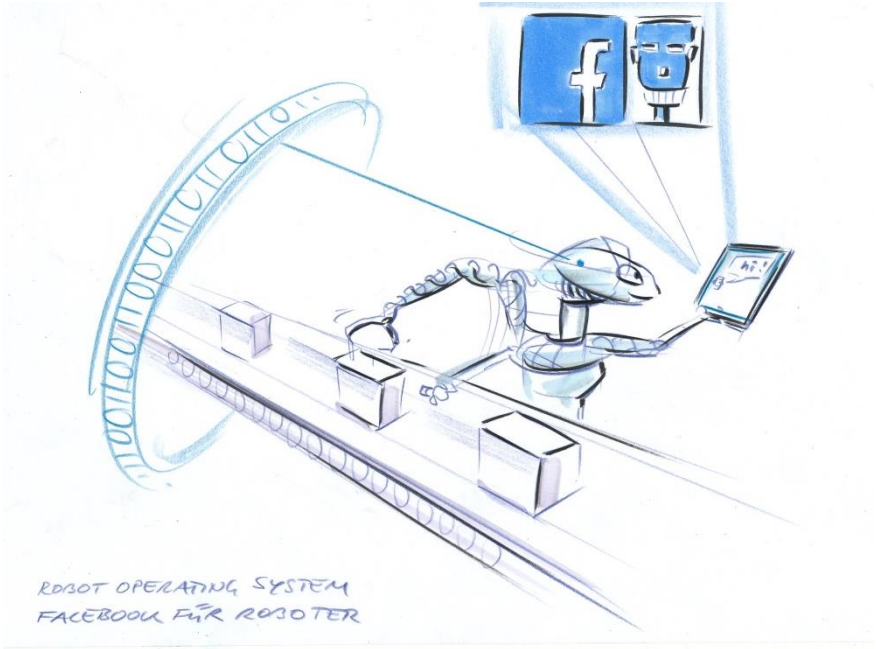
« Construction Equipment in an Agile World »

Session 1„ Innovation in manufacturing processes"
16th October 2014, Crowne Plaza -Antwerp

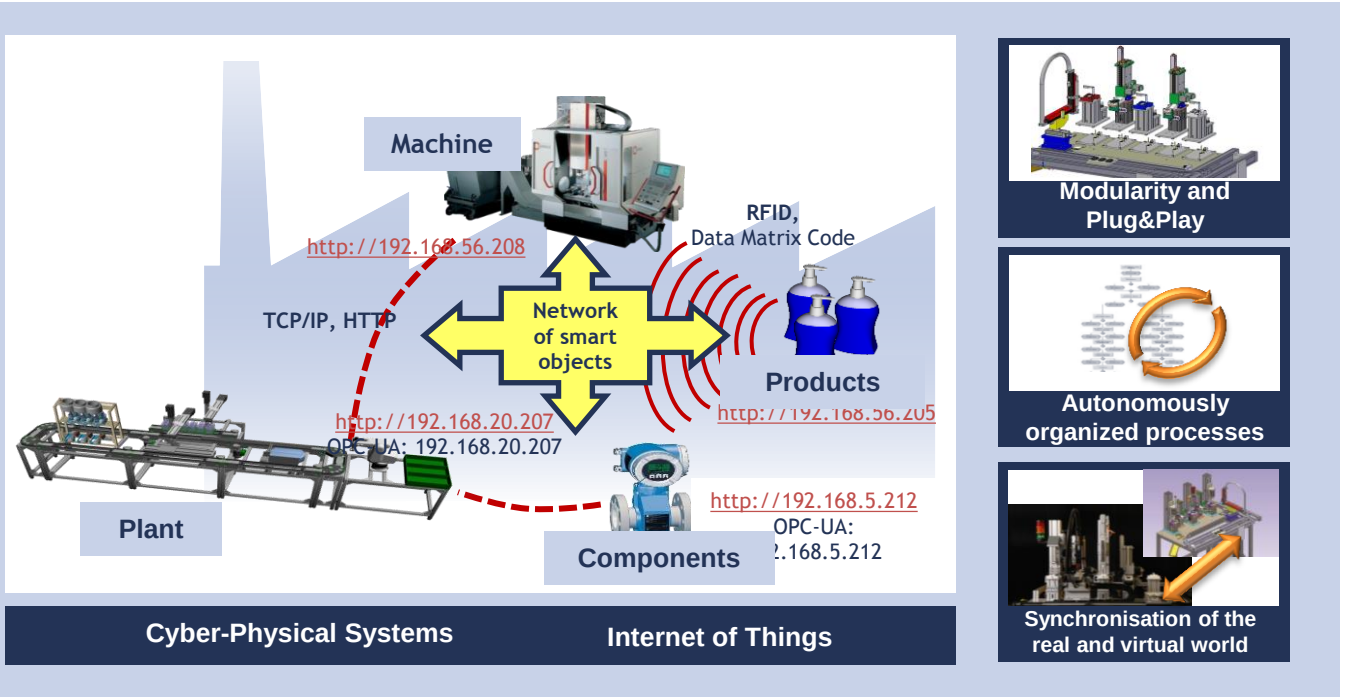
CECE Congress 2014 - 15, 16, 17 October - Antwerp, Belgium



