



Alliance for IoT
and Edge Computing
Innovation

24-25 Sep
BRUSSELS

AIOTI
DAYS 2024

Continuum, digital twins
and virtual worlds

Session Edge driven AI and infrastructures

Edge Computing, Digital Twins and Manufacturing Examples

Speaker **Klaus Beetz, klaus@beetz94.de**

Event Sponsors

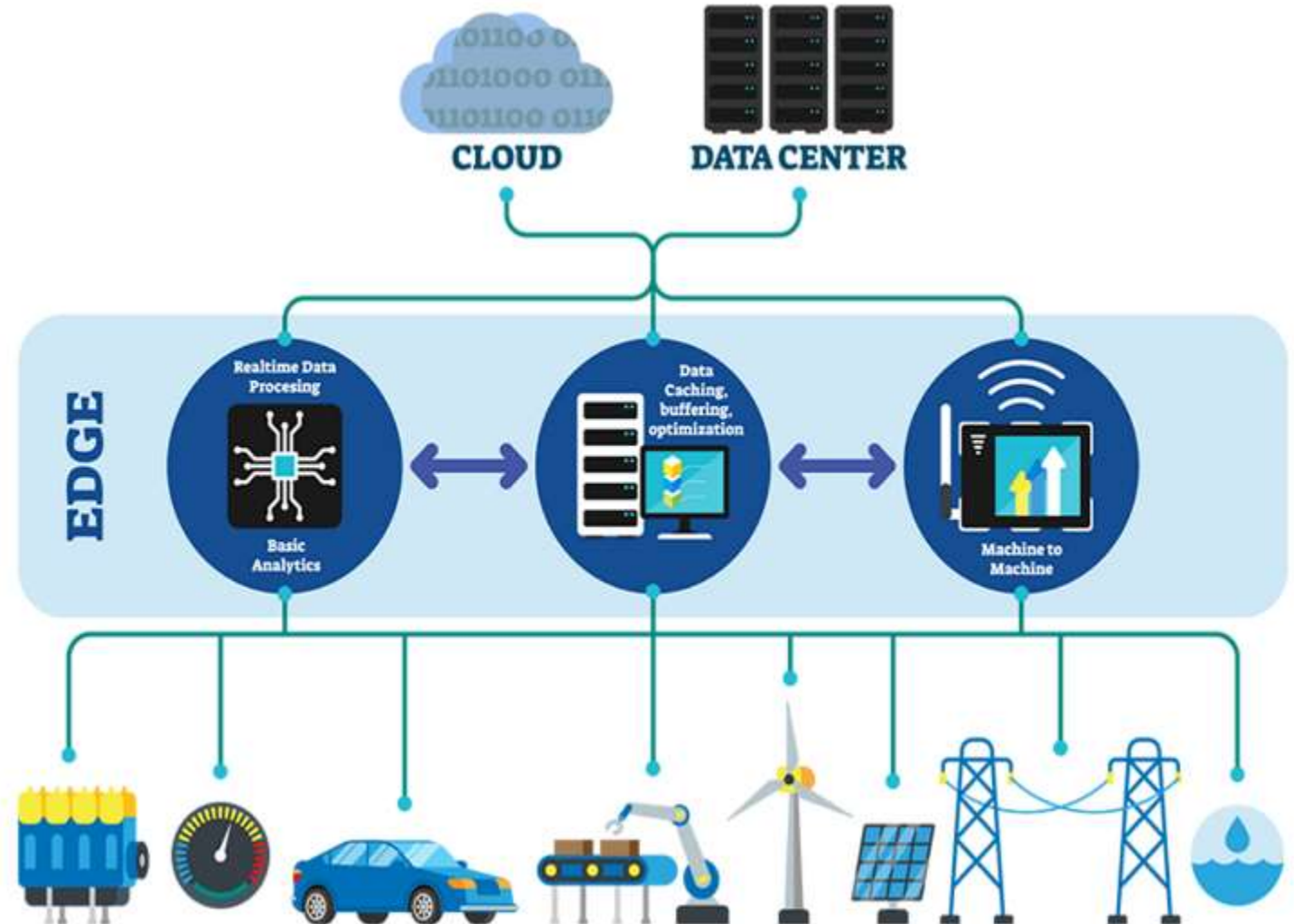


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Edge Computing

Definition:

