

ANALYTICS AND ARTIFICIAL INTELLIGENCE IN MANUFACTURING

pmOne Webinar

27 November 2020

TODAY`S AGENDA

Part 1: Optimize your (own) Production

- **Your Analytics Maturity Assessment**
- **Customer Cases**
- **IT + OT Bridge:** Checklist for navigating Analytics & AI Solutions

Part 2: Extension to your Services Offering (to your clients)

- **Intelligent Products**
- **Customer Cases**



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NUMEROUS BENEFITS OF DATA DRIVEN MANUFACTURING

- Avoid **waste**
- Reduce **rework**
- Recognize **errors** early on
- Save **raw material cost**
- Find the right **settings** quickly
- Correct errors **immediately**
- Receive and distribute **knowledge**
- Control the risk of **fluctuation**
- Shorten **set-up** times
- Produce numerous **product variants**
- Reduce high **manual effort**
- Simplify **planning**
- Higher **customer satisfaction**
- ...



TODAY`S AGENDA

Part 1: Optimize your (own) Production

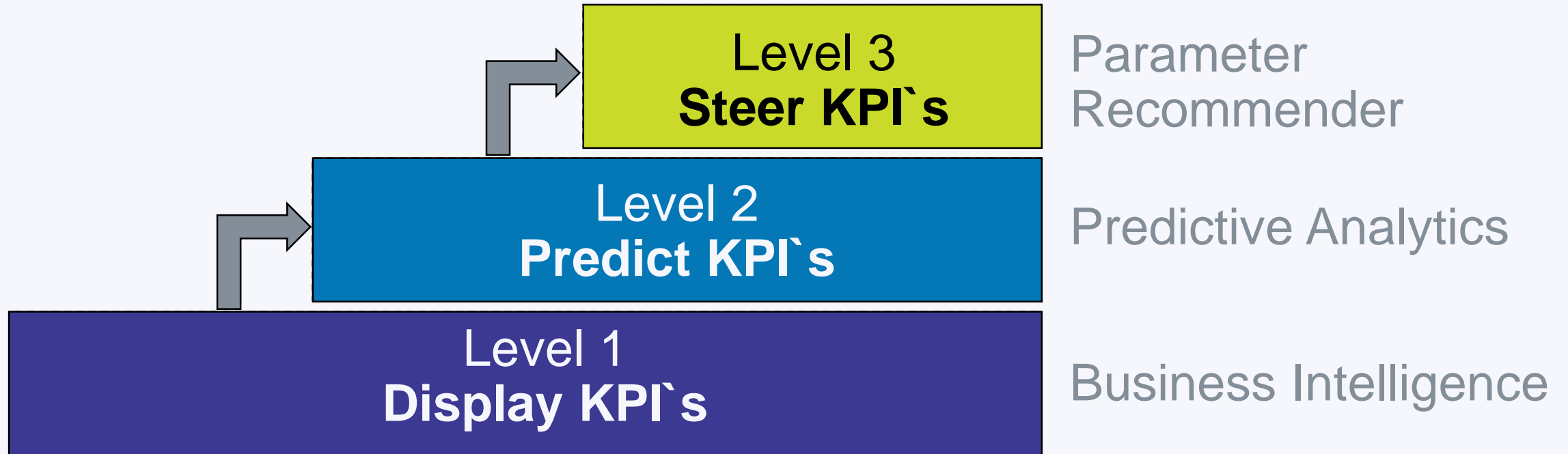
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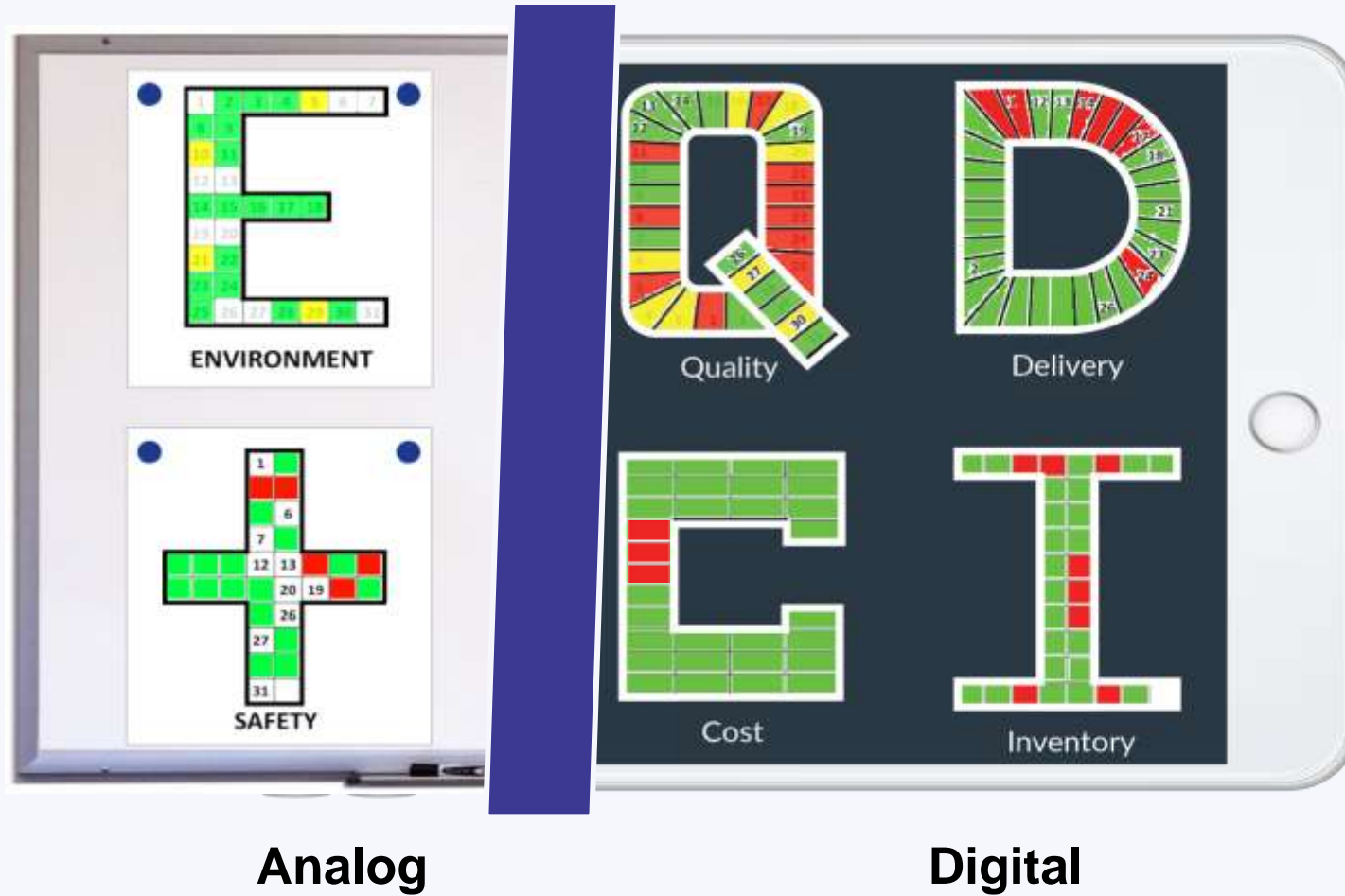
ANALYTICS BY MATURITY LEVEL

