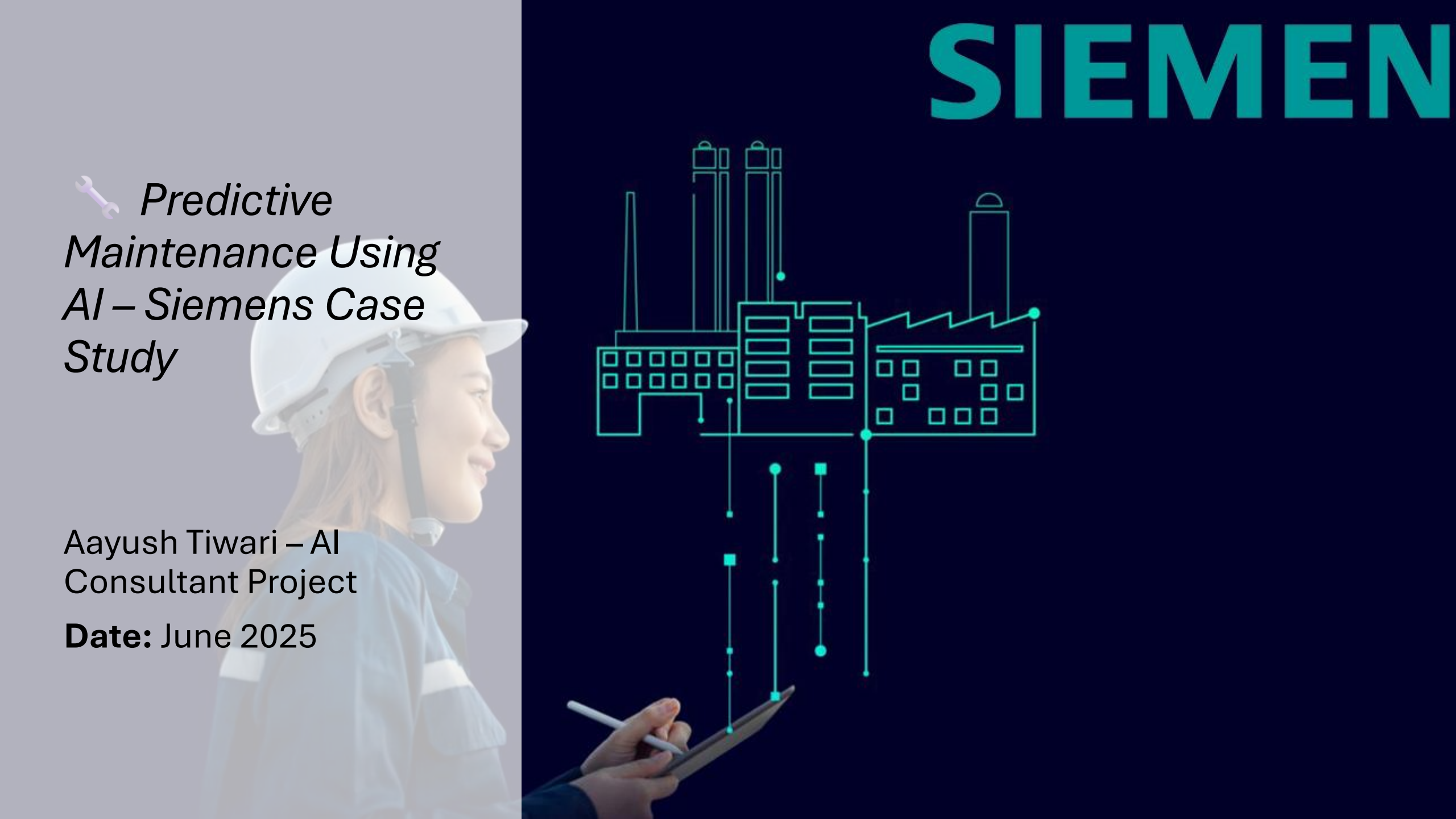
🔧 *Predictive Maintenance Using AI – Siemens Case Study*