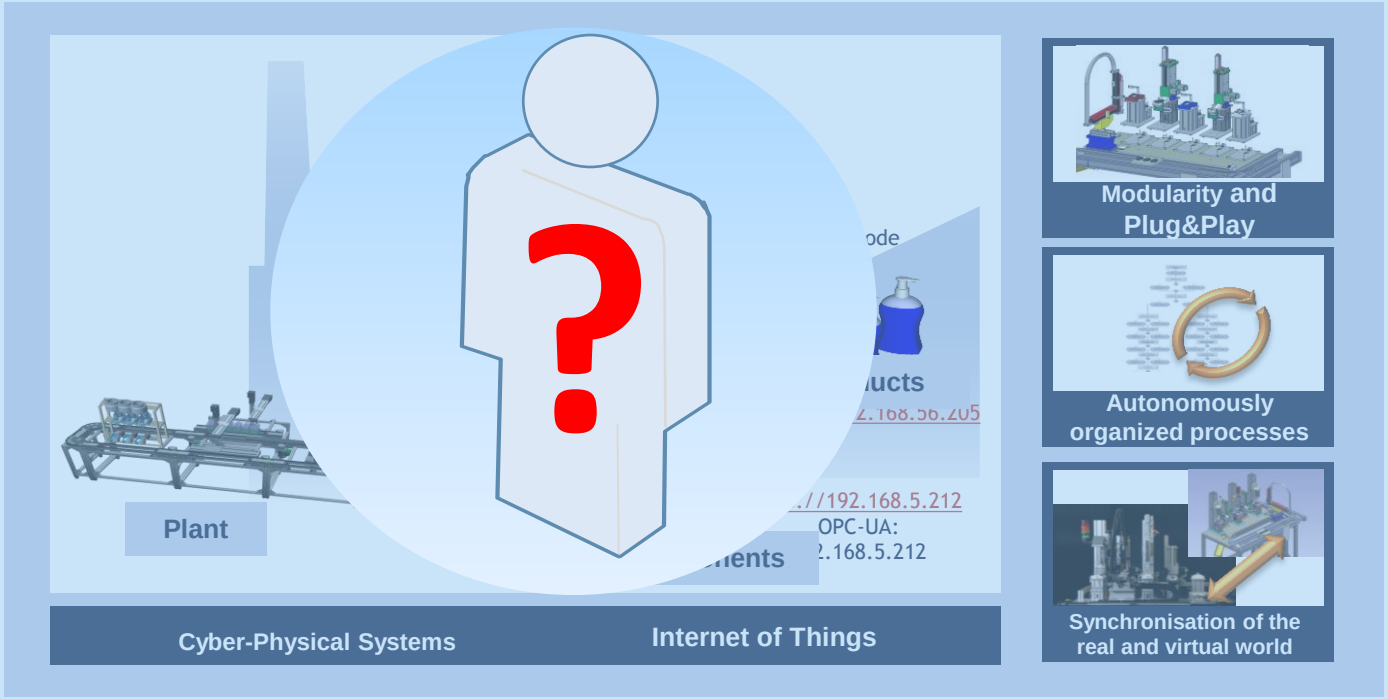
Industry 4.0
- from the Human and HMI perspective