In Manufacturing Planning and Operations



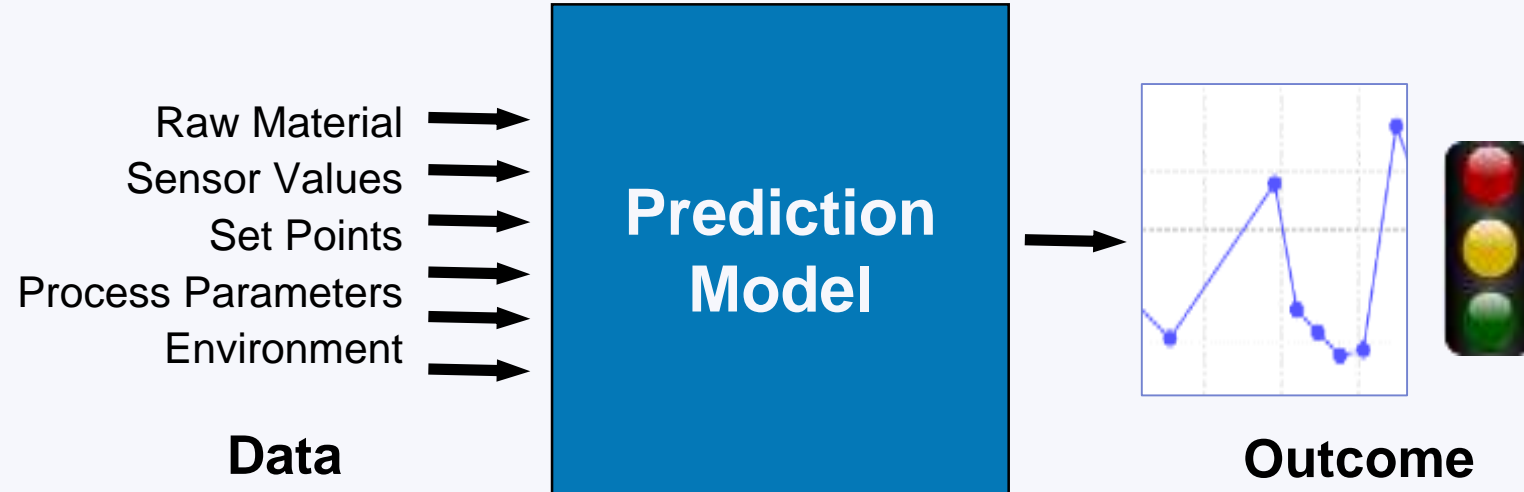
LEVEL 1: DISPLAY KEY PERFORMANCE INDICATORS

Business Intelligence



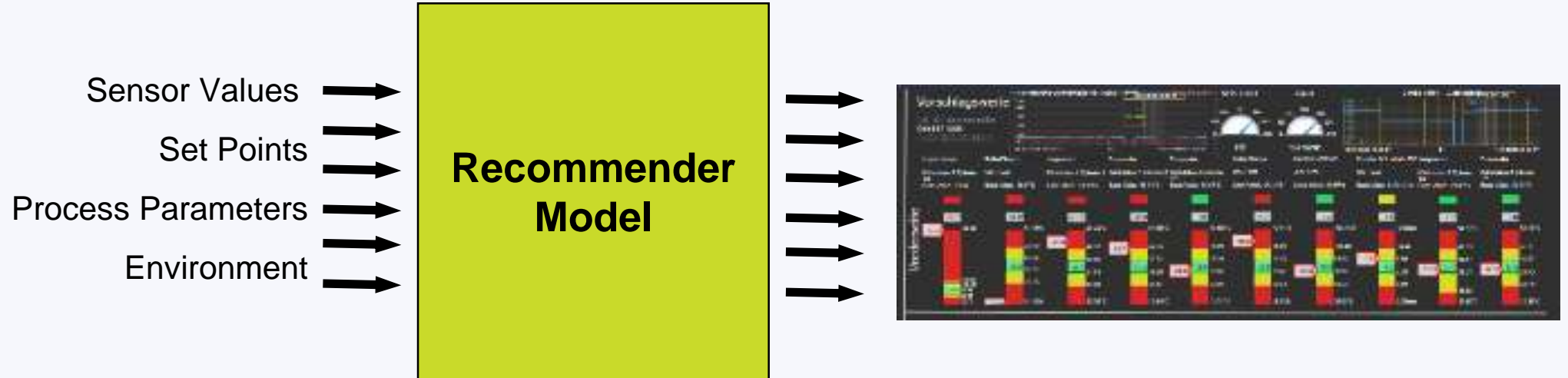
LEVEL 2: PREDICT KEY PERFORMANCE INDICATORS