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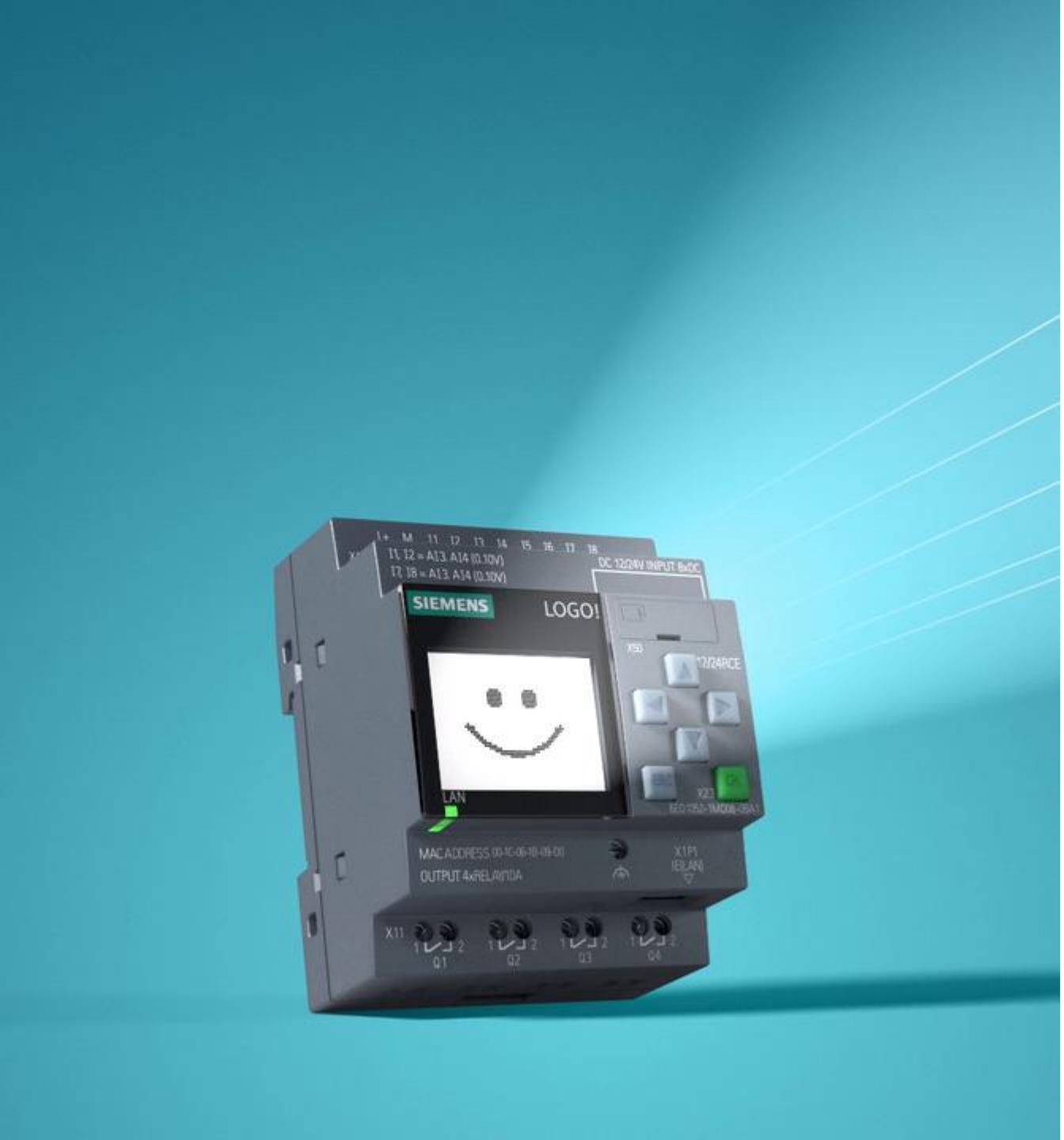


