Smart Production Control

Take a Risk-Free Step Into AI-Optimized Process Control

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automatica

YET ANOTHER DATA SCIENCE PROJECT

"Take a huge amount of data, train and test some models, and enjoy the benefits for your business."

... that's what they said.

Theory is obvious, but implementation often fails

- Large-scale projects **lack a clear focus** on problems to be solved
- Broad data collection **neglects in-depth quality checks and expert knowledge** for specific problems
- High efforts without demonstrable successes **destroy trust** in new technologies and digital solutions

THE INDUSTRY IS CRAVING SUCCESS IN DIGITALIZATION AND AI IMPLEMENTATION

Digitalization deficits multiply the pressure on manufacturing companies and threaten their long-term competitiveness

Shortage of skilled workers

Aging workforce
Skills mismatch
Uncertain labor migration

→

Reduced capacity and quality
Increased delays
Higher labor costs

Cost & productivity pressure

Rising raw material & energy prices
Uncertain logistics
Inflation and tariffs

→

Higher overall costs
Expensive risk provision
Reduced margins

Climate change & stricter regulations

Waste and overuse of materials
Stricter compliance requirements
Climate affecting production stability

→

Demand for sustainable production
Regulatory fines & reputational damage
Increased production risks

Digitization & innovation deficits

Inefficient use of data
High investment barriers
Organizational misalignment

→

Reduced resilience
Diminished competitiveness in the long term

Automation and AI demand

Complex measurements of returns
Rapid innovations
Fragmented strategies & realization

→

Slow innovation adaption
Missed opportunities
Competitive disadvantage

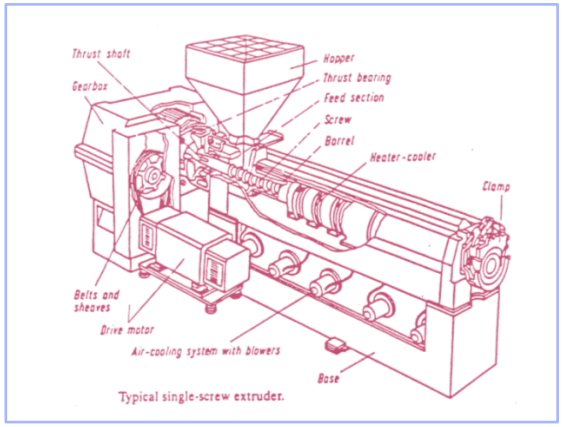
INDUSTRY CHALLENGES – IN THE PROCESS PRODUCTION

Limits of Manual Control in Continuous Production Processes

Experience & Expertise + **Data**

Human

Machine control based on experience and isolated expert knowledge

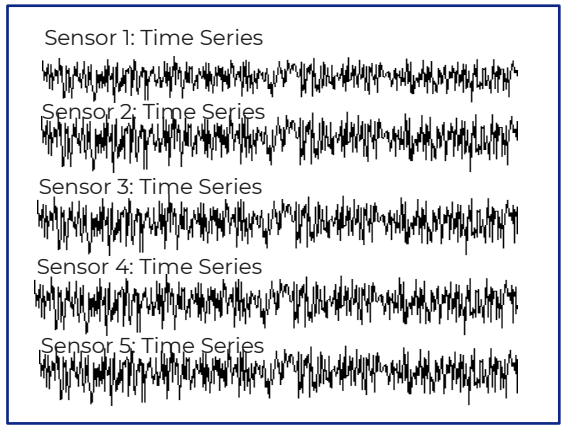


Practical Example:

An employee relies on their experience that the machine will deliver good quality even with a shorter preheating time.

Sensors

Overwhelming variety, hardly interpretable, therefore unused



Practical Example:

Increased contamination subtly changes 74 sensor data sets — barely noticeable to the employee.

