AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY

SIEMENS
Ingenuity for life

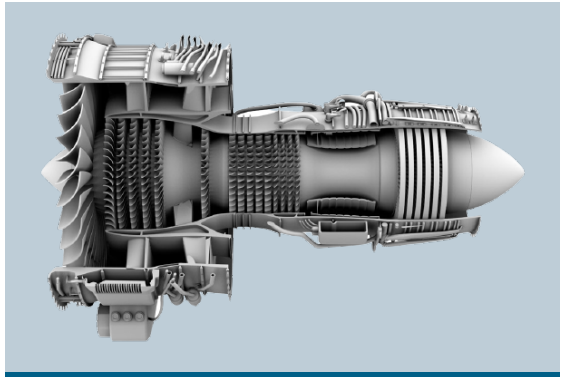
INTERACTIVE

Active Learning in Distributed Industrial Data Science Settings

Bernhard Haslhofer, AIT
Jana Kemnitz, SIEMENS
Forum Produktion, 2021-05-11

Industrial Data Science
Typical Use Cases and Scenarios

AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY



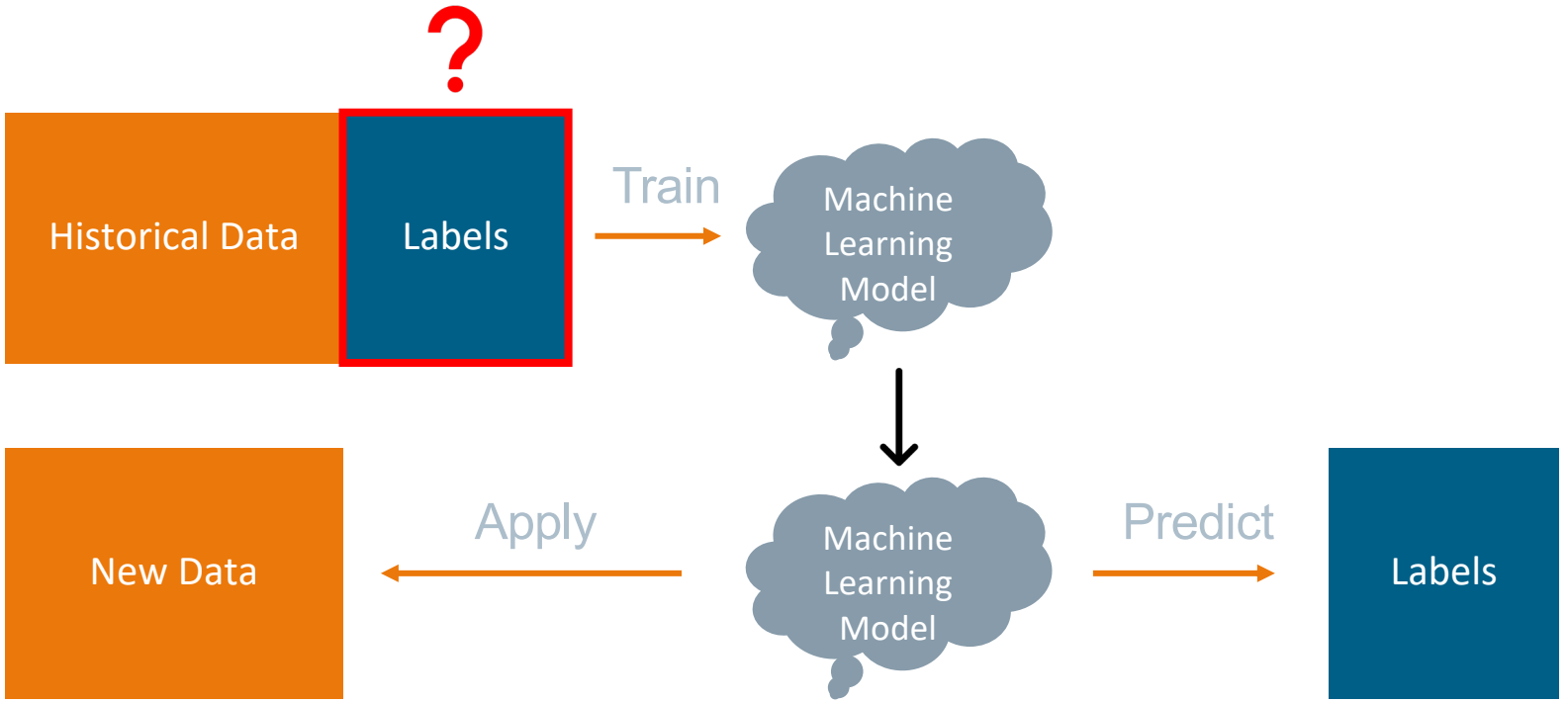
Fault Diagnosis & Remaining Useful Life Prediction

