celano Company Presentation

Industrie 4.0, Smart Factory Solutions

4th February 2020, Bangkok, Thailand
Introduction

• Founded 2002 in Bottrop
• 32 Employees
  • (Electrical and mechanical engineers, computer scientists and mathematicians)
• Tailor made solutions
• Our solutions are based
  • on the understanding of manufacturing processes and
  • on the use of modern, dependable hardware and software technologies
Introduction
Two strong partners for ASIA

www.frp-solutions.com
www.rgu-asia.com
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LinkedIn: FRP Solutions Asia
Introduction

• Link between automation level (level 1) and production planning systems/ERP (level 3/4).
• Design, realization and commissioning of the customized software systems
• Selection and installation of the required hardware
• **The core of our corporate strategy is the customer proximity and a high quality service.**
celCAP® 4.0 - ready for Industrie 4.0

Middleware (celWebConnect) - Frontend / GUI
JavaScript / HTML5

GUI/Client

Java

Wearables AR/VR

Middleware (celWebConnect)

DB

Application Server

TCP/IP

Wearables AR/VR

TCP/UDP

Level 1

Level 3

Business Logic
celsps
celDSP
celmes
celNetServer
cell3mes

TA e.g. MeasEquip.

Java

Backend C++ / Java

Wearables AR/VR

Mobiles

Mobiles

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Our portfolio and services

• Our services are
  • feasibility studies and analysis
  • process simulations
  • technical specifications and requirement specifications
  • system design
  • project support
  • system integration
  • maintenance
  • and support
  • training

SCADA/MES
Process control and data acquisition systems

Optimization solutions for production processes

Logistics and warehouse management systems

celCAP® 4.0
The celano IT-framework – ready for Industrie 4.0
Smart Factory Solution for a Rolling Mill

Preheating line

Cut-to-length line

Rolling mill with pusher-type furnaces

Rolling mill with pusher-type furnaces

Grinding, inspection and quality control

Cooling bed

Roller hearth furnace

Roller hearth furnace

Roller hearth furnace

Roller hearth furnace

Descaling systems

Flame cutting machine

Annealing furnaces

Cutting line

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AI based Material Tracking

• Challenges
  • Different lighting situations
  • Crane movements
  • Overlapping materials
  • Shadows/water on the surface

• Accuracy of material identification and tracking > 97%

• 7 very high colour depth cameras

• Data rate per camera 25MB/s
AI based Material Tracking

• New fast algorithms, running on high-end graphic processing units (GPU) are developed
• Detecting and extraction of suitable features (edges, surface structures)
• Combining all camera data streams to track the material along the entire cooling bed
• Adding further data (crane position, material data, material tracking from input and output lines...) to support the tracking
Traffic Analogy

Source: Wikimedia Commons
Material flow optimization

• Monitor critical transport infrastructure
• Predict jams and idle times
• Decelerate aggregates to increase overall throughput
• Redirect materials while possible
• Request more materials when necessary

• Discrete event simulation
• Cellular automaton as model
Material flow optimization

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Smart Factory Solutions
Furnace Control System celFCS

- **New challenges** for furnace operators
  - Wider product mix
  - Smaller lots
  - Higher quality standards
  - Stricter environmental regulations

- Three stage optimization concept
  - Observer
  - Prognosis
  - Optimization
Smart Factory Solutions
Furnace Control System celFCS

• universal approach
  • reheating/tempering furnaces
  • batch annealing furnaces

• detailed 3D information
during heating/annealing process

• high accuracy
  \((\Delta < 1\% \text{ at moment of discharging})\)

• energy savings and CO2 reduction

• equal quality

• celFCS-sim furnace simulator
  • “What is going on?”
  • “What if?”
Smart Factory Solutions
Furnace Control System celFCS
How new technologies... („Industrie 4.0“, Wearables, AR/VR, contextualization...)

...can be integrated...

in this environment.
Evaluation
Thank you ขอบคุณ

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