Challenge in Companies

- **Expert Knowledge** is not available for digital methods
- **Sensor Data** is too overwhelming to manage effectively
- **Machine Learning Methods** fail due to **too few defects**

Consequences in Practice

- **Reluctance** to carry out **data analytics projects**
- Until now, **little data-driven support** in production
- **Untapped potential** for improving quality and efficiency

SPC provides a data-driven solution to gain quality and improve efficiency.

SPC Gen

Creates a digital process model from sensor data and enables intuitive fine-tuning by experts.

- **Compact and intuitive** presentation of the process.
- **Expert knowledge embedded** = increases acceptance

→ **Defect-agnostic model** = clearly outperforms standard ML

SPC Watch

Monitors the production process in real time.

- Model-based approach **= Higher information density**
- **Early prediction** of quality changes – before they cause failures

→ **From early signals to actionable insights**

SPC Opt

Calculates optimized process parameters and provides clear recommendations.

- **Immediate feedback** on the results
- **Target-based process control** , e.g., energy consumption, processing speed, expected quality

→ **High level of clarity** about what to do

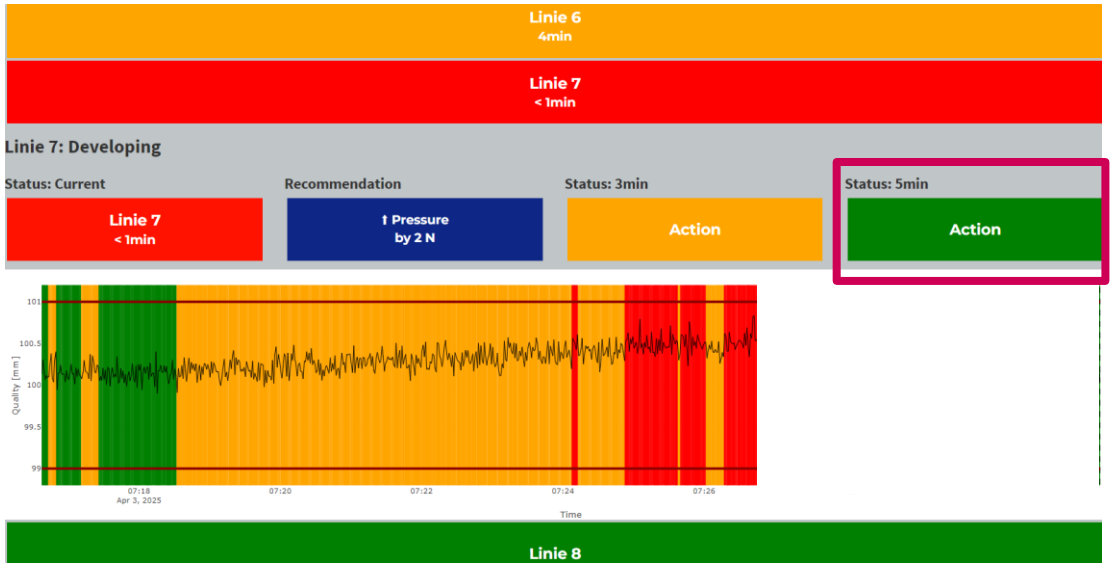
SPC provides overview and insights – predictive simulation adds foresight