CECE CONGRESS 2014
Antwerp, Belgium

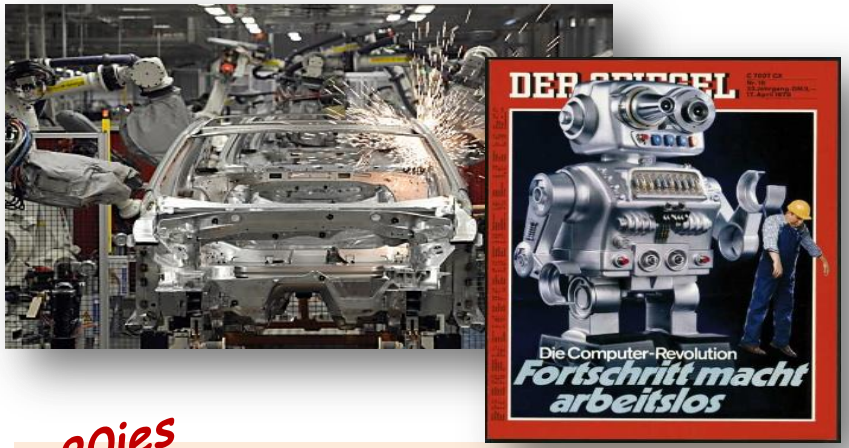
Paradigms of a Cyber-Physical Production System (CPPS)

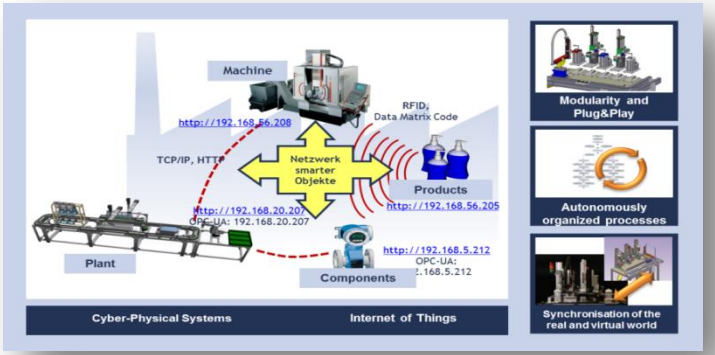


Paradigms of a Cyber-Physical Production System (CPPS)



Computer-Integrated Manufacturing (CIM) ≠ Industry 4.0





70-80ies

CIM-illusion:

man-abandoned factories

today

Industry 4.0:

the human in the middle?

smartFactory KL

German Research Center for Artificial Intelligence | IFS Innovative Factory Systems

Compared to machines,

humans are good at …

- Recognizing complex stimuli: pictures, voices, patterns, language etc.
- Associative memory
- Explaining phenomenons
- Improvisation and flexibility regarding new situations
- High learning ability
- Estimation
- Inductive conclusions

Compared to machines,

humans are limited at...

- Carrying out complex, multilayer tasks
- Short-term memory
- Big data storage
- Reliable, fatigue-free performance
- Physical strength
- Deductive conclusions

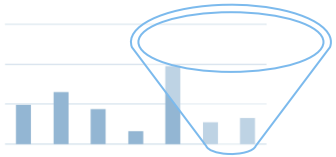
Cyber-Physical-Production-System - Control Loop

- Adapted production strategy
- Problem solution

Autonomously organized processes according a given production strategy

CPPS

Capture of comprehensive, real-time information



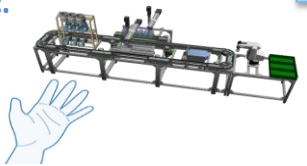
CPS

Aggregation and pre-processing of information

Human

Interpretation

Potential for Optimization
Error, Defect, etc.