Predictive Analytics



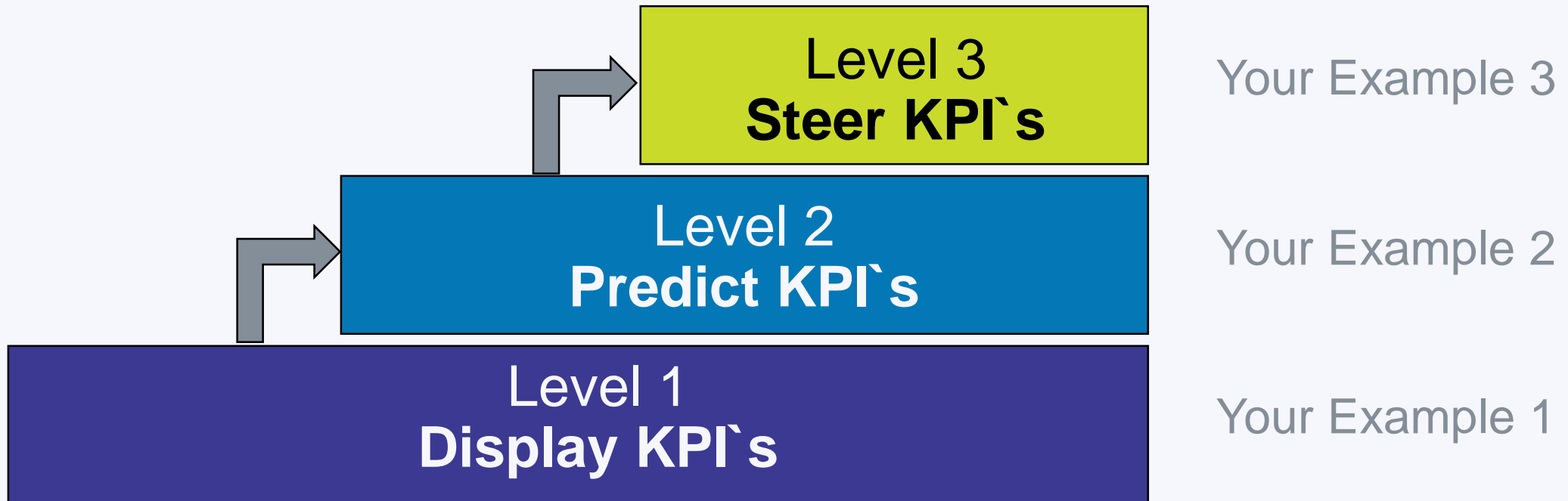
LEVEL 3: STEER KEY PERFORMANCE INDICATORS

Machine Parameter Recommender



WHAT IS YOUR ANALYTICS MATURITY LEVEL?