Quality Prediction & Scrap Reduction

Anomaly Detection

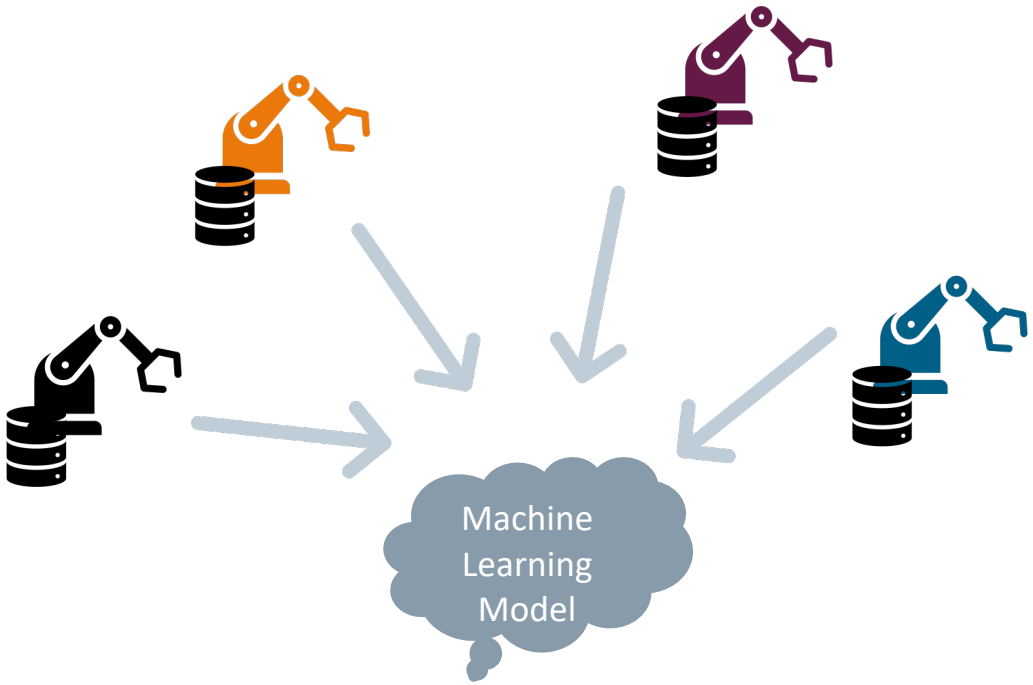
© AIT 2021

Problem 1
Missing Ground-Truth



© AIT 2021

Problem 2
Distributed Environments



No Central
Data Repository

© AIT 2021

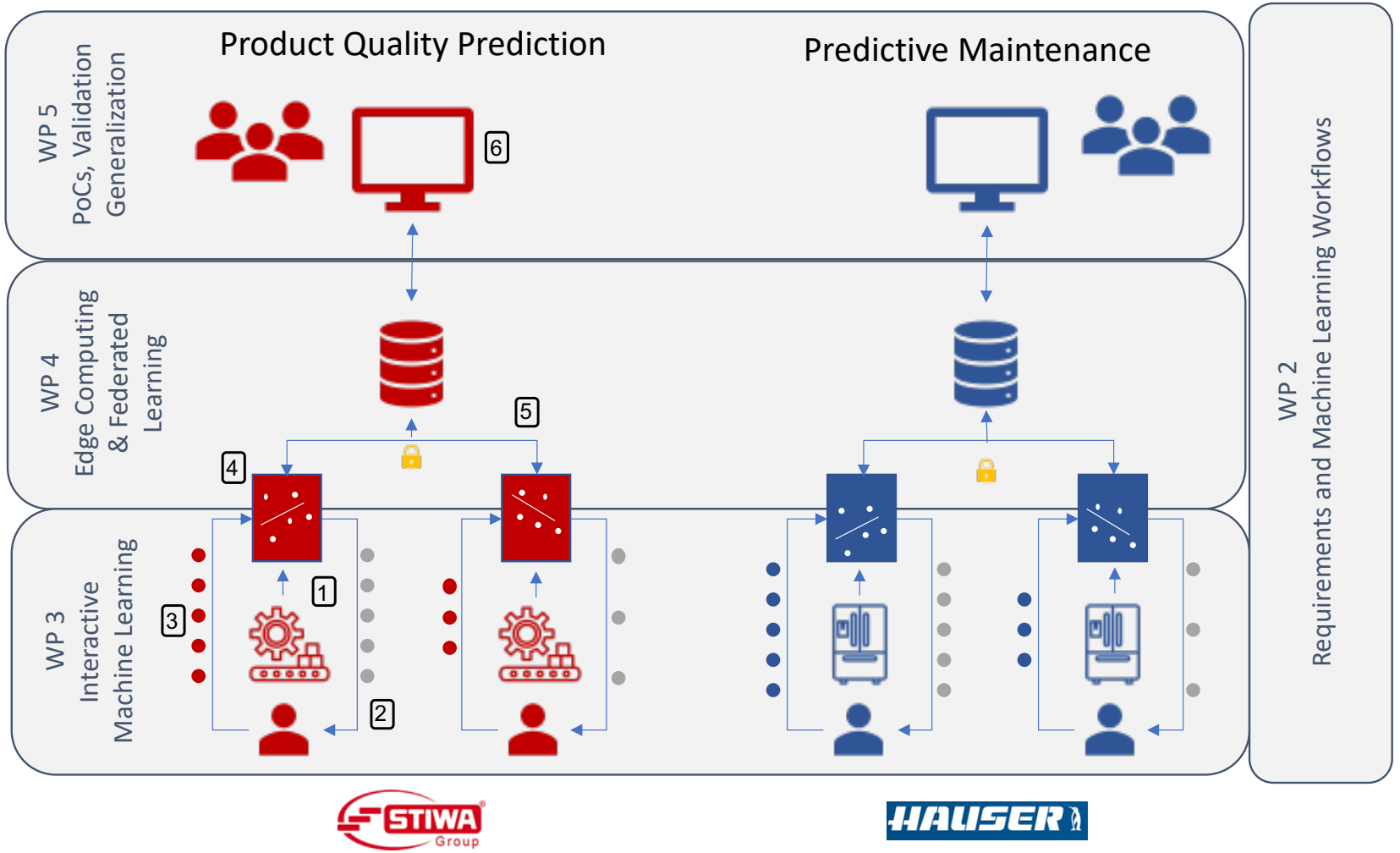
Project goal

AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY

Design and develop workflows and algorithmic methods that enable machine learning in distributed edge computing environments despite missing or insufficient ground-truth data.