Full shop floor overview

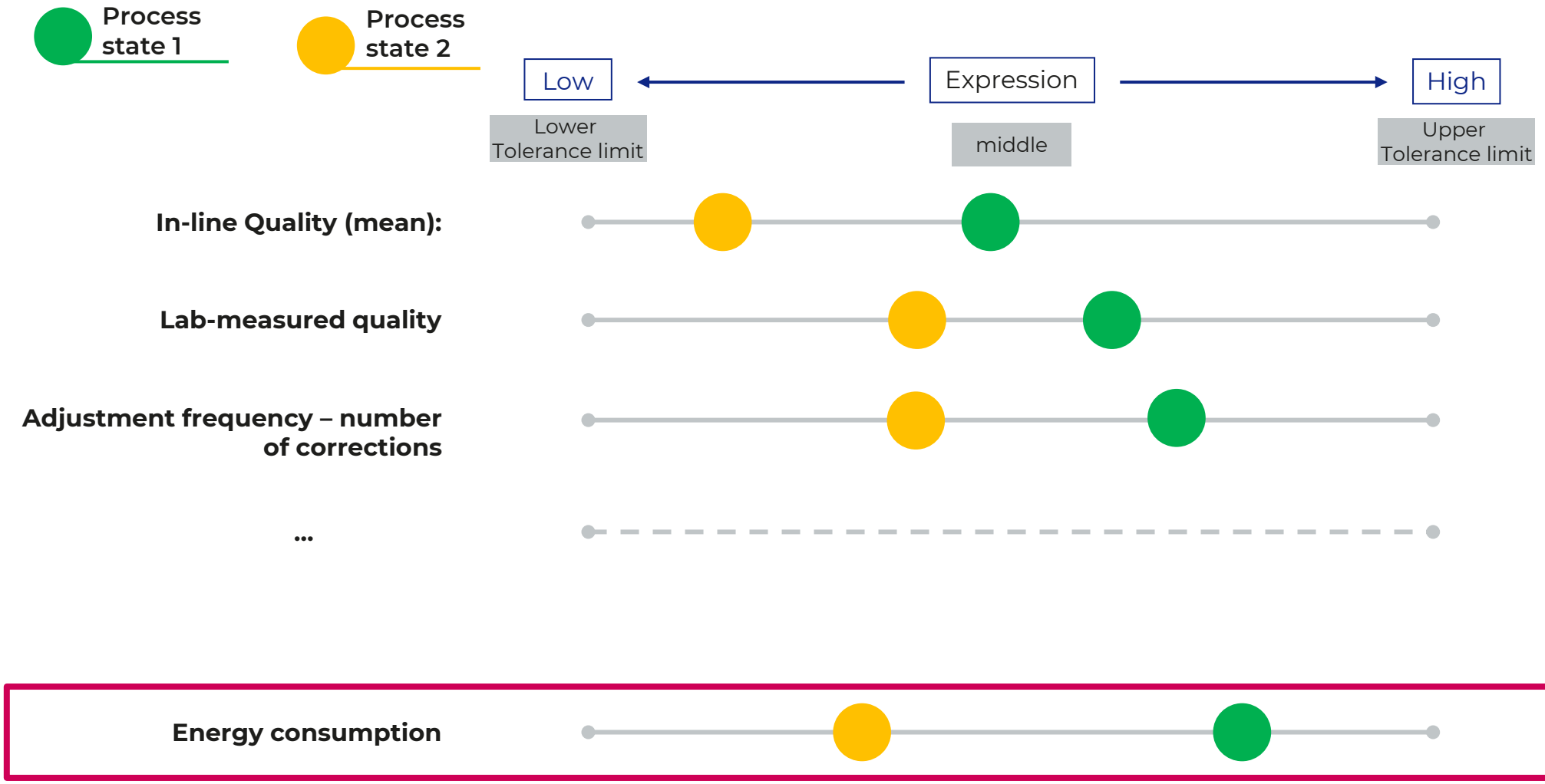
Know **where** to act: Pinpoint relevant action points
in real time

From early signals to actionable insights

Know **how** to act: Clear recommendations
– confidently, based on forecasts



Quality-driven energy efficiency: Smart energy savings aligned with quality goals
Example: Two Process States