Business Problem

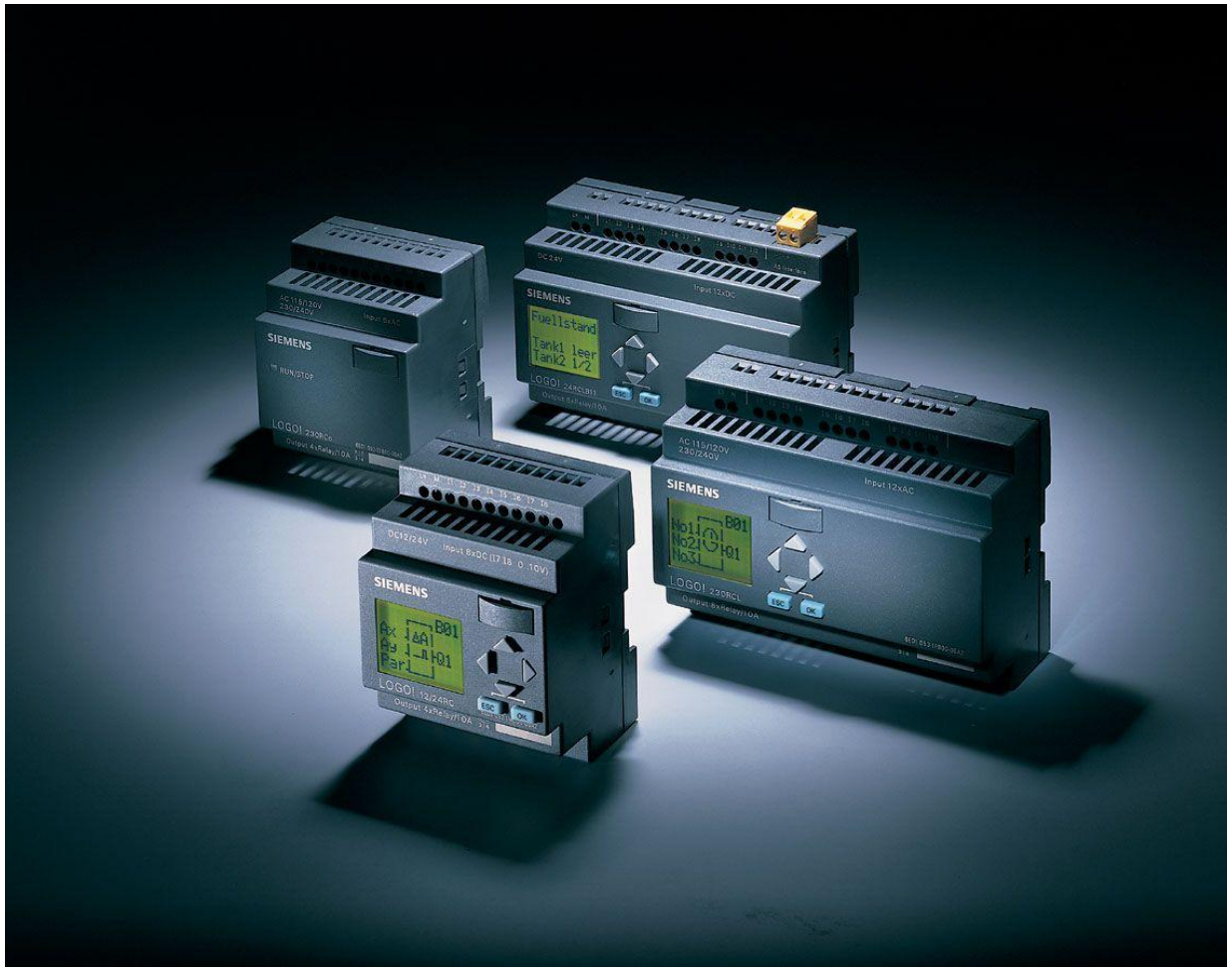
- Siemens operates industrial machinery at scale.
- Unexpected machine failures cause downtime and revenue loss.
- Goal: Predict failures in advance and recommend timely maintenance.

Raw Sensor Data

- 50 machines, each generating:
- Temperature (°C)
- Vibration (mm/s)
- Pressure (bar)
- Timestamp
- Status label: *Running, Warning, Failure*