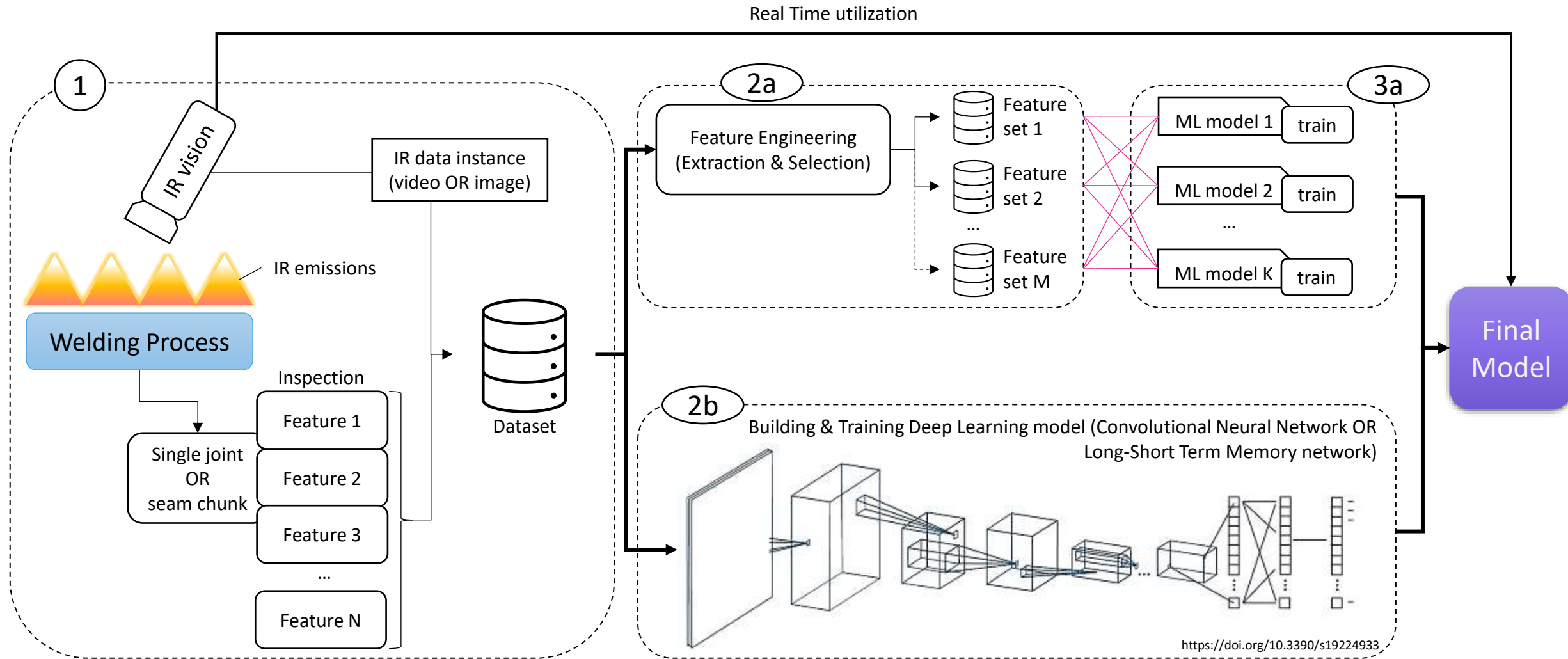
Edge computing is a distributed computing paradigm that brings computation and data storage closer to the sources of data, enabling processing at greater speed and volumes, leading to greater action-led results in real time.