© AIT 2021

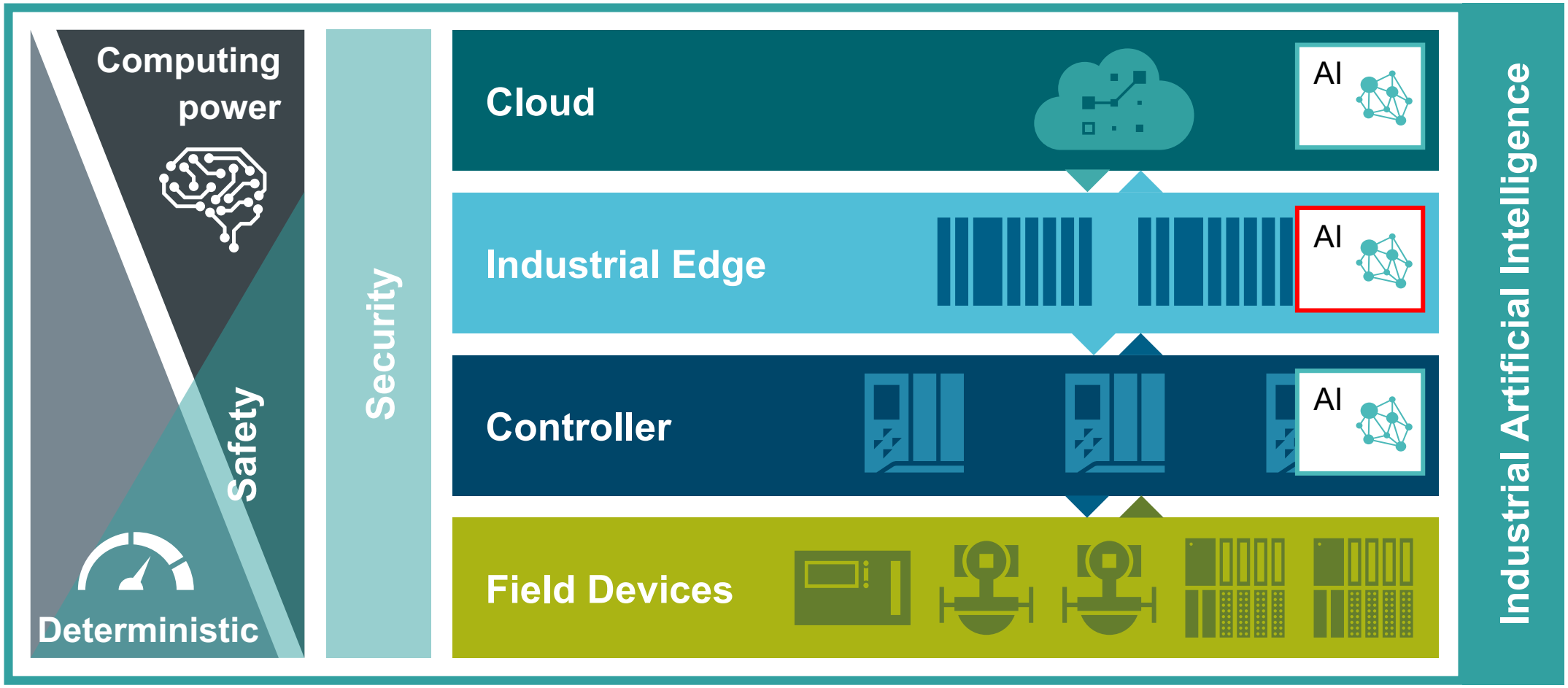
Approach
Big Picture & PoCs



© AIT 2021

Artificial Intelligence in Industry
Platforms & Deployment

SIEMENS
Ingenuity for life



© Siemens 2021

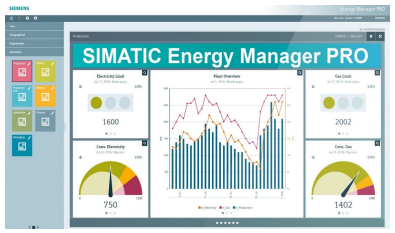
Energy Efficiency Labelling

SIEMENS
Ingenuity for life

Data Analysis

- KPIs
- Pattern Recognition
- Predictive Maintenance
- Anomaly Detection
- Data Processing

