

SEMINAR PRESENTATION
ON
Securing the Unseen: Real-Time IoT Device Security Monitoring

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Introduction to IoT

- Network of interconnected smart devices
- Used in homes, industries, healthcare, and more
- Communicates over the internet autonomously



Growth of IoT Ecosystem

- Billions of devices deployed globally
- Increasing automation in daily life
- Expanding attack surface for hackers



Key Features

- Real-time traffic inspection and analysis
- ML-driven anomaly detection
- Signature-based threat identification
- Alert notifications (email, SMS, webhook)
- Automated response actions



Technologies Used

- **Language** - Python, Node.js, HTML, CSS, JavaScript.
- **Network Tools** - Zeek, Suricata, tcpdump, WireShark.
- **Machine Learning** - scikit-learn, TensorFlow, Isolation Forest.
- **Supported Protocols** - MQTT, CoAP, HTTP, Zigbee, UPnP

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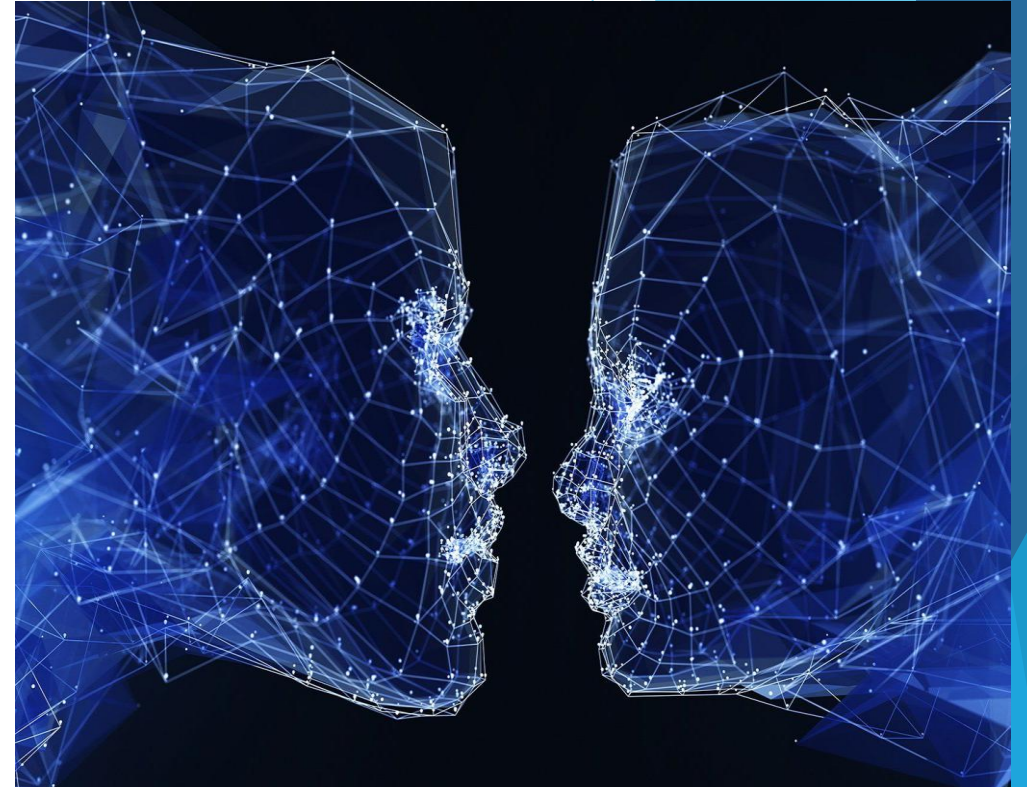
Why IoT Security Matters

- Devices handle sensitive data
- Compromise can impact safety and privacy
- Weak security can enable large-scale attacks



Challenges in IoT Security

- Limited processing capabilities
- Lack of standard security guidelines
- Weak Authentication & Authorization
- Poor manufacturer support
- Data Privacy Issues



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Benefits in IoT Security

1. Early Threat Detection

- Identifies suspicious behavior or attacks

2. Enhanced Data Privacy

- Protects sensitive user and system data from tampering or leaks

3. Continuous Protection

Protection Ensures that even unattended



Real-World Applications

Smart Homes

Detect compromised smart TVs or locks.