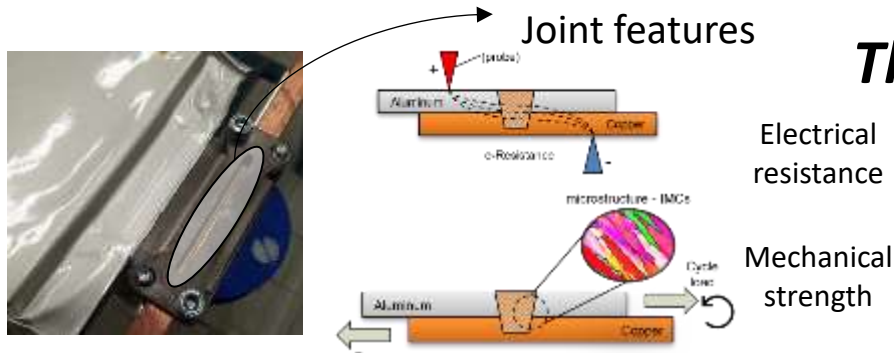
Digital twins of heavy industrial warehouses

Situation	Approach	Impact
<p>Warehouse without defined shelf system - material is arranged in piles / pyramids.</p> <p>Internal logistics absorbs variability from production and customers</p>	<p>~1 robust edge device per 100 square meters of WH (1-10EUR / sqm CAPEX)</p> <p>~10 virtual sensors / sqm to detect material (coils, slabs, wheels), and vehicles (cranes, forklifts, trucks, trains)</p> <p>Accurate tracking of full material and vehicle trajectories - no labels (or RFIDs) needed</p>	<p>Exact track & trace of every part (90-100% accuracy), 3D model of the warehouse for any time</p> <p>20% increase in labour productivity of the warehousing staff saving time for searching for material (RoI <6mo), indirect savings on quality and customer delivery, improved safety</p>
		

Welding Example – Top Level Approach



Welding Example – Laser Welding of Batteries

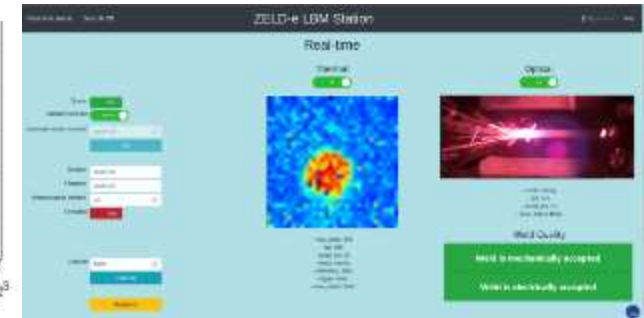
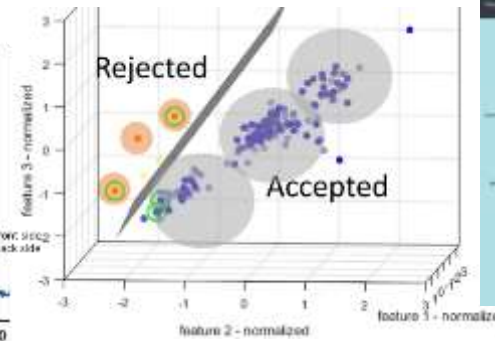
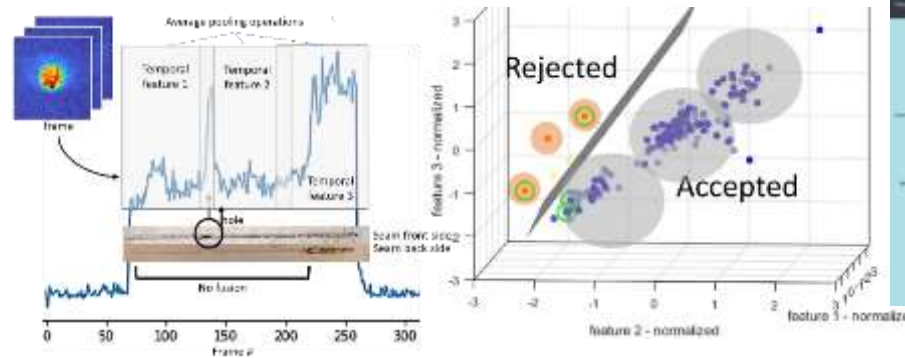
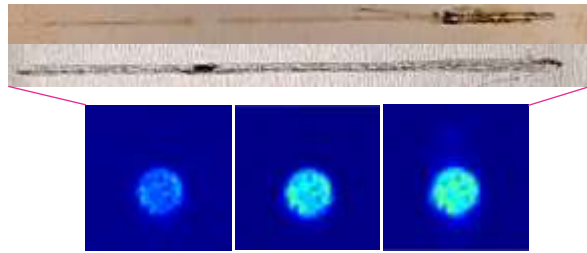
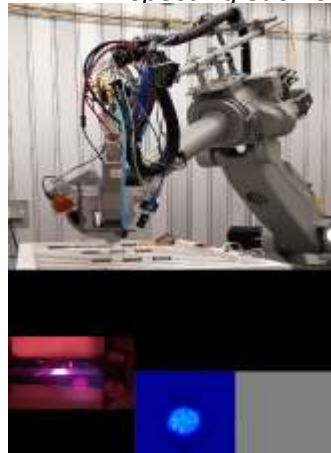


