
IARIA
Panel:
Cooperation and Trust
(humans, robots, applications, empathy, liability, …)
InfoWare
2020
Cooperation and Trust

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InfoWare 2020

Chair

Gil Gonçalves, Faculdade de Engenharia da Universidade do Porto, Portugal

Panelists

Mário Antunes, Instituto Politécnico de Leiria, Portugal

Mary Luz Mouronte-López, Universidad Francisco de Vitoria, Spain

Zahid Iqbal, Universidade do Porto, Portugal

Bourret Christian, University Gustave Eiffel /Paris East Marne la Vallée, France

Yasuhiko Watanabe, Ryukoku University, Japan

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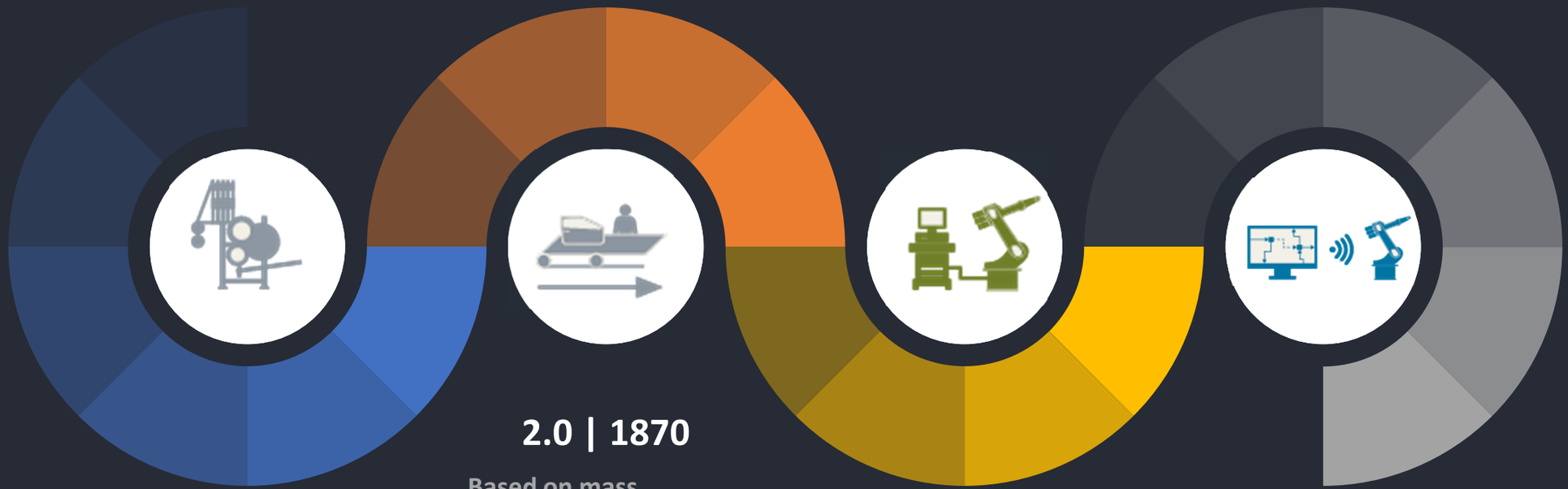


1.0 | 1784

Based on mechanical production equipment driven by water and steam power

2.0 | 1870

Based on mass production enabled by the division of labour and the use of electrical energy

