Jake Farber, Ph.D.
Research Scientist

December 3 - 5, 2024

Technologies for Advanced Remote Monitoring

Plant Modernization Pathway Stakeholder Engagement Meeting

Advanced Remote Monitoring for Operational Readiness (ARMOR)

- Research and develop **advanced monitoring and inspection tools** to support the current fleet of nuclear power plants in reducing operational costs and preventing unnecessary shutdowns

- These tools integrate diverse sensor data with algorithms and artificial intelligence

- Benefits include early problem detection, condition-based maintenance, and reduced operator workload

- This presentation covers:

  - Automated process anomaly detection

  - Automated gauge reading

  - Automated fire watch

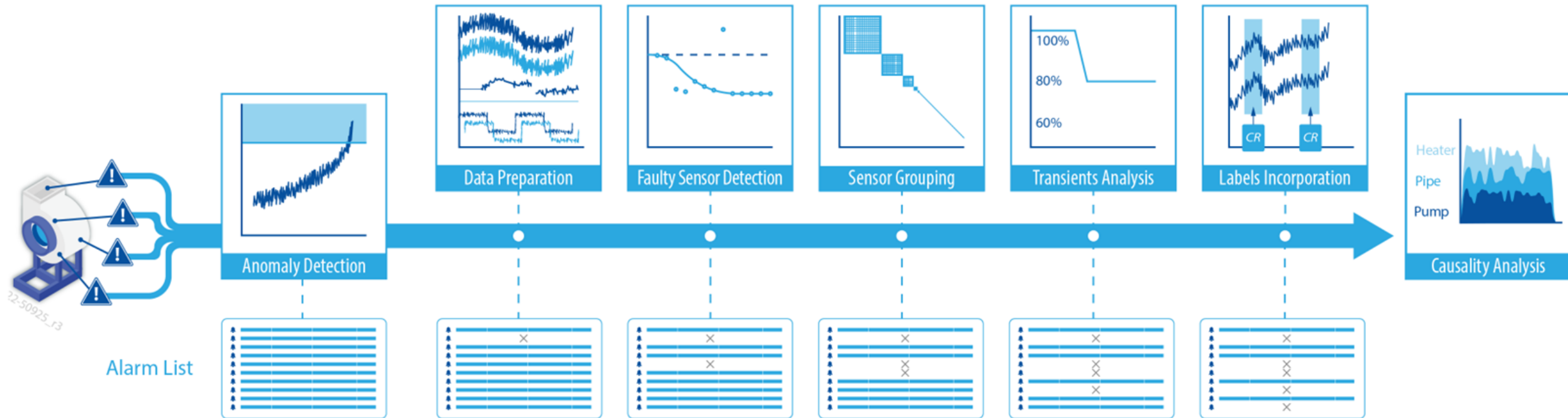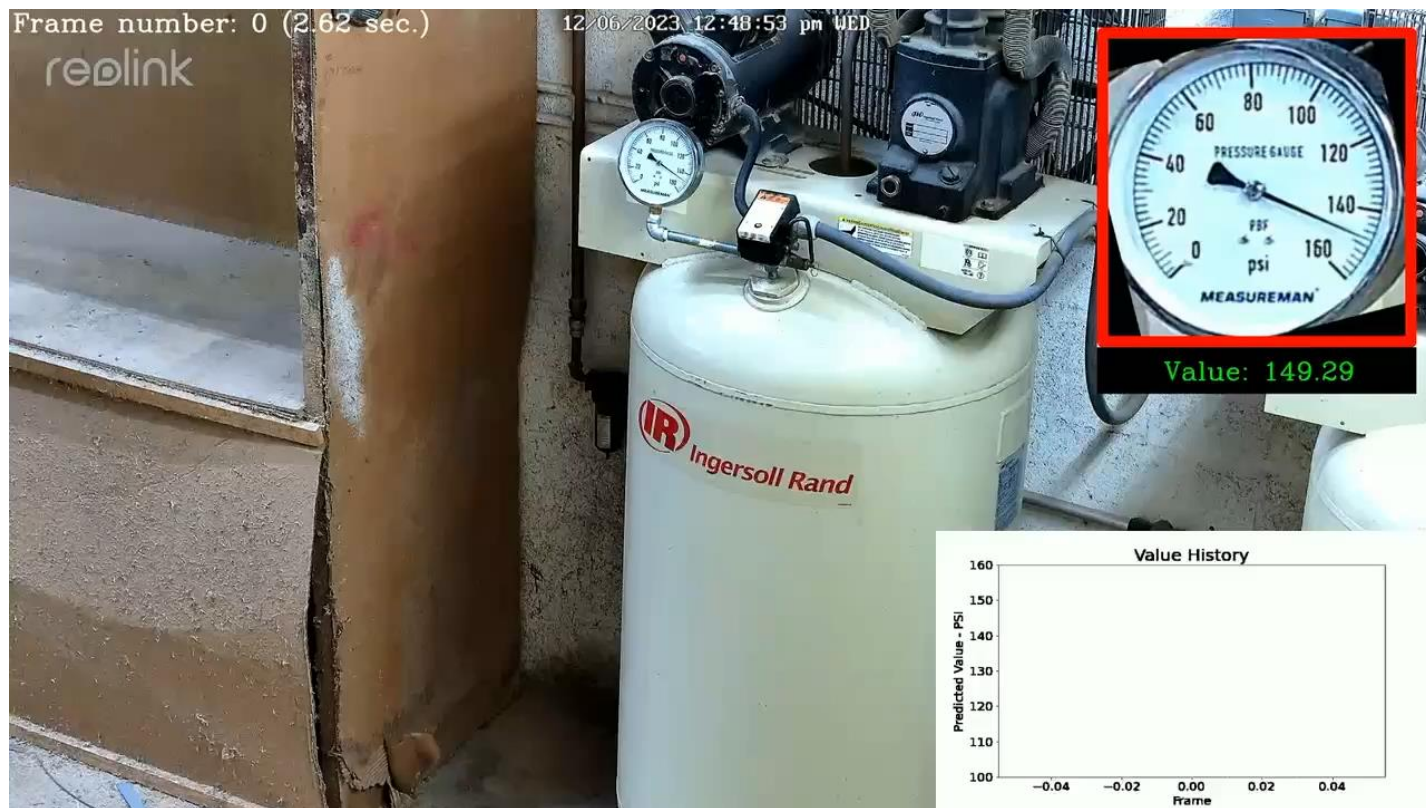 - Automated change detection