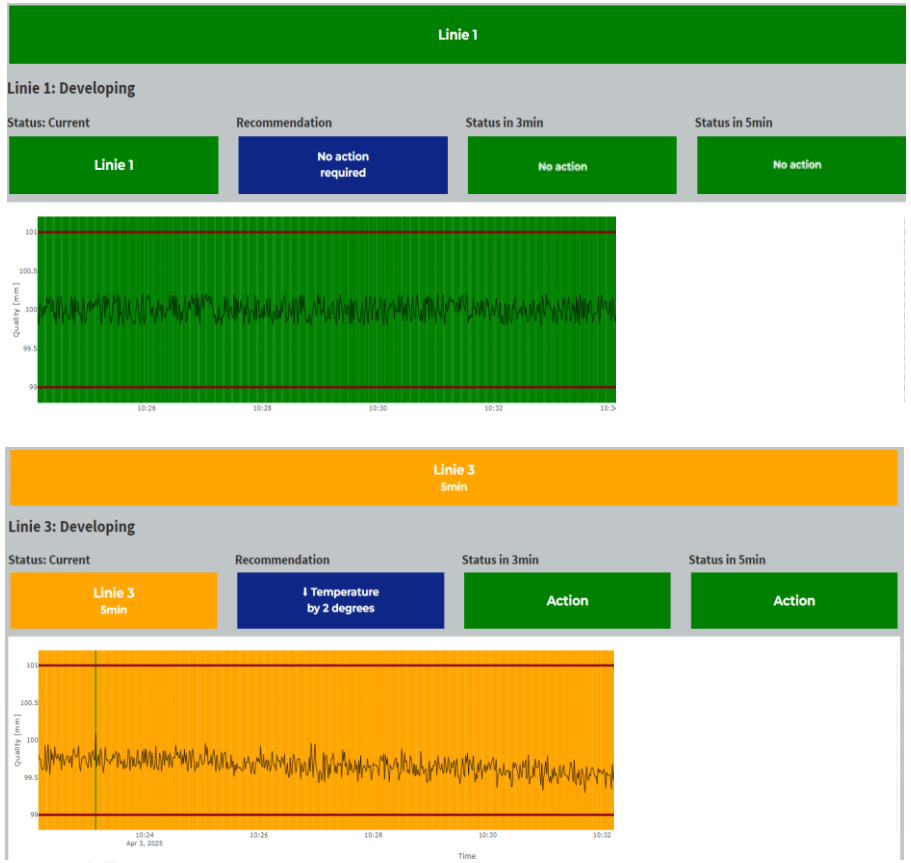


SPC – USE CASES: ENERGY EFFICIENCY

Smart energy savings aligned with quality goals – by adapting the target production state

In-line Quality (mean):

Energy consumption:



In-line Quality (mean):