Human

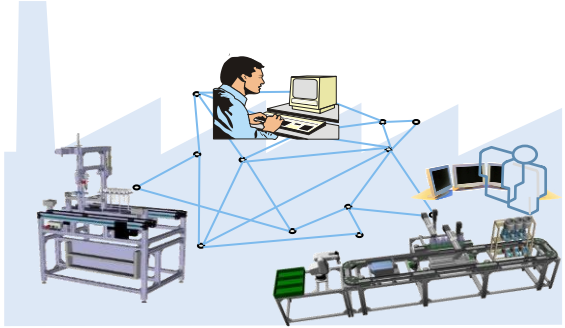
Intervention

take strategic decisions

monitor

intervene

FORMS OF INTERACTION IN A CYBER-PHYSICAL WORLD



long-cycle

Industrie 4.0

Today

Tomorrow

Trends in Manufacturing

Trends in Human-Machine-Interaction

. . .

Short-cycle

1 - Advanced Visualisation & Interaction

Mobile devices such as *smartphones*, *tablets* and *smartglasses* are the main tool in dealing with CPS and the information provided by them.

Ability to operate via

- touchscreen
- language recognition
- gesture recognition

uni-modal multi-modal

Ruggedized Tablets

Siri, etc.

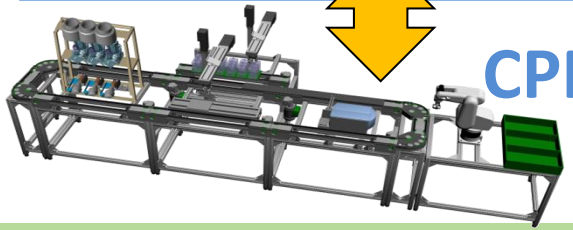
Leap Motion, Kinect, etc.

2 - Smart Assistance Applications – Services

Communication:
E-Mail, Timeline, Microblogs, Instant-Messenger, Video-conferences & 'view-sharing'

Integration of Production-IT and Knowlegde Management

VR/AR as mediator

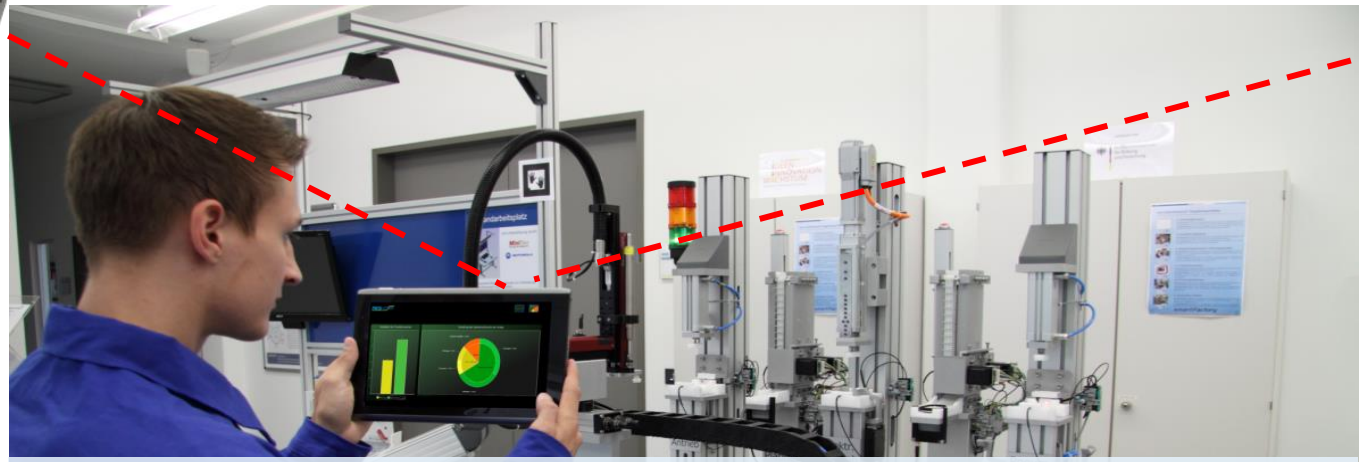


CPPS

Assistance:
e.g. navigation & location-based content and applications

Interaction and device access:
Live-Data, Parameterization, etc.