Online Condition Monitoring
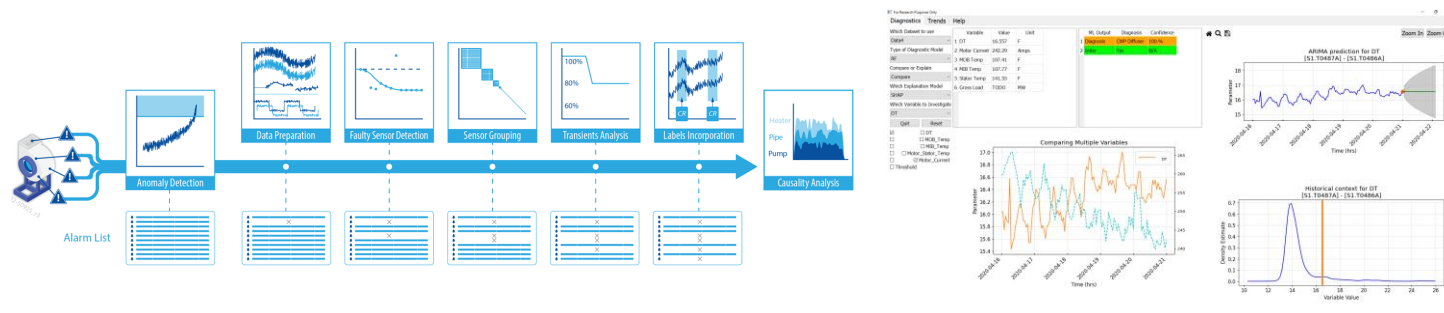
Automated Rounds and Monitoring