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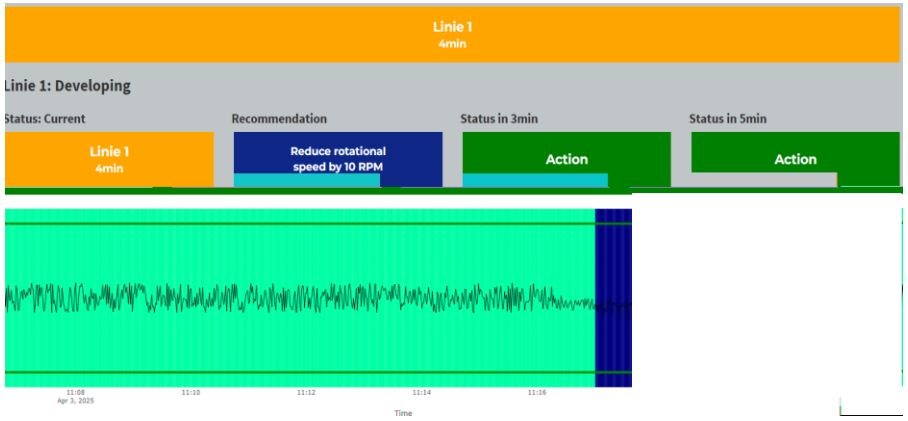
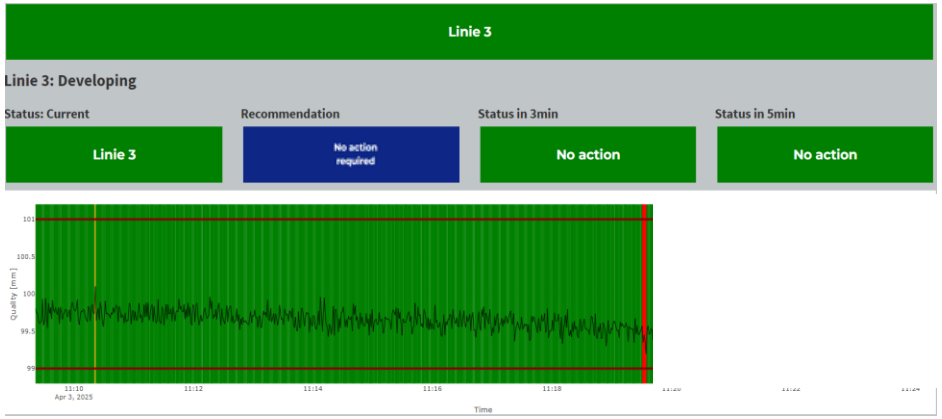
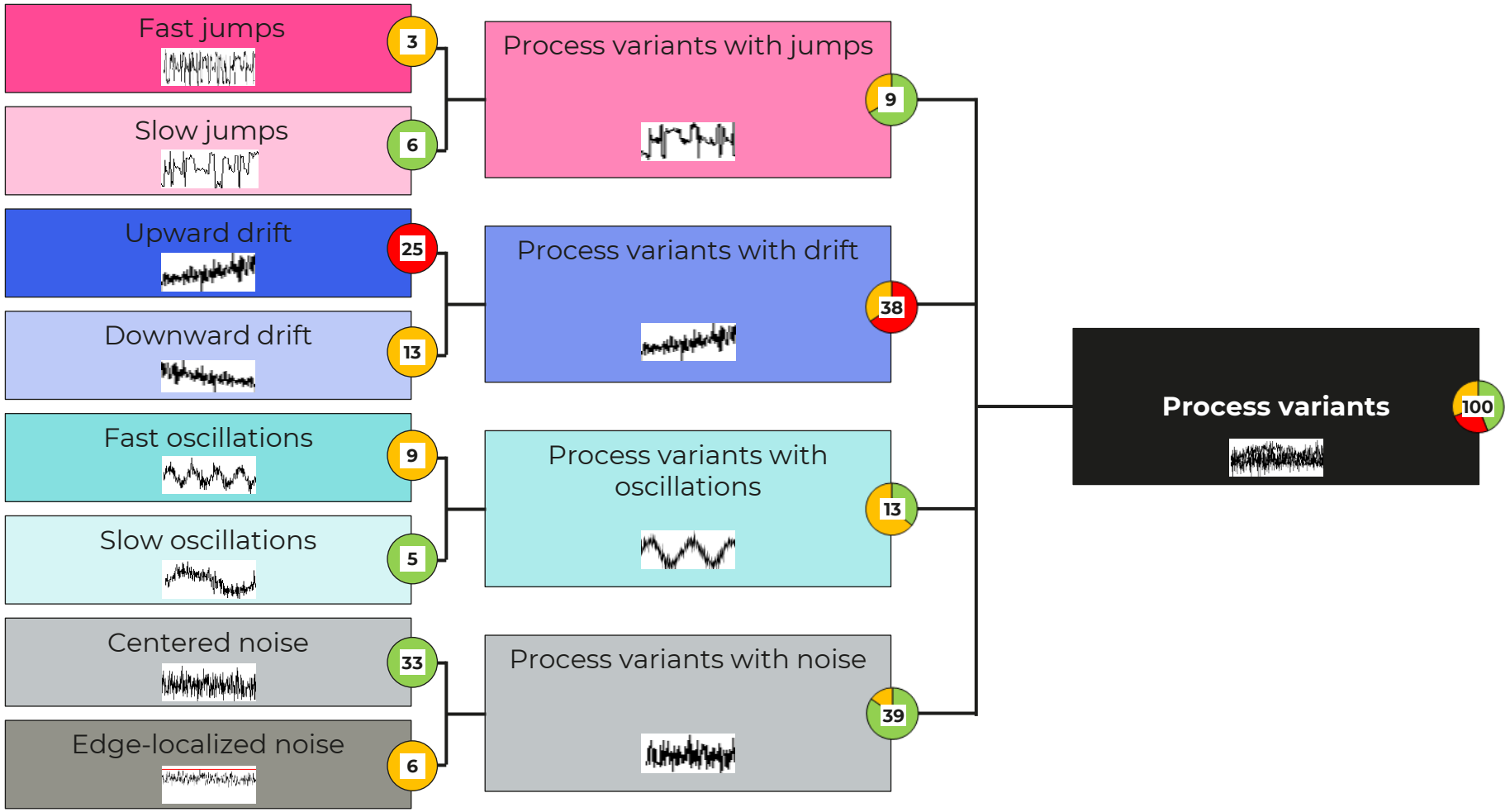