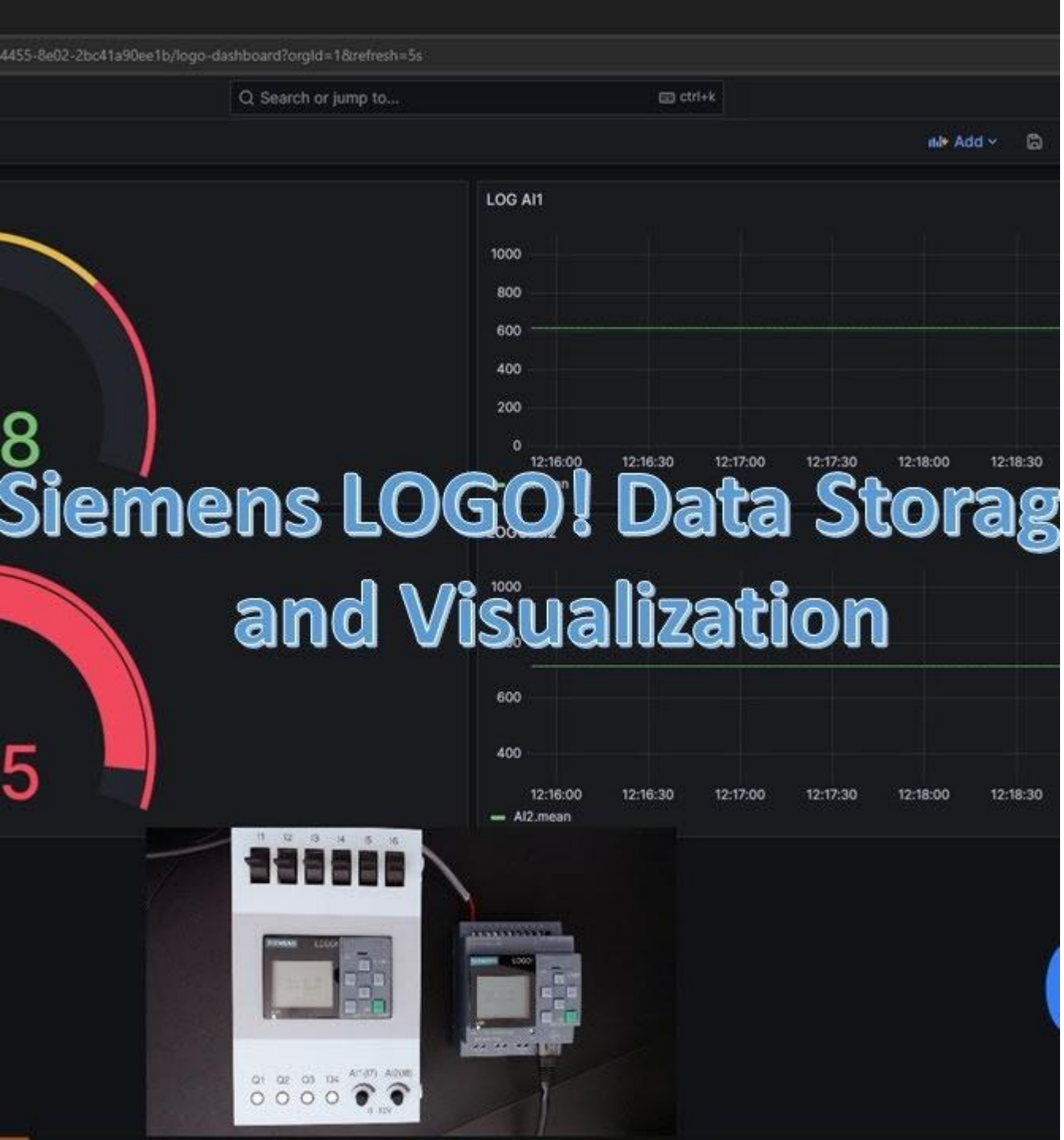
Data Preparation

- Removed outliers and unrealistic values
- Engineered fields like:
- Risk Score
- Rolling Averages
- Anomaly Detection
- Maintenance Needed
- Excel used for preliminary data cleaning



Predictive Model – Failure Detection

- Model: Random Forest Classifier
- Target: Predict Failure (Binary Classification)
- Features:
- Temperature Cleaned
- Vibration Cleaned
- Pressure Cleaned
- Risk Score
- Accuracy: 100%