Visualization

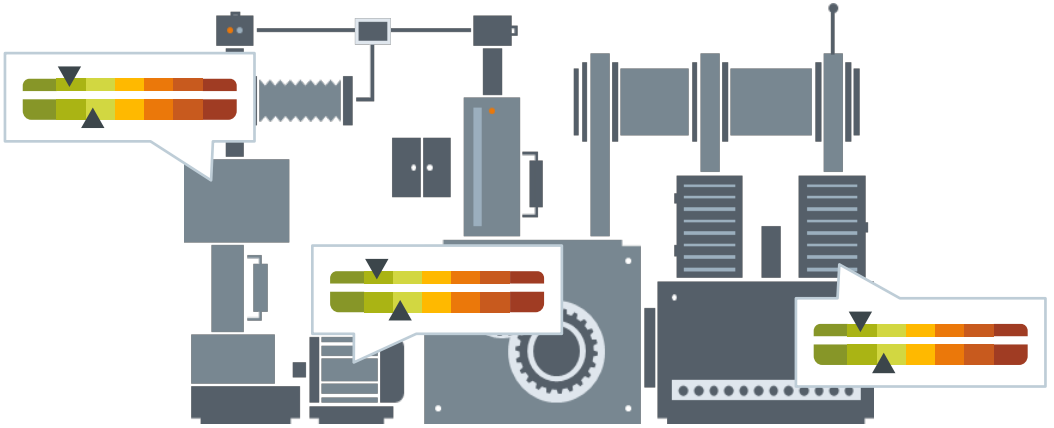


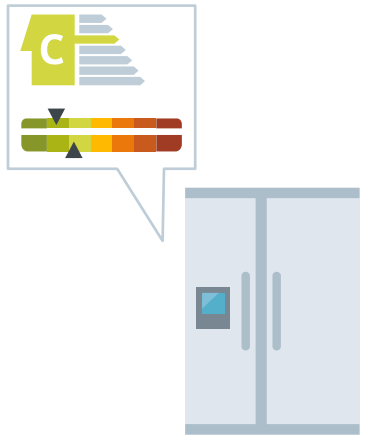
Energy Monitoring
without intervening in the control

Condition Monitoring

Cloud AI

Industrial Edge AI





© Siemens 2021

Artificial Intelligence in Industry
Vision for Industrial AI Approach

SIEMENS
Ingenuity for life

Establishing a data driven quality assurance process:

- Downtime reductions between 25-50%
  - Costs savings to production downtime: EUR 140.000 € per manufacturing machine per year
- Quality increase charges
  - Waste reduction

Specific predictive maintenance service:

- The energy saving for one large refrigerated warehouses are 7%
- With an annual electricity consumption of 2.5 million kWh per refrigerated warehouse, this would be an annual saving of 175,000 kWh
- The saved CO2 emissions over 10 years and 20 plants would be 21,000 tons of CO2

  (with a CO2 equivalent / mWh of 0.6 tons) [1]

[1] https://www.energyagency.at/fileadmin/dam/pdf/projekte/klimapolitik/3_SEAP-Vorlage-Technischer-Anhang.pdf

© Siemens 2021

Artificial Intelligence in Industry
Vision for Industrial AI Approach

SIEMENS
Ingenuity for life

Market Potential:

- The additional gross value generated by AI in Austria is estimated to 122 billion euros in 2035 and one third is attributed to the manufacturing sector [2]

Potential Costumers:

- Austria: 1,600 companies in Austria with more than 50 employees [3]
- Germany: 19,000 companies with more than 50 employees [3]

Exploitation strategy

- Cold start of AI projects with insufficient or missing round truth
- Scalable and - in modifications – reusable solution across industrial assets
- **AI applications on the edge**

[2] https://www.accenture.com/_acnmedia/pdf-99/accenture-mission-mit-vision.pdf

[3] STATISTIK AUSTRIA resp. EUROSTAT

© Siemens 2021

Thank you!

Dr. Bernhard Haslhofer

Senior Scientist | AIT
Thematic Coordinator Data Science
bernhard.haslhofer@ait.ac.at

Dr. Jana Kemnitz

Senior Data Scientist | SIEMENS
Jana.kemnitz@siemens.com