SPC: CLASSIFICATION SYSTEM

Classifies cross-line variations for holistic insights and smarter shop floor decisions.



Critical variants

Partially critical variants

Uncritical variants

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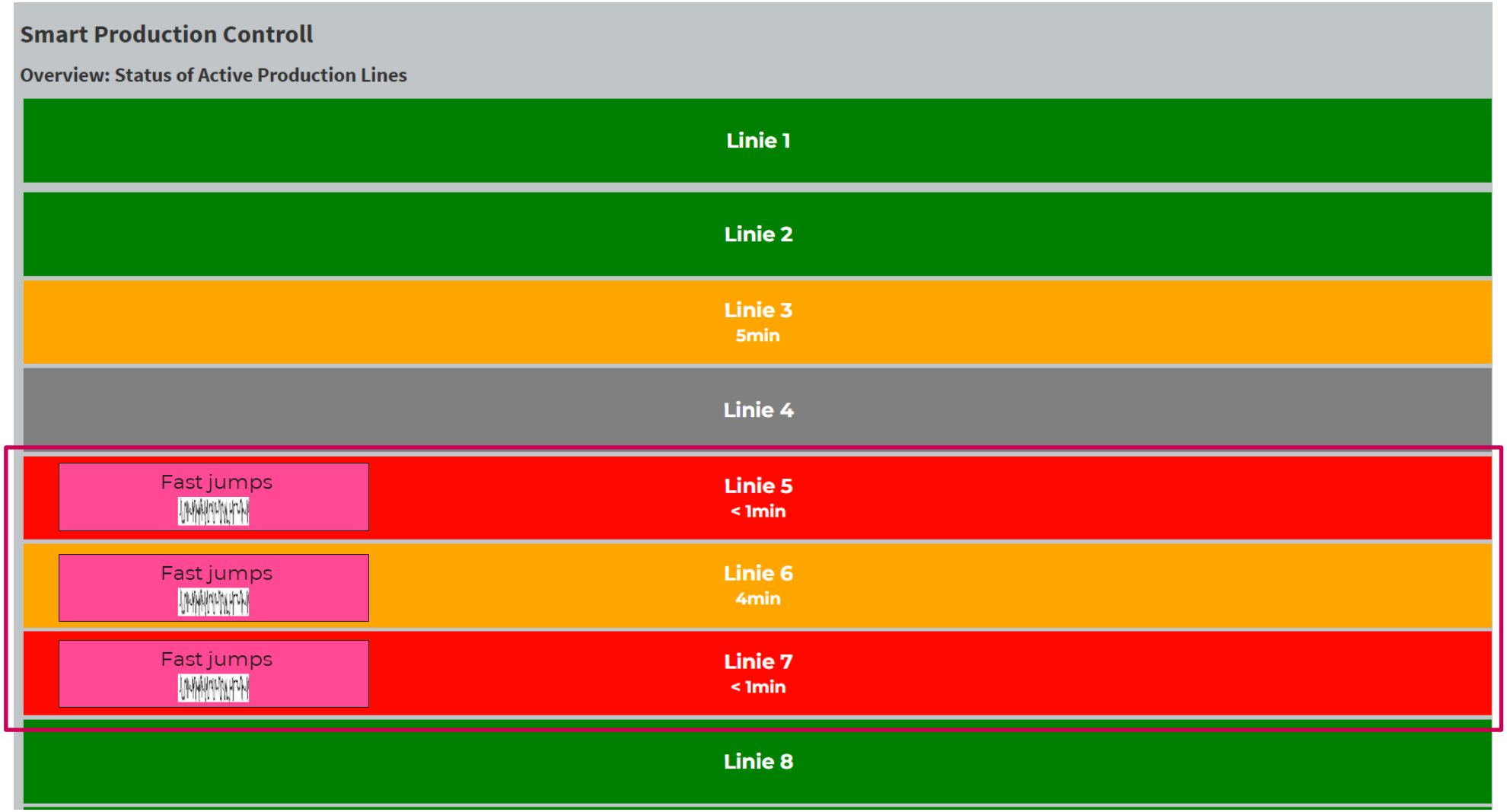