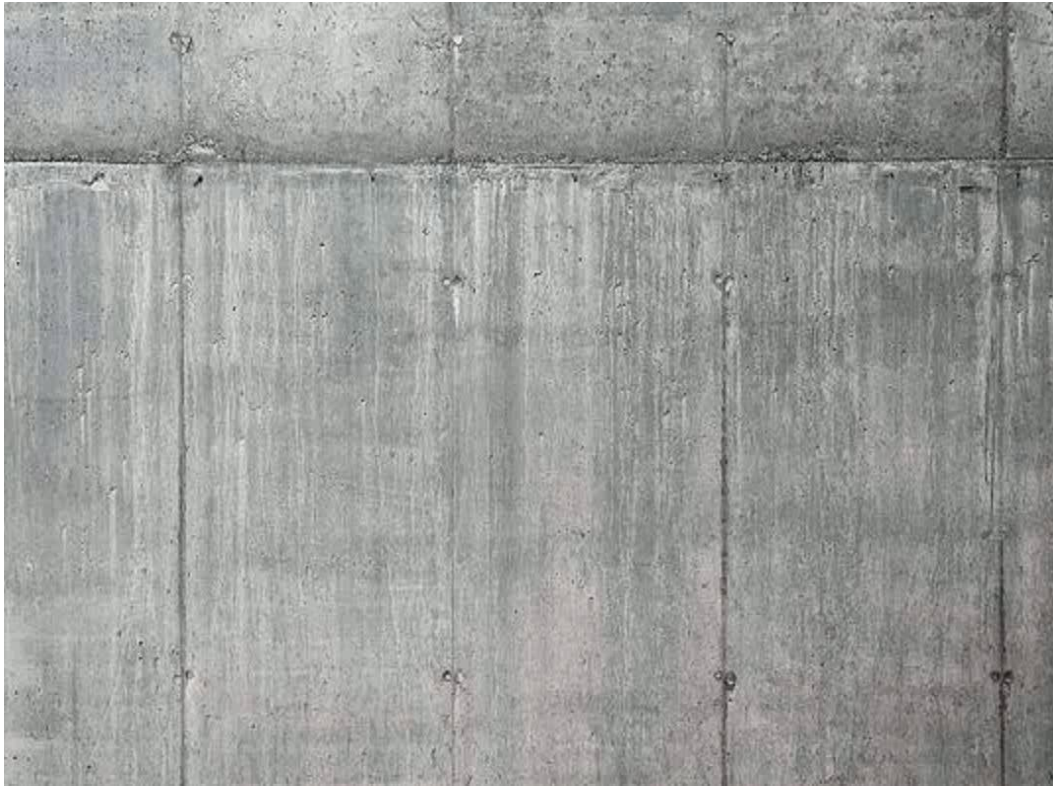
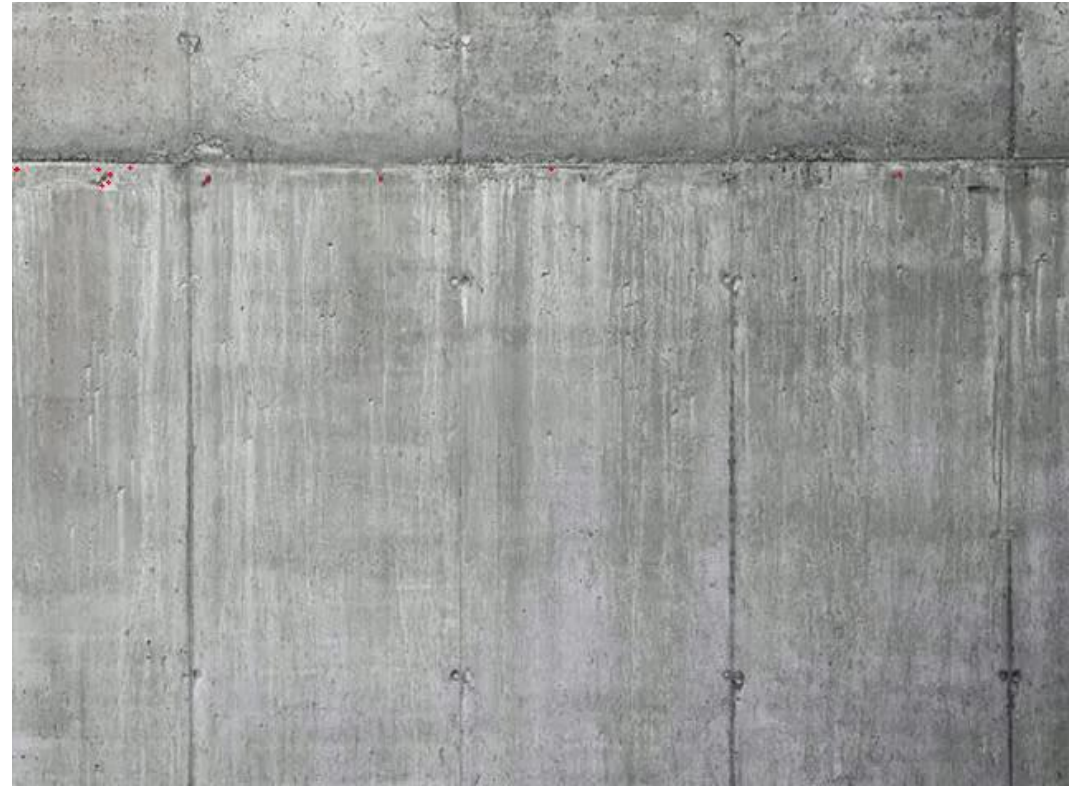# Automated Process Anomaly Detection