3.0 | 1969

Based on the use of electronics and IT to further automate production

4.0 | today

Based on the use of cyber-physical systems

It's not just in industry anymore .. Industry 4.0 is everywhere

health 4.0

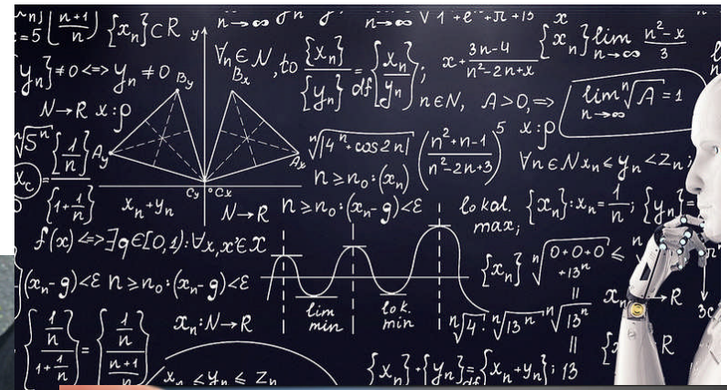
education 4.0

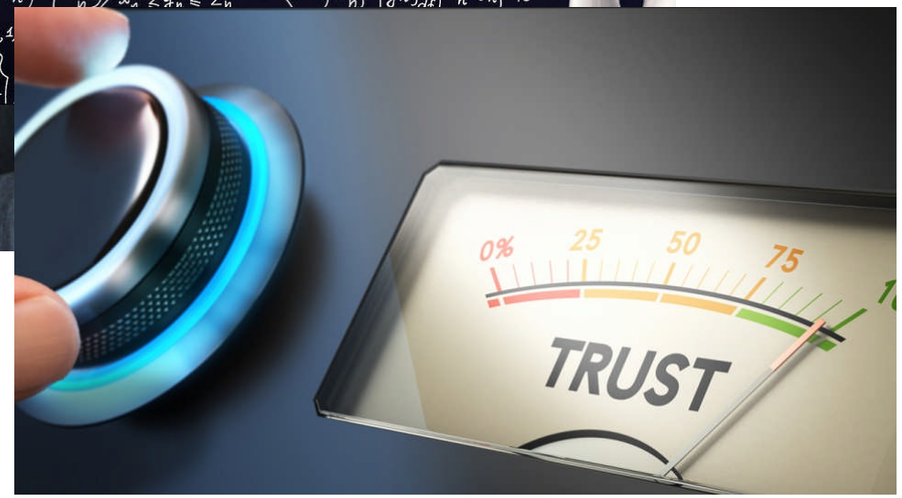
commerce 4.0

democracy 4.0

..

economy 4.0 & society 4.0





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Cooperation and Trust
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InfoWare 2020

Gil Gonçalves, it's no longer just technology and data

Mário Antunes, Cybersecurity, cyberhygiene and "cyber trust"

Mary Luz Mouronte-López, Enhancing the Business Processes Using Artificial Neural Networks

Zahid Iqbal, Dynamic Path Planning for Industrial robots, Challenges & Opportunities

Bourret Christian, Analyse the importance of trust for cooperation, especially in the Healthcare sector.

Yasuhiko Watanabe, Personal Information Disclosing Problems of Non-real Name Users

Panel:
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Chair

Gil Gonçalves, University of Porto, Digital and Intelligent Industry lab

gil.goncalves@fe.up.pt

It's no longer about technology and data

- analysis, specification and implementation of complex systems with adaptive capabilities
- software engineering, control architectures and design of software for complex systems.
- digital transformation and industry 4.0
- Cyber Physical Systems, IoT and edge computing
- predictive and prescriptive models for adapting and reconfiguring systems

Panellist Position

Cybersecurity, cyberhygiene and “cyber trust”

Mário Antunes
Polytechnic of Leiria, Portugal mario.antunes@ipleiria.pt
Computer Science and Communication Research Centre, Polytechnic of Leiria
CRACS, INESC-TEC, University of Porto, Portugal

- Value of data an information in cyberspace
- Main threats to cybersecurity
- Challenges to security and trust in cyberspace
- The meaning of cyberhygiene and the best practices of cybersecurity.

Panellist Position

Enhancing the Business Processes Using Artificial Neural Networks

Mary Luz Mouronte-López, Universidad Francisco de Vitoria, Spain maryluz.mouronte@ufv.es

- Cooperation and trust in the industry are linked to the business processes.
- The business models require to be formalized and improved. ANN offer interesting opportunities.

→ Diminution of OPerational Expenditures (OPEX) (carrying some activities in the process by machines instead of humans).

→ Reduction of Time-To-Market (optimizing the inventory control, improving the execution times, etc.)

→ Improvement of working conditions (releasing humans from routine and stressful tasks)

Panellist Position

Dynamic Path Planning for Industrial robots, Challenges & Opportunities

Zahid Iqbal, DIGI2 - FEUP, Portugal zahid@fe.up.pt

- Autonomous manipulation
- Unstructured environments – need for efficient perception
- Complexity challenge – high dimensional configuration space
- Coordination of planning and perception
- In human-robot interaction, leverage the structure of the world / goal, guide by gestures

→ Perception & planning loosely coupled but need to enable high frequency feedback

→ High performance / parallel computation via GPUs would enable real-time performance

→ leverage the task and environemnt structure to reduce the state space

Christian Bourret

Analyse the importance of trust for cooperation, especially in the **Healthcare** sector.

