ANOMALY DETECTION SYSTEM PATENT CN113678901

Patent Registration Certificate

Chinese Patent Office Registration No. CN113678901

1. PATENT DETAILS

1. **Patent Title**: "System and Method for Real-Time Anomaly Detection in Industrial Control Networks Using Deep Learning"

2. **Patent Number**: CN113678901

3. **Filing Date**: March 22, 2019

4. **Grant Date**: September 15, 2021

5. **Patent Owner**: DeepShield Systems, Inc.
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2. TECHNICAL ABSTRACT

The invention relates to an advanced anomaly detection system specifically designed for industrial control networks and operational technology (OT) environments. The system employs a novel deep learning architecture that combines convolutional neural networks (CNNs) and long short-term memory (LSTM) networks to detect anomalous behavior in real-time network traffic patterns. The system is particularly adapted for SCADA networks and industrial automation systems, incorporating specialized preprocessing modules for industrial protocol analysis.

3. PROTECTED CLAIMS

1. A system for detecting anomalies in industrial control networks, comprising:

a) A network traffic capture module configured to collect data from industrial control system protocols;

b) A deep learning preprocessing engine that normalizes and segments captured network data;

c) A hybrid neural network architecture combining:

- A convolutional neural network for spatial feature extraction
- An LSTM network for temporal pattern analysis

d) A real-time classification module for anomaly detection

e) An alert generation system with configurable severity levels

2. The method of claim 1, wherein the system further comprises:

a) Protocol-specific parsing modules for industrial protocols including:

- Modbus
- DNP3
- EtherNet/IP
- Profinet

b) Adaptive learning mechanisms for continuous model improvement

c) Automated response triggers for critical security events

4. TECHNICAL SPECIFICATIONS

1. **Architecture Components**:

- Data ingestion layer with support for multiple industrial protocols
- Feature extraction module with industrial-specific preprocessing
- Neural network training module with transfer learning capabilities
- Real-time inference engine
- Alert management system

2. **Performance Parameters**:

- Maximum latency: 50ms
- Minimum accuracy: 99.95%

- False positive rate: <0.01%
- Processing capacity: 100,000 events per second

5. TERRITORIAL COVERAGE

1. This patent provides protection in the following jurisdictions:

- People's Republic of China (Primary Registration)
- Hong Kong SAR
- Macau SAR

2. Related patent applications pending in:

- United States (US2019/0456789)
- European Union (EP3567890)
- Japan (JP2019-567890)

6. MAINTENANCE AND RENEWAL

1. **Renewal Schedule**:

- First renewal fee due: September 15, 2024
- Subsequent renewals: Every five years
- Maximum term: 20 years from filing date

2. **Maintenance Requirements**:

- Annual technical documentation updates
- Usage reporting to Chinese Patent Office
- Local agent representation maintenance

7. LEGAL NOTICES

1. **Confidentiality**:

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2. **Ownership Rights**:

All rights, title, and interest in this patent are exclusively owned by DeepShield Systems, Inc., including all improvements, modifications, and derivative works.

8. CERTIFICATION

The undersigned hereby certifies that this is a true and accurate copy of Patent CN113678901 as registered with the Chinese Patent Office.

EXECUTED this 15th day of September, 2021

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