THERE ARE NO BOUNDARIES OR BORDERS IN THE DIGITAL WORLD

- KARIM RASHID -

industry
4.0

Industry 4.0 consists of 4 main topics:

Connectivity and communication
- Industrial internet - multidirectional real-time connection of machines, production and objects
- Cloud and cyber-security - management of large data sets in cloud-based, open but secured systems

data, intelligence and analytics
- Big data and analytics - Combination and intelligent analysis of various large data sets
- Artificial intelligence - "machine learing" based development of intelligent algorithms

human- machine interaction
- Simulation - optimisation through real-time data based simulation of products and scenarios

Smart factory
- Manufacturing technology - e.g. 3D printing od spare parts and prototypes; real-time commissioned production
- Developed robotic technology - autonomous, cooperative robots that interact autonomously based on (sensor) data

Robotic
"A roboter is a programmable multi-purpose handling device for movement of materials, workpieces and special devices. The freely programmable movement sequence makes it replaceable for various tasks."

Fields of Application
- e.g. Industry, medicine, care work, agriculture and at home
- Robots are very versatile in their functionality, e.g. they can be used as assembly/welding robots, operation robots, search robots, inspection robots or also for communicative tasks as greeting and guiding robots

Humanoid Robots
- highly developed machine beings whose construction was modelled on the human form

Artificial Intelligence
Opens up areas of application in robotics that were previously inaccessible to humans

Cyber physical systems

are open social technical systems and enable a row of novel functions, services and features.
Those includedes:
-embedded systems of production, logistic, engineering, coordination and management processes
-combined with internet services
-which capture physical data with a sensor and have an effect on physical processes by an actor (real person)
-at the same time via digital nets which are connected to each other and have multimodal human-machine interfaces

examples for cyber physical systems:
-control of train and flight traffic
-remote monitoring of self working production systems
-autonomic car driving
-sensor nets for environment monitoring (pollutants, forest fire, climate, earthquakes)
-modern connected health systems

Development of the Internet

1957 the US ministry of defence founds the 'Advanced Research Projects Agency'(ARPA) to develope new technologies for data transfer and communication
1969 rise of the internet, the connection of the first four mainframes
1971 the network consisted already of 14 knotes and as the standard architecture for the data fransfer 'Network Control Protocol' (NCP) and File Transfer Protocol (FTP) got introduced. The ARPANet as a closed net and a prerunner of an open and free internet existed until 1991.
in **1989** the CERN conciderations about a spreaded hypertext-net were made already
1991 launch of the internet
in the year **2017** about 3,6 billion (50% of the world population) used the internet.