The challenge

“ Measuring the electrical resistance and the mechanical strength of a joint requires contacting or even destroy the workpiece ”

“ A single mechanically or/and electrically defective joint can compromise the performance of an entire battery pack which includes hundreds of them. Inspecting each one individually its not efficient neither possible ”

The solution



MWIR Monitoring (Medium-Wavelength Infrared)

Labeling: Video - Seam

Feature engineering & training linear SVM

Classify electrical/mechanical quality



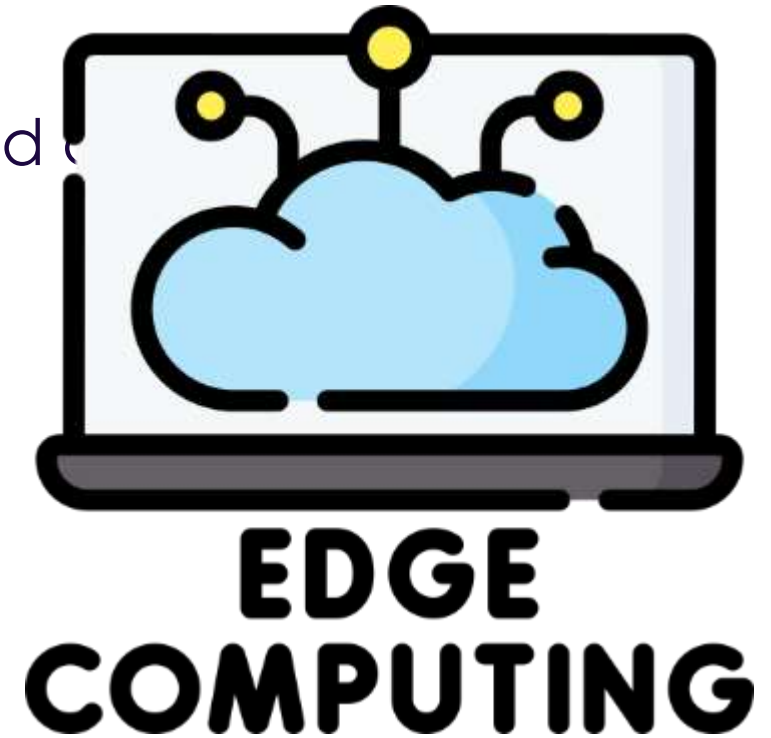
Edge Computing

General benefits in a Nutshell

- Decreased latency/bandwidth use and associated cost
- Decrease in server resources and associated cost
- Analysis during runtime
- Added functionality

General drawbacks in a Nutshell

- Security - increase attack vectors
- Cost - requires more local hardware





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Thanks for your Attention!

Klaus Beetz, klaus@beetz94.de