Requirements

- Minimum Processing Power: 4.5 TFLOPS

- RAM: 16GB

- Dedicated Neural Processing Unit: NaviFloor NPU-2000 or equivalent

- Sensor Suite: NaviFloor Sensor Array v3.0

- 2. Software Dependencies

- NaviFloor Core Framework v4.2

CUDA 11.4 or higher

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Custom runtime environment (NF-Runtime v2.3)

6. CONFIDENTIALITY AND ACCESS CONTROL

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1. Access Classifications

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Level 1: Model deployment parameters

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Level 2: Training methodologies

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Level 3: Core algorithms and architecture

Level 4: Source code and training data

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2. Security Measures

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Encryption: AES-256 for stored components

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Access Logging: Mandatory for all interaction levels

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Authentication: Multi-factor, role-based access control

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Audit Trail: Continuous monitoring and logging

7. LICENSING AND USAGE RESTRICTIONS

1. Internal Use

- Limited to Company employees and authorized contractors
- Subject to signed confidentiality agreements
- Usage monitoring and tracking required

2. External Distribution

- Prohibited without written authorization
- Customer access limited to compiled binaries

No reverse engineering permitted

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Usage restricted to authorized NaviFloor AMR platforms

8. CERTIFICATION AND COMPLIANCE

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1. Standards Compliance

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ISO/IEC 27001:2013

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IEC 61508 SIL 2

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CE Marking requirements

RoHS 3 (EU 2015/863)

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2. Testing and Validation

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Continuous integration testing

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Monthly security audits

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Quarterly performance validation

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Annual compliance review

9. LEGAL NOTICES

DOCUMENT CONTROL

Document Owner: Legal Department

Technical Reviewer: Dr. Elena Kovacs

Legal Reviewer: Jonathan Marshall, Esq.

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[INTERNAL USE ONLY]

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