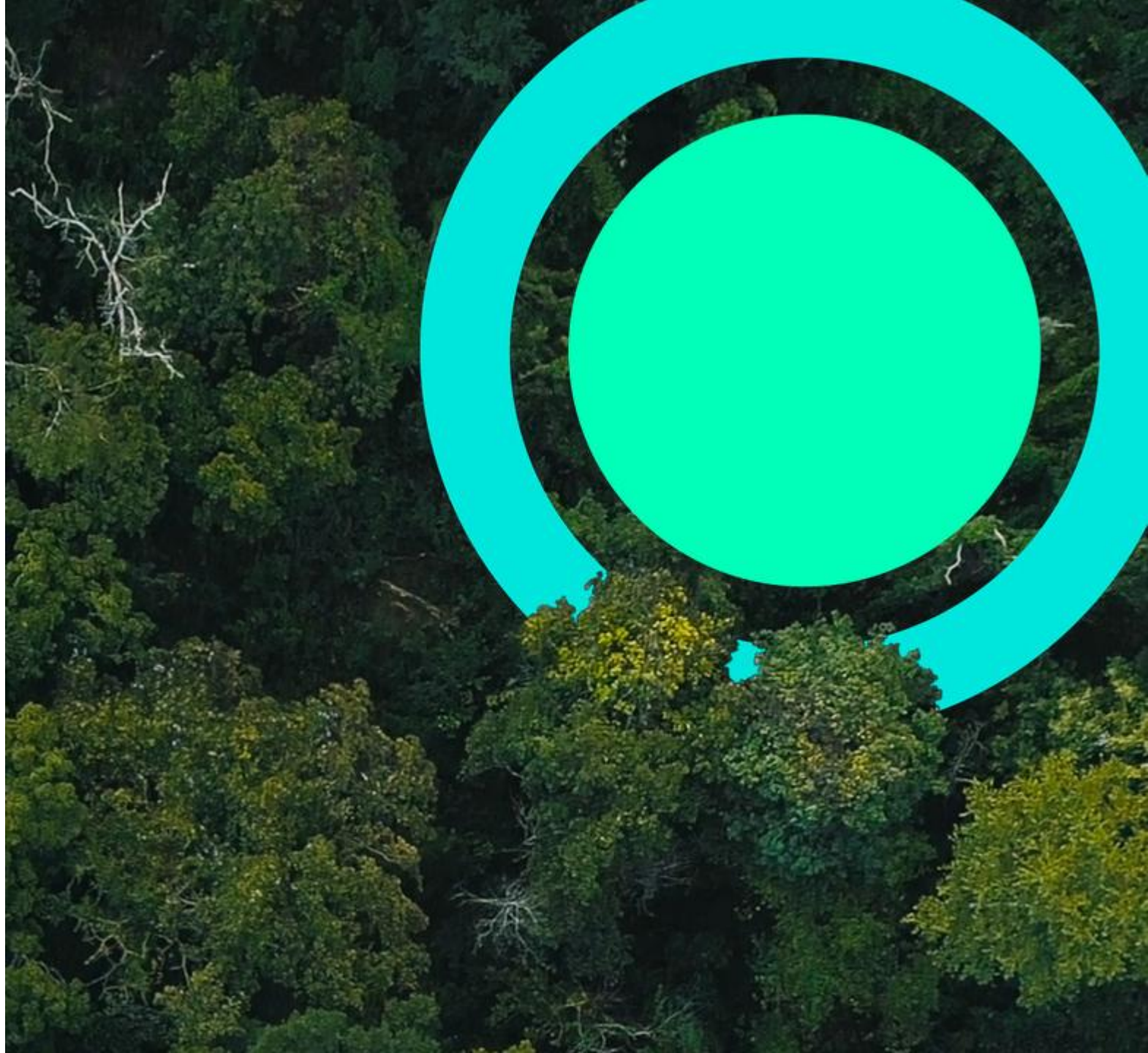


Real-Time Monitoring Dashboard

- Visuals built in Power BI:
- Failures per Machine (Bar Chart)
- Status Distribution (Pie Chart)
- Risk Score Trend (Line Chart)
- Filters: Machine ID, Status, Date Range

Results & Impact

- Proactive maintenance planning
- Reduced downtime and machine replacement costs
- Scalable model for deployment across other Siemens plants



What’s Next

- Integrate live IoT stream with Power BI
- Add alerting system (email/SMS)
- Retrain model quarterly with new data

AI doesn't replace humans — it empowers them.

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