Smart Cities

- Monitor traffic systems, public Wi-Fi routers, and surveillance cameras

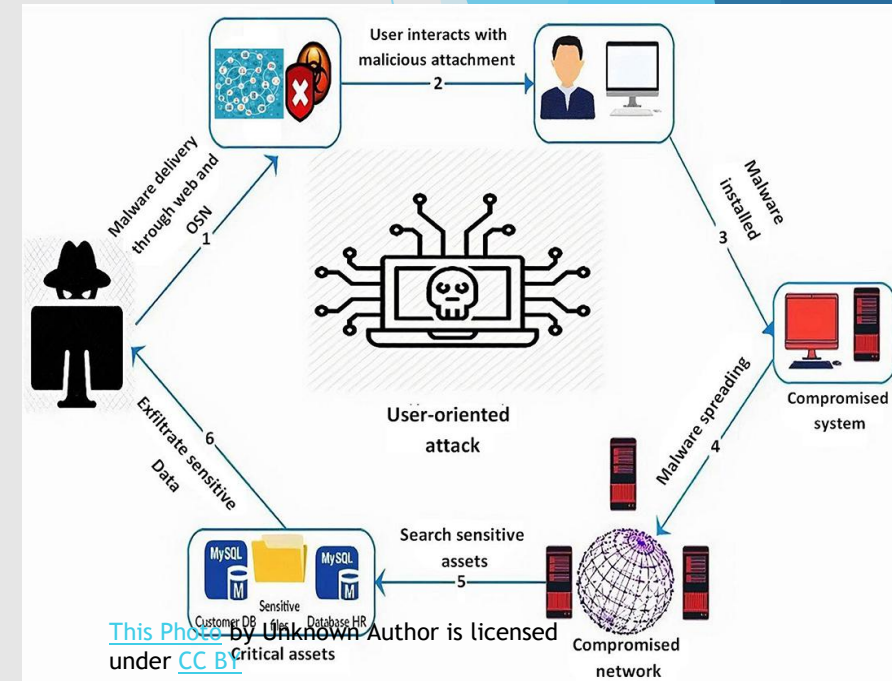
Industrial IoT

- Secure SCADA systems and PLCs



Common IoT Vulnerabilities

- Weak/default passwords
- Unpatched firmware
- Unencrypted network communication
- Third-Party Component Risks
- Physical Access Vulnerabilities



