3D POINT CLOUD PROCESSING FOR FLOOR TYPE DETECTION

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Technical Documentation and IP Rights

PROPRIETARY & CONFIDENTIAL

NaviFloor Robotics, Inc.

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1. OVERVIEW AND SCOPE

1. This document describes the proprietary technology and methodolo

2. The intellectual property described herein is protected under U.S. P

2. TECHNICAL SPECIFICATIONS

1. **Data Acquisition System**

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LiDAR sensor array configuration: 16-beam vertical resolution

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Scanning frequency: 20Hz nominal

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Point cloud density: Minimum 2,000 points/m at 5m range

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Vertical field of view: 30 (+15 to -15)

Distance accuracy: 2cm at 20m range

2. **Processing Architecture**

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Real-time point cloud segmentation using proprietary NaviScan(TM) a

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Multi-threaded processing on edge computing hardware

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Maximum latency: 50ms from scan to classification

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Memory footprint: 256MB per processing instance

3. PROPRIETARY ALGORITHMS

1. **Surface Normal Extraction**

The system employs Company's patented adaptive neighborhood sel
for robust normal vector estimation, specifically optimized for industria
surfaces.

2. **Feature Detection**

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Geometric feature extraction using modified RANSAC implementation

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Surface roughness quantification using proprietary metrics

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Material property inference from reflection intensity data

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Dynamic threshold adaptation based on environmental conditions

3. **Classification Engine**

Protected machine learning model incorporating:

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Supervised learning on labeled industrial surface types

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Real-time classification updates at 10Hz

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Minimum classification accuracy of 98% under specified conditions

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Support for 12 distinct surface type categories

4. INTELLECTUAL PROPERTY RIGHTS

1. All algorithms, methodologies, and implementations described here

2. **Protected Components**

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NaviScan(TM) point cloud processing pipeline

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Adaptive surface normal estimation algorithm

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Dynamic feature extraction methodology

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Classification model architecture and weights

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Training data preprocessing techniques

3. **Trade Secrets**

The following elements are maintained as trade secrets:

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Parameter optimization techniques

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Training data augmentation methods

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Model architecture modifications

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Performance optimization strategies

5. USAGE RESTRICTIONS

1. This technology shall only be used in Company-authorized product

2. No reverse engineering, decompilation, or modification of any prote

3. Usage metrics and performance data are automatically collected ar

6. COMPLIANCE AND CERTIFICATION

1. The technology complies with:

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ISO/IEC 27001:2013 Information Security Management

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IEC 61508 Functional Safety Standard

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ANSI/RIA R15.06-2012 Industrial Robot Safety

2. **Performance Validation**

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Quarterly validation testing required

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Minimum accuracy metrics must be maintained

Compliance logging and reporting mandatory

7. WARRANTY AND DISCLAIMER

1. The Company warrants that the technology will perform substantial

2. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS O

8. CONFIDENTIALITY

1. This document contains confidential and proprietary information of

2. Distribution limited to authorized personnel under NDA only.

EXECUTION

IN WITNESS WHEREOF, the undersigned acknowledges the confide
document and agrees to maintain its confidentiality.

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NAVIFLOOR ROBOTICS, INC.

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Title: Chief Research Officer

**Date:** _

RECIPIENT:

**By:** _

**Name:** _
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Title: - 10 -

Date: _

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