Examples in France with the **triple dimension of trust**: in other actors (human dimension), in tools and in organizations

With the whole issue of the production and use of **sensitive data**.

This question of trust is a key issue in our society in digital transformation which doubts its leaders (**society of mistrust**) and itself.

InfoWare 2020 Oct. 2020 Porto, Portugal

Personal Information Disclosing Problems of Non-real Name Users

Yasuhiko Watanabe

watanabe@rins.ryukoku.ac.jp

Ryukoku University

Non-real name users' personal information disclosing problems

key points of investigation

- **when,**
- **where,**
- **how, and**
- **to whom**

non-real name users disclose their personal information

Twitter users disclosed their personal information

elder member of us

fake information

young member of us

real information

Why an elder member of us thought “ fake information“

Some users in a Q&A site (Yahoo! Chiebukuro) submitted contradictory words

fake information

elder me of

We found many users in a Q&A site submitted their fake personal information

[watanabe @ J. of Adv. Int. Tech (2015)]

I am a man ⇔ a woman

a student ⇔ a dentist

a Tigers fan ⇔ a Dragons fan

How we examined whether fake or real

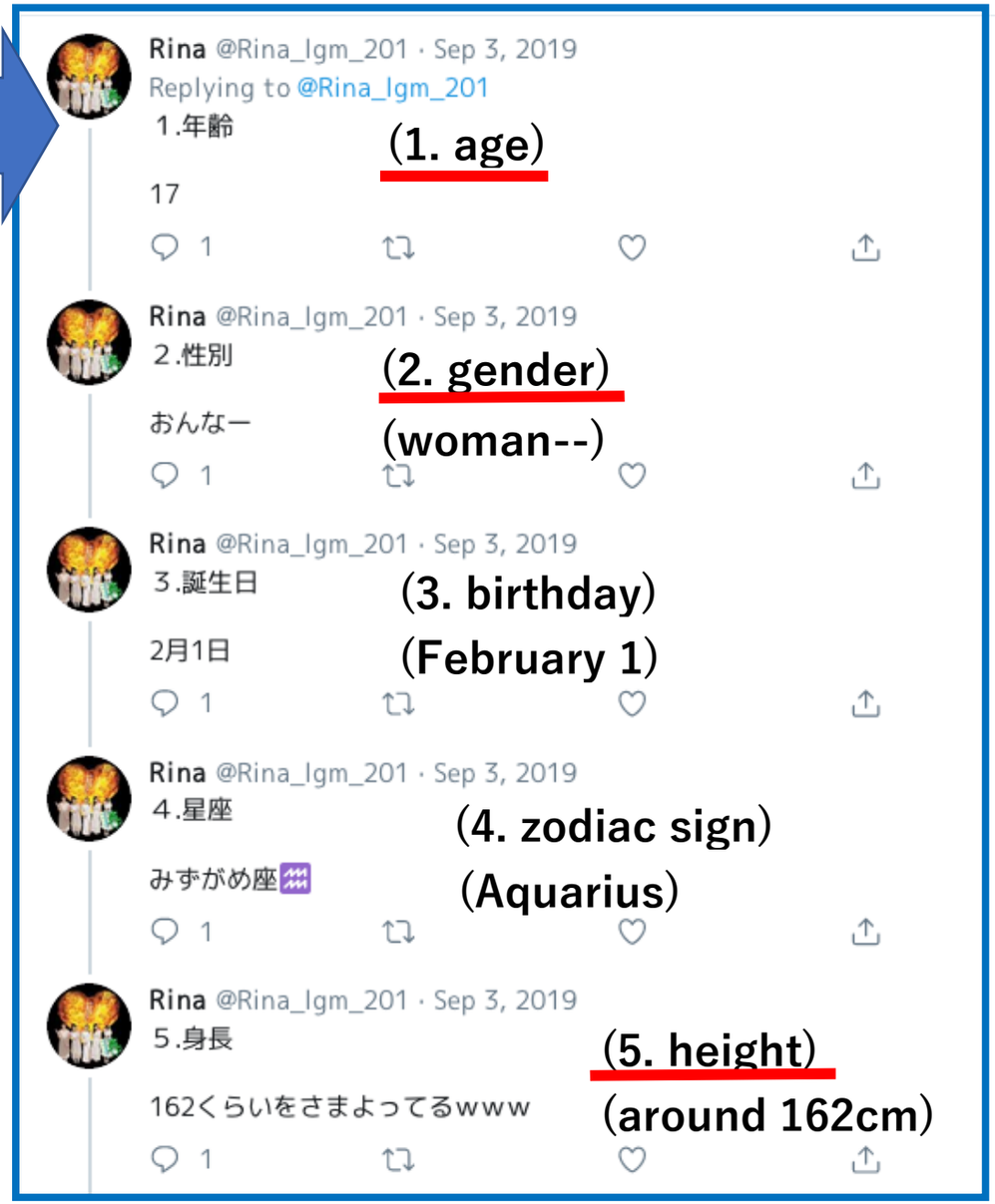
elder member of us

We examine whether their heights follow normal distribution.

MAYBE NOT because they were fake!

young member of us

OK, boss. Try it.



The result : most of them told their real information

elder member of us

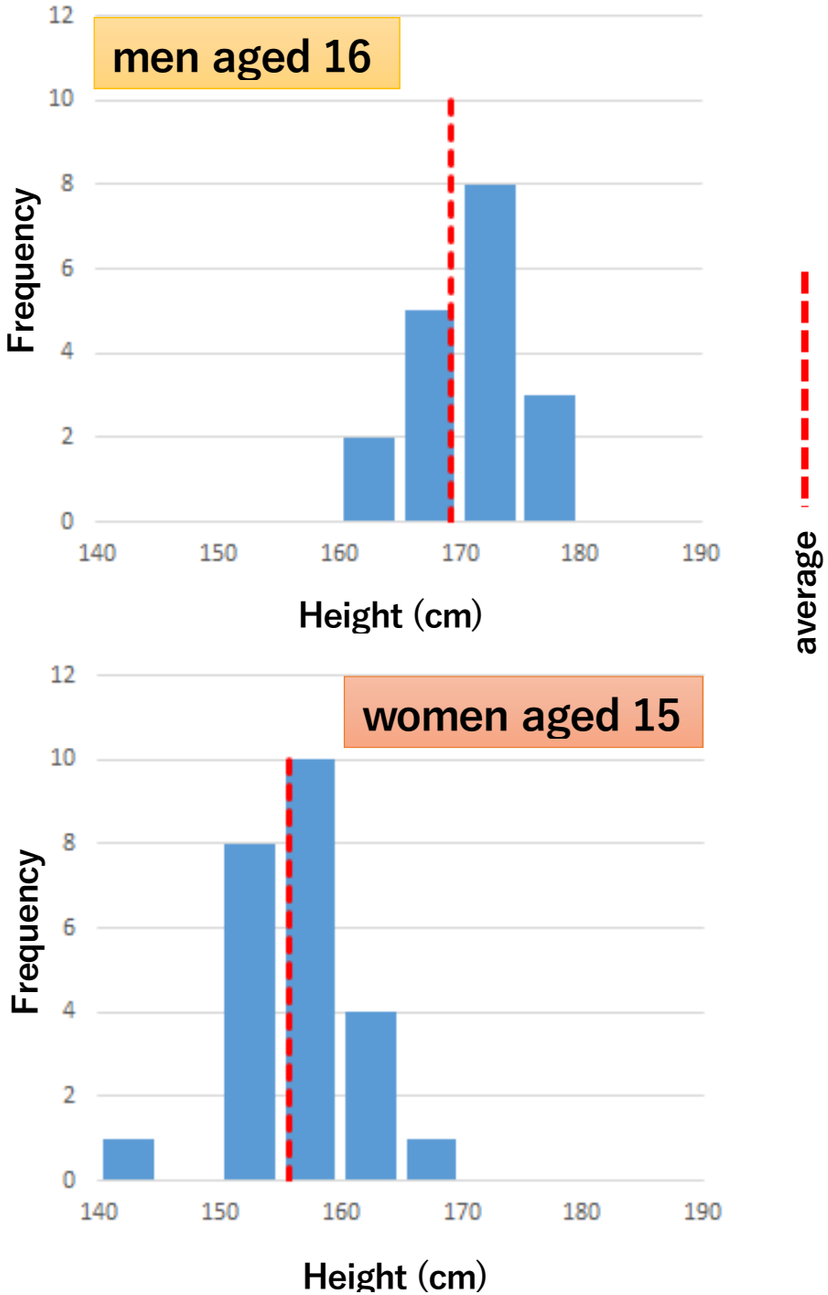
Wow .....

