PATENT DRAFT: INTELLIGENT SYSTEMS PREDICTIVE MAINTENANCE ARCHITECTURE

CONFIDENTIAL DOCUMENT

NEXUS INTELLIGENT SYSTEMS, INC.

Patent Application No. NIS-2024-PA-001

1. TECHNICAL FIELD

1 This patent application relates to an advanced predictive maintenance architecture utilizing artificial intelligence and machine learning algorithms for real-time industrial system diagnostics and prognostic modeling.

2 The invention specifically encompasses a novel method and system for integrating multi-dimensional sensor data streams with adaptive machine learning models to predict equipment failure probabilities and optimize maintenance interventions.

2. BACKGROUND OF THE INVENTION

1 Existing predictive maintenance technologies suffer from significant limitations:

a) Inability to process complex, multi-variable sensor data in real-time

b) Limited predictive accuracy across diverse industrial environments

c) High computational overhead and latency in diagnostic processing

2 Current industry solutions require substantial manual configuration and lack adaptive learning capabilities, resulting in:

- Increased operational downtime
- Inefficient maintenance scheduling
- Substantial economic losses from unexpected equipment failures

3. SUMMARY OF THE INVENTION

1 The present invention provides a comprehensive intelligent systems architecture that:

- Integrates heterogeneous sensor data streams
- Employs advanced machine learning algorithms

- Generates probabilistic equipment failure predictions
- Enables proactive maintenance scheduling

2 Key Innovation Components:

a) Adaptive Neural Network Diagnostic Engine

b) Multi-Dimensional Data Normalization Protocol

c) Real-Time Anomaly Detection Framework

4. DETAILED DESCRIPTION

1 System Architecture Overview

The proposed system comprises interconnected modules designed to process, analyze, and predict equipment performance characteristics through a sophisticated machine learning infrastructure.

2 Data Ingestion and Preprocessing

- Standardized sensor data collection protocols
- Multi-dimensional data normalization
- Automated feature extraction and transformation

3 Predictive Modeling Methodology

a) Recursive Neural Network Configuration

b) Bayesian Probabilistic Inference Modeling

c) Continuous Model Retraining Mechanism

4 Diagnostic Output Generation

- Failure probability calculations
- Recommended maintenance interventions
- Confidence interval assessments

5. CLAIMS

1 Primary Claims

A method for predictive maintenance utilizing adaptive machine learning architectures

A system for real-time industrial equipment diagnostic processing

A computer-implemented technique for probabilistic failure prediction

2 Unique Technological Contributions

- Novel multi-dimensional data integration approach
- Advanced recursive learning algorithms
- Automated maintenance recommendation generation

6. PATENT DRAWINGS AND TECHNICAL SPECIFICATIONS

1 Accompanying technical drawings and schematics are incorporated by reference, detailing:

- System block diagrams
- Data flow architectures
- Algorithmic process flows

7. LEGAL DISCLAIMERS

1 Confidentiality

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2 Patent Pending Status

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8. INVENTOR CERTIFICATION

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