Automated Gauge Reading

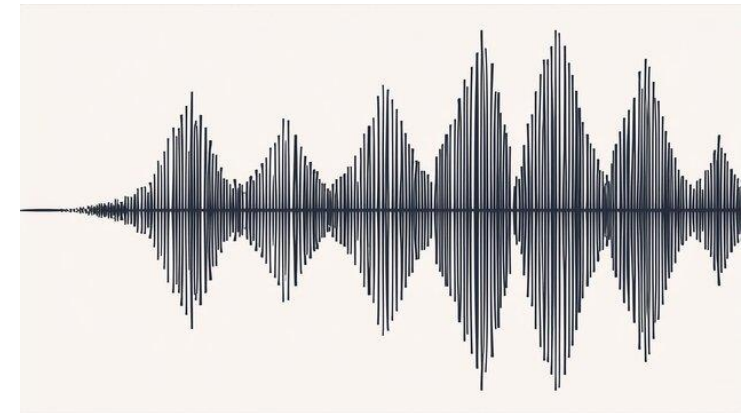# Automated Fire Watch

Automated Image Change Detection

Simulated crack growth on concrete

Detected image anomalies (in red)

Other Technologies

- Operator rounds
  - Aerial drones
  - Infrared fire watch
  - Acoustic anomaly detection
- Inspections
  - Computer vision
  - Drones
- Transformer health monitoring

Day 2 - Session 4 – Innovation and Data Analytics

Wednesday, December 4, 2024
1:30pm – 3:45pm (EST)

Time (EST)	Topic	Speaker - Organization
1:30 - 1:35	Introduction	Jake Farber, INL
1:35 - 2:00	Advanced Remote Monitoring	Jamie Dugan, Vistra Corp.
2:00 - 2:25	Continuous Online Monitoring for Process Anomaly Detection and Predictive Maintenance	Jake Farber and Vivek Agarwal, INL, on behalf of Xcel Energy and PSEG
2:25 - 2:50	Artificial Intelligence (AI) in Work Management	Pat Murray, EQRPI, Inc.
2:50 - 3:15	Insights on using AI for Inspections	Chris Esser, Xcel Energy
3:15 - 3:45	General Q&A and Session Wrap Up	Vivek Agarwal, INL
3:45	Session Adjourned	

Sustaining National Nuclear Assets

Jake Farber   Jacob.Farber@inl.gov

lwrs.inl.gov