Please name Examples of Analytics Models running in Production for Levels 1-3



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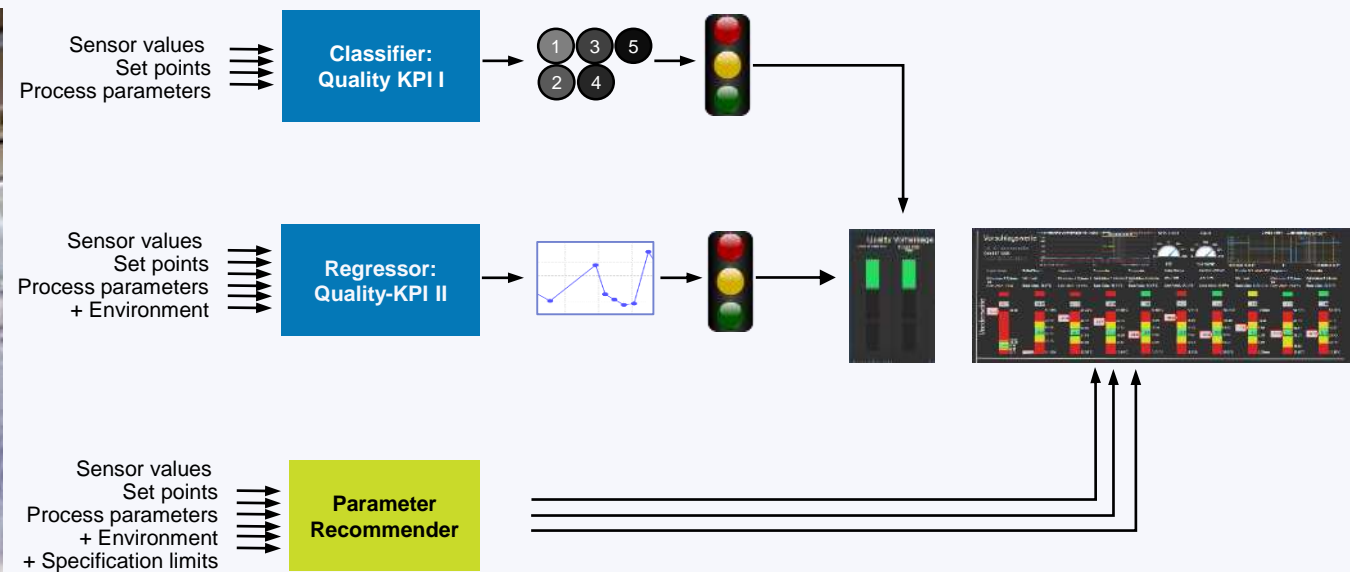
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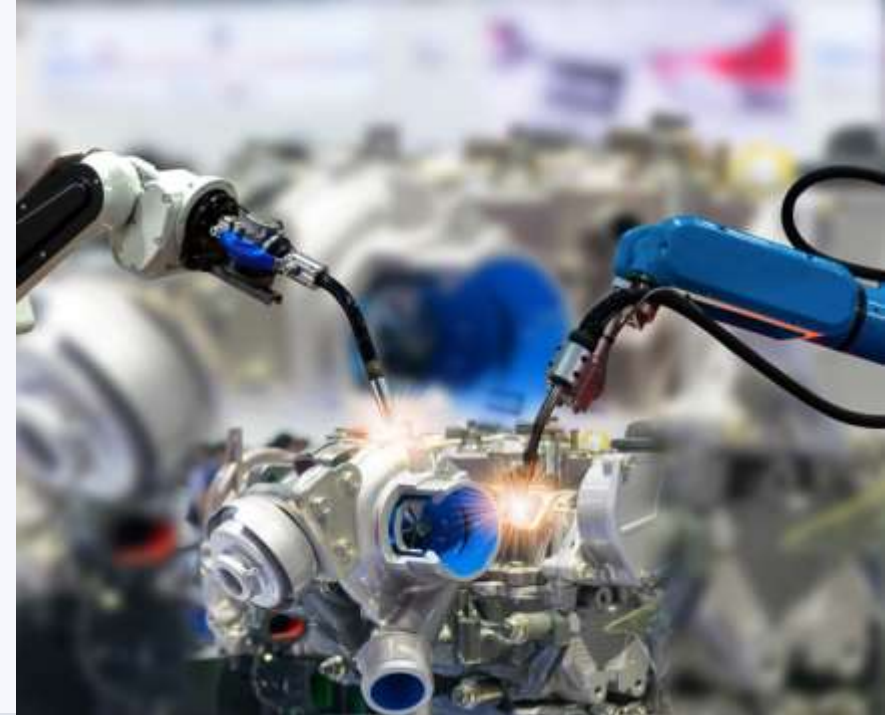
- Intelligent Products
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REDUCTION OF VARIABILITY IN COATING

- Mondi is a market leader and manufacturer in the packaging industry
- Three parallel models were developed: two KPI predictors and a parameter recommender
- For this purpose, several hundred sensors are evaluated on a coating machine in near real time