MAIN BENEFITS OF SPC (SMART PRODUCTION CONTROL)

Boost production, reduce environmental impact, and enhance sustainability

SPC Gen

Small Data Start – Scale as needed

Low-Threshold: Optional Single-Sensor Entry with Scaling Potential.

- ✓ Low upfront Investment in time & costs
- ✓ Step-by-step scaling avoids complexity
- ✓ Employee Buy-In: Ensures acceptance

Smart Expertise Preservation

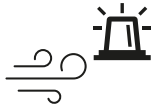
AI Assistant for Capturing Expert Knowledge on Critical Process Patterns.

- ✓ Continuous Availability of Expertise
- ✓ Better & Faster Problem-Solving
- ✓ Boosted Efficiency

SPC Watch

Alerting critical unknown Influences

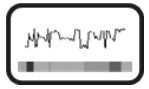
Classifying process variations reveals hidden environmental impacts.



- ✓ Flagging need for stricter control
- ✓ Proactive response reduces waste
- ✓ Fewer returns cut costs and emissions

Enhanced Process Stability

Fine-tuned Monitoring within Tolerance to Reduce Variance.

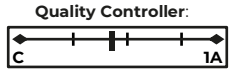


- ✓ Improves resource efficiency
- ✓ Reduces waste
- ✓ Longer product lifespan via higher quality

SPC Opt

Target-based Process Control

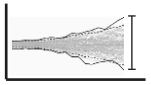
Allows Resource-Optimized Production by Client-Required Quality.



- ✓ Adapts to changing requirements
- ✓ Optimizes resource use
- ✓ Prevents faulty deliveries

Predictive Simulation & Training

Realistic process flow simulation for decision support and training.



- ✓ Real-time simulation for peak efficiency
- ✓ Non-disruptive testing of ideas
- ✓ Resource-free training

WHO WE ARE – CONTACT

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Inspired Data
Use your DATA. Craft your PRODUCTION.

We support companies with AI-powered data solutions to increase efficiency, reduce costs and drive digital transformation.

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Inspired Data

Use Your Data. Craft Your Future.

Founded in 2023, Inspired Data provides AI-powered, data-driven solutions that help companies strategically leverage their data, unlock potential, and drive successful digital transformation.

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About Dr. Sandra Romeis – Founder of Inspired

- **DataExpertise & Technical Background:** PhD in Statistics with over 15 years of experience in Data Science, Analytics, and AI – including roles at GfK, SUPERCRUNCH by GfK, and REHAU.
- **Industry Know-how:** Extensive and versatile project experience across Marketing, Sales, Industry 4.0, and data-driven process optimization – including leading the Data Lab and Smart Factory initiatives at REHAU.
- **Leadership & Solution Development:** Established and led REHAU's Data Lab; developed and implemented AI-based optimization solutions to increase efficiency in industrial operations.
- **Where Technology Meets Business:** Bridging the gap between data science and real-world business applications.
- **Strategy & Impact:** ROI-focused data consulting with a strong emphasis on sustainable integration of data-driven solutions to boost value creation and operational efficiency.
- **Innovation & Intellectual Property:** Patent application submitted in the field of data-driven technologies for process optimization.