Future of Enhancements

1

Blockchain Authentication

Ensure tamper-proof device identity

2

Federated Learning

Train ML models without sharing raw data

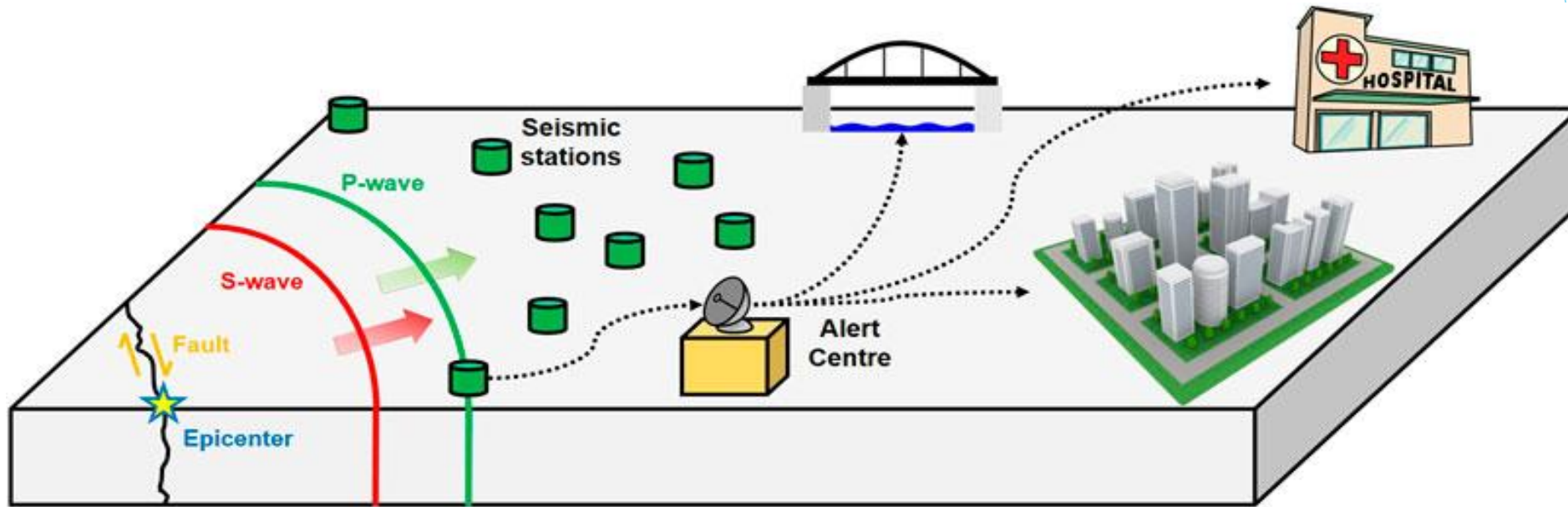
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Threat Intelligence Feeds

Integrate with sources like AlienVault OTX



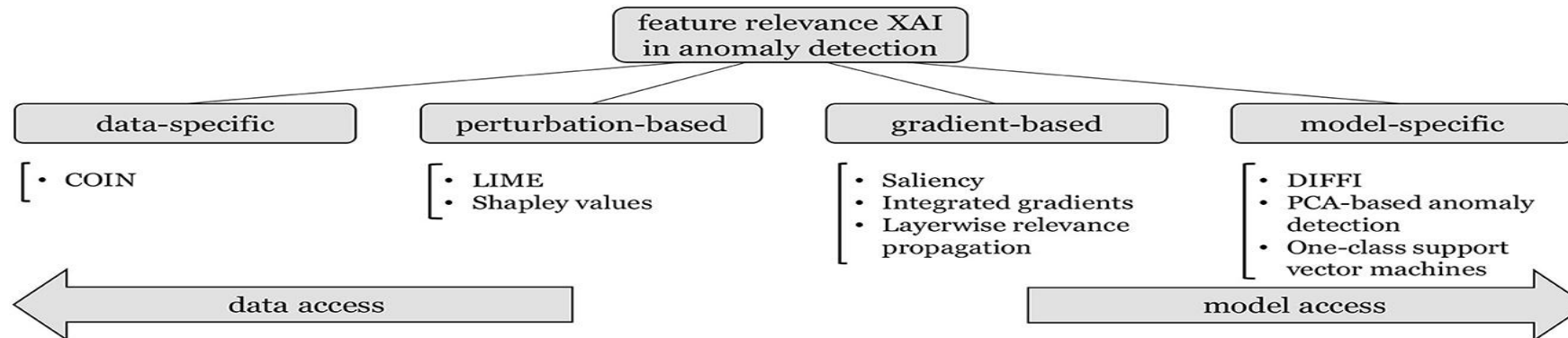
Alerting and Automated Response



- ▶ Immediate administrator notification
- ▶ Immediate administrator notification
- ▶ Automated blocking of malicious traffic

Anomaly Detection Techniques

- ✓ Rule-based detection
- ✓ Signature-based patterns
- ✓ Machine learning algorithms



Security Dashboards



- Visual representation of alerts
- Track device health and status
- Provides risk insights to administrators

Conclusion

1. Real-time monitoring reduces hidden threats
2. Essential for continuous device safety
3. Future innovations will enhance resilience



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Thank You!