ANOMALY DETECTION ON WELDING SEAMS



- ⊕ Robotic production of metal components
- ⊕ Simultaneous welding by two robots
- ⊕ Defect detection of welding defects through automatic analysis of vibration data

CHALLENGE

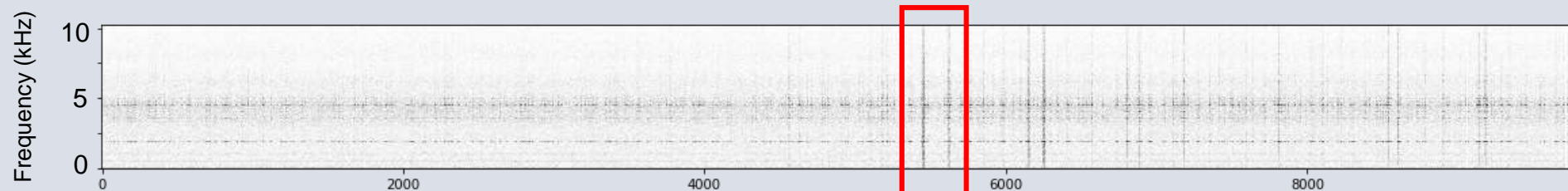
- Optical inspection only detects defects on the surface
- Errors are identified in very complex and extensive machine sensor data

SOLUTION

- Digital signal processing combined with machine learning

OUTCOME

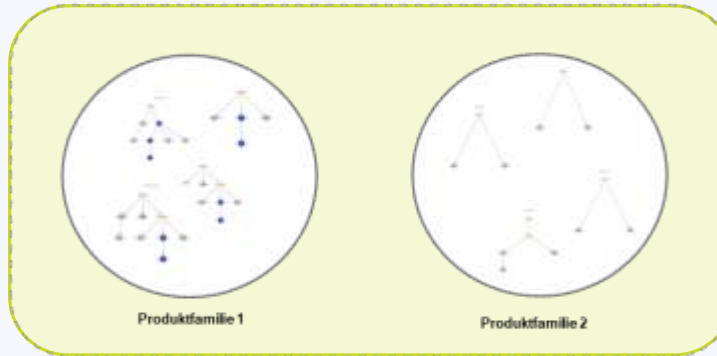
- Increase in production quality & yield
- Allows early intervention while production is running



PRODUCT SEGMENTATION FOR ASSEMBLY PLANNING

- ⊕ Data-driven creation of product families
- ⊕ Optimization of manufacturing processes through the achievement of synergies
- ⊕ Better utilization of the production facilities

Creation of product families of similar products



CHALLENGE

- Large number of products & variants
- Complex dependency structures
- Parts lists as a data basis

SOLUTION

- Conversion of the product parts lists in graphs that embody the subcomponents and dependency structures
- Machine learning to identify similar products
- Distributed computing using Databricks for quick generation of results

OUTCOME

- Creation of 100 manageable product families
- Thousands of products are grouped together in a few hours

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OPTIMIZING PRODUCTION WITH INDUSTRIAL ANALYTICS

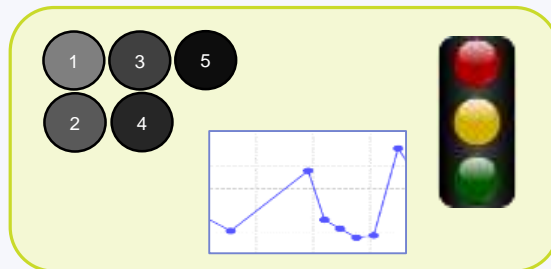
IT + OT Bridge

Production

- ✓ Recognize **errors** early on
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- ✓ Avoid **waste**
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Analytics

Predictive Quality Analytics



Machine Parameter Recommender



Product Segmentation



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BENEFITS OF THE APPLICATION OF ANALYTICS & AI

Operational Efficiency in your Production



- Higher Efficiency
- Optimized Processes
- Increase Quality
- Optimize Costs
- Reduce Waste
- Increase Customer Satisfaction

