

LIDAR-BASED EDGE DETECTION IN VARIABLE LIGHT CONDITIONS

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TECHNICAL DISCLOSURE AND INTELLECTUAL PROPERTY DOCUMENT

NaviFloor Robotics, Inc.

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2. TECHNICAL OVERVIEW

2.1 Technology Description

The disclosed technology relates to advanced LiDAR-based edge detection systems specifically designed for autonomous mobile robots (AMRs) operating in various light conditions. The system employs proprietary algorithms for real-time surface analysis and edge detection across multiple environmental contexts.

2.2 Core Components

- Multi-beam LiDAR array configuration (Patent Pending, US App. No. 17/X)

- - 2 -

Adaptive gain control system for variable light compensation

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Real-time edge detection processing unit

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Environmental condition monitoring subsystem

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Surface characteristic analysis module

3. TECHNICAL SPECIFICATIONS

3.1 Operating Parameters

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Scanning frequency: 20-120 Hz (adaptive)

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Detection range: 0.05m - 25m

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Angular resolution: 0.1° - 0.5° (configurable)

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Light condition operating range: 0.1 - 100,000 lux

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Processing latency: <5ms

3.2 Performance Metrics

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Edge detection accuracy: 99.7% in standard conditions

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False positive rate: <0.1%

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Surface type identification reliability: 98.5%

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Real-time adjustment capability: 1000 updates/second

4. INTELLECTUAL PROPERTY CLAIMS

4.1 Protected Elements

The following elements are subject to intellectual property protection:

- a) Adaptive gain control methodology for variable light compensation
- b) Multi-surface characterization algorithms
- c) Real-time edge detection processing architecture
- d) Environmental condition compensation protocols
- e) System integration methodology

4.2 Patent Status

- - 5 -

Primary Patent Application: US 17/XXX,XXX (filed March 15, 2022)

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PCT Application: PCT/US2022/XXXXXX

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Related Applications: EP22XXXXXX.X

5. IMPLEMENTATION SPECIFICATIONS

5.1 Hardware Requirements

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Dedicated FPGA processing unit

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Minimum 3 LiDAR sensors (Model NF-L350 or equivalent)

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Environmental sensor array

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Real-time processing module

5.2 Software Architecture

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Core detection algorithm (v4.2.1)

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Environmental compensation module (v2.1.0)

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Surface analysis framework (v3.0.2)

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System integration layer (v2.5.0)

6. TRADE SECRET PROTECTION

6.1 Confidential Elements

The following elements are maintained as trade secrets:

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Calibration methodologies

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Surface type classification algorithms

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Environmental compensation coefficients

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System integration protocols

6.2 Protection Measures

All trade secret elements are subject to:

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Access control protocols (Level 3 security)

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Employee confidentiality agreements

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Vendor non-disclosure agreements

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Segmented knowledge distribution

7. DEVELOPMENT HISTORY

7.1 Version Control

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Initial Development: March 2020

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Beta Testing: January 2021

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Production Release: September 2021

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Current Version: 4.2.1 (December 2023)

7.2 Contributors

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Principal Inventor: Dr. Marcus Depth

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Development Team: NaviFloor Advanced Systems Group

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External Consultants: [REDACTED]

8. LEGAL NOTICES

8.1 Ownership

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9. CERTIFICATION

The undersigned hereby certifies that this technical disclosure accurately represents the intellectual property of NaviFloor Robotics, Inc. as of the date indicated below.

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By: _

Dr. Marcus Depth

Chief Technology Officer

NaviFloor Robotics, Inc.

Date: December 15, 2023

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10. DOCUMENT CONTROL

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