3 - Smart Assistance Applications – Location /context awareness



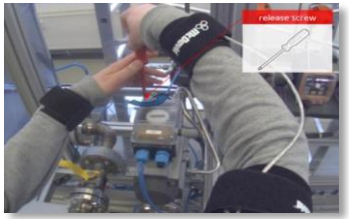
Requirements:

- **Location /context awareness:** Identify and evaluate position / context of components and human
- **Active information filtering:** Only relevant for information and interaction options are accessible.

no proprietary, fix control panels 1: m-access

Smart Assistance Applications – Summary & Examples

- **mobile devices and advanced visualisation / interaction**
- **seamless integration of information and services** (vertical and horizontal integration)
- **advanced sensors** to detect and to characterize location / context



Support the human operator **in difficult, infrequent or previously unknown situations**

Example 1 – Smart AR-Informationsystem

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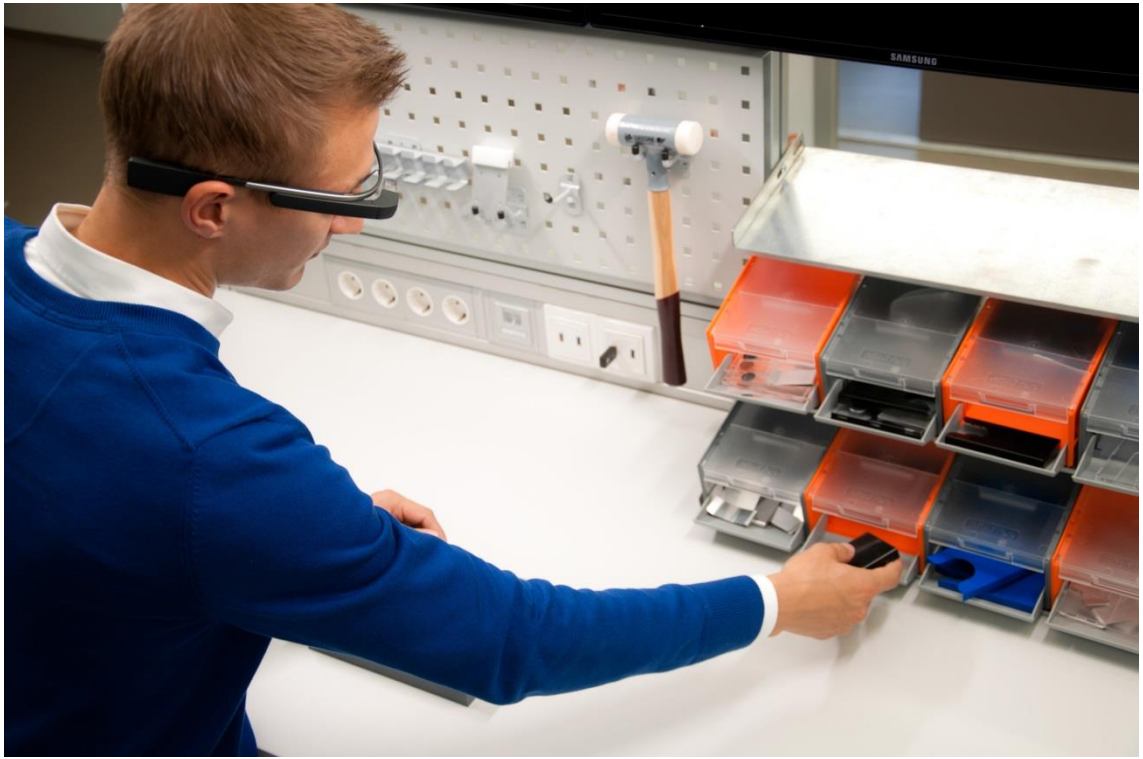
Video

Example 2 – Manuel Workstation at the SmartFactory



Example 2 – Manuel Workstation at the SmartFactory

Video

Example 3: Virtual Training - VISTRA

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Video

Thank you for your attention!

smartFactory KL

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COMMITTEE FOR EUROPEAN
CONSTRUCTION EQUIPMENT