Intelligent Products for your Customers



- New / Updated Business Model
- Use Data to offer new Services
- New Revenue Streams
- Increase Customer Satisfaction

EXAMPLE: PREDICTIVE MAINTENANCE



Avoid material damage and reduce downtime

- » Higher product quality through seamless process monitoring
- » Maximizing machine utilization by avoiding failures
- » Better planning through targeted maintenance
- » Avoidance of unnecessary machine downtimes
- » Increase in production yield

In your company



As a Service to your customers



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Elevator Maintenance „as-a-Service“

- ⊕ Scalable, flexible solution transmits data in real time
- ⊕ Machine learning enables precise predictions of elevator downtime

IoT
Cloud
Advanced Analytics
Data Science
AI & Machine Learning
Business Intelligence



CHALLENGE

- Use existing data
- Reduce excursion downtime
- Elevator maintenance with predictive maintenance

SOLUTION

- Uniform data structures and formats
- Cloud-based maintenance solution
- Machine learning: Predictive models for elevator behavior

RESULT

- Transmission of data in real time
- Maintenance measures before failure
- Reliably functioning elevators

SWISS RE: MODERN TELEMATICS SOLUTION

Case Study

- ⊕ Automated solution on one platform
- ⊕ Easy access & analysis for data scientists
- ⊕ Added value for insured persons & insurer:
 - Determination of driving risks
 - Reduced insurance premiums
 - Clarification of insurance claims
 - Savings in personnel costs

IoT
Cloud
Analytics Platform
Artificial Intelligence
Machine Learning
Data Science
Reporting
Business Intelligence



CHALLENGE

- Using digitization in the automotive sector
- Recording of comprehensive vehicle data e.g. GPS position, acceleration, braking manoeuvres, steering behaviour, etc.
- Fast & informative processing and use of data
- Visual representation

SOLUTION

- Analytics platform with full cloud integration
- Generation of vehicle data in real time
- Development of an app for mobile data transfer
- Automated data processes (Machine Learning, Data Science)
- Visualization with MSFT Power BI

OUTCOME

- Win-win for insured persons & insurer
- Data are on one platform, are constantly updated and automatically further processed
- Easy, fast data access
- Targeted use of the data for different added values

Your data & analytics partner in Germany, Austria and Switzerland



- ✓ Software and consulting for analytics, reporting and cloud
- ✓ Founded in 2007, more than 600 customers
- ✓ approx. 160 employees at 7 locations
- ✓ Technology focus: Microsoft Azure


2018 Partner of the Year und
Data Estate Modernization
Weltweit Nr. 1 Partner


Power BI



Data driven. AI based. People minded.

Data Management



- Data Integration
- Data Warehouse
- Data Lake
- Cloud Data Warehouse
- Master Data Management

Business Intelligence



- Custom BI
- Reporting
- Self-Service BI
- Dashboarding
- Visualization

Data Science & Artificial Intelligence



- Advanced Analytics
- Predictive Analytics
- Prescriptive Analytics
- Machine Learning
- Artificial Intelligence

Corporate Performance Management



- IFRS
- Disclosure Management
- Group Consolidation
- Corporate Planning
- Driver Analysis

SELECTED CUSTOMER REFERENCES

Data Science
& AI



Customer Analytics

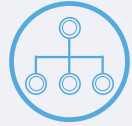


Industrial Analytics



Finance & Procurement
Analytics

MORE ANALYTICS AND AI SOLUTIONS FROM PMONE



Customer Segmentation



Next Best Offer /
Cross- und Upselling



Customer Lifetime Value



Churn Prevention



Automatic recognition of text,
voice and images

Customer Analytics



Sales Forecasting



Cost Forecasting



Risk-Simulation



Driver Based Planning
& Simulation



Cash Flow- &
Liquidity-Prediction

**Finance & Procurement
Analytics**



pmOne

Data driven. AI based. People minded.