

Neural Network Optimization Patent Filing

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Nexus Intelligent Systems, Inc.

1. PRELIMINARY PATENT DISCLOSURE

1.1 Patent Identification

Patent Title: Adaptive Neural Network Optimization Method for Predictive Industrial Diagnostics

Patent Application Serial Number: NIS-2024-PA-0037

Inventor(s): Dr. Elena Rodriguez, Michael Chen

Filing Date: January 22, 2024

1.2 Technical Field

This patent filing relates to advanced machine learning architectures specifically designed for real-time predictive maintenance and diagnostic optimization in industrial enterprise environments, with particular emphasis on dynamic neural network recalibration techniques.

2. TECHNICAL SPECIFICATION

2.1 Invention Summary

The disclosed invention provides a novel neural network optimization methodology that enables:

- Autonomous performance recalibration of machine learning diagnostic models
- Real-time adaptive learning across heterogeneous industrial sensor networks
- Predictive maintenance algorithm self-correction with minimal human intervention

2.2 Technical Characteristics

The patent encompasses a proprietary algorithmic approach featuring:

- Multi-dimensional feature extraction mechanisms
- Probabilistic error correction protocols
- Autonomous model retraining capabilities
- Scalable computational architecture

3. INTELLECTUAL PROPERTY CLAIMS

3.1 Primary Claims

A method for dynamically optimizing neural network performance in industrial diagnostic systems, comprising:

- Continuous sensor data ingestion
- Probabilistic error detection
- Autonomous model recalibration
- Performance threshold monitoring

A computational system for adaptive machine learning model optimization, characterized by:

- Distributed computational architecture
- Real-time learning capability
- Autonomous error correction mechanisms

3.2 Derivative Claims

Additional patent claims include specific implementations across:

- Manufacturing predictive maintenance
- Energy infrastructure monitoring
- Transportation system diagnostics
- Critical infrastructure resilience modeling

4. TECHNICAL IMPLEMENTATION DETAILS

4.1 Algorithmic Architecture

The proposed neural network optimization methodology utilizes a multi-layered computational approach:

- Primary neural network layer
- Adaptive learning middleware
- Autonomous recalibration protocol
- Performance monitoring subsystem

4.2 Computational Requirements

Minimum system specifications for implementation:

- High-performance distributed computing infrastructure
- Minimum 128 GB RAM
- GPU-accelerated processing capabilities

- Low-latency network connectivity

5. COMPETITIVE DIFFERENTIATION

5.1 Unique Technical Advantages

- 37% faster model retraining compared to existing solutions
- 92% predictive accuracy in complex industrial environments
- Minimal computational overhead
- Vendor-agnostic sensor integration

6. LEGAL PROTECTIONS

6.1 Confidentiality

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6.2 Patent Pending Status

All described methodologies are patent pending under United States Patent and Trademark Office regulations.

7. EXECUTION

7.1 Inventor Certification

We hereby certify that the technical descriptions and claims contained herein represent original intellectual work, developed exclusively by Nexus Intelligent Systems, Inc.

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Date: January 22, 2024