Their **heights** follow **normal distribution**.

Most of them told their real personal information.

young member of us

OK, boss.



We know very little about non-real name users

- **Now we know**

  They disclose their personal information under a specific situation

- **Next points of investigation**
  - To whom they disclose their personal information？
  - What kind of situation they do it？

Panellist Position

Personal Information Disclosing Problems of Non-real Name Users

Yasuhiko Watanabe, Ryukoku University, Japan watanabe@rins.ryukoku.ac.jp

- We know very little about non-real name users
- Internet users have potential privacy risks even if they used non-real name accounts
- It is difficult to check whether non-real name users tell real or fake information
- Some non-real name users disclosed their personal information under a specific situation
- The result of our statistical analysis showed that most of them disclosed their real personal information under the situation

→ We should investigate when, where, how, and to whom non-real name users disclose their personal information

→ The investigation give us a chance to know more about non-real name users

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InfoWare 2020

Industry 4.0 ++
it's no longer about technology and data

Porto, October 2020

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FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

Digital Industry Lab

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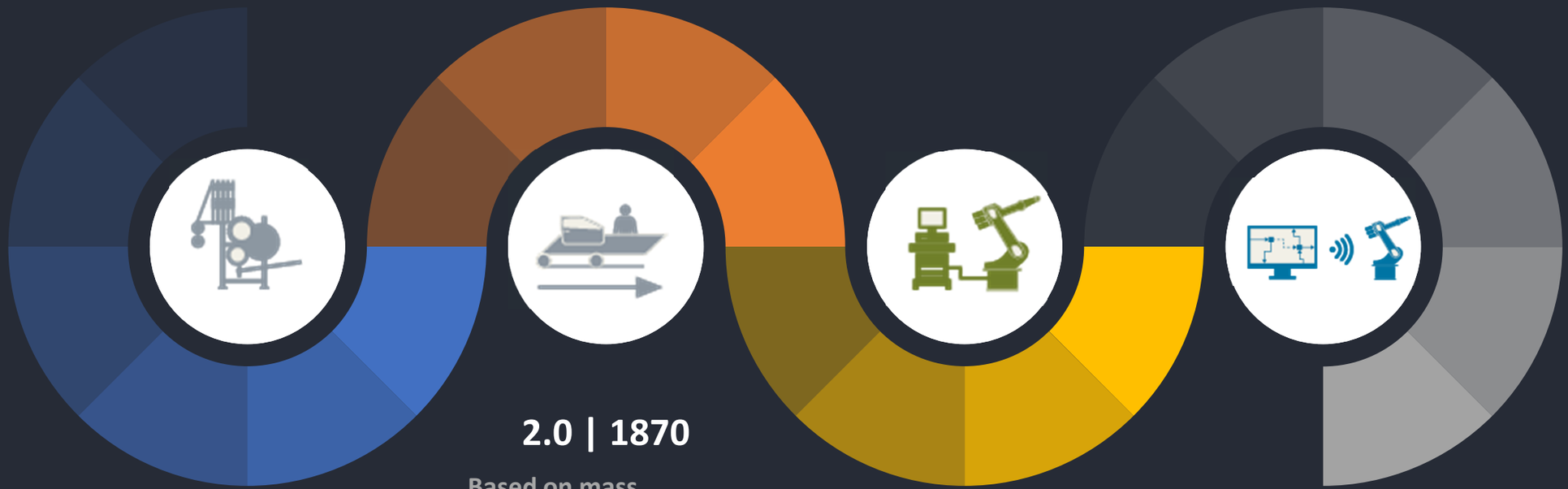
UNIVERSIDADE DO PORTO

DEI DEPARTAMENTO DE
ENGENHARIA INFORMÁTICA

SYSTEC
RESEARCH CENTER
FOR SYSTEMS & TECHNOLOGIES


LEONI
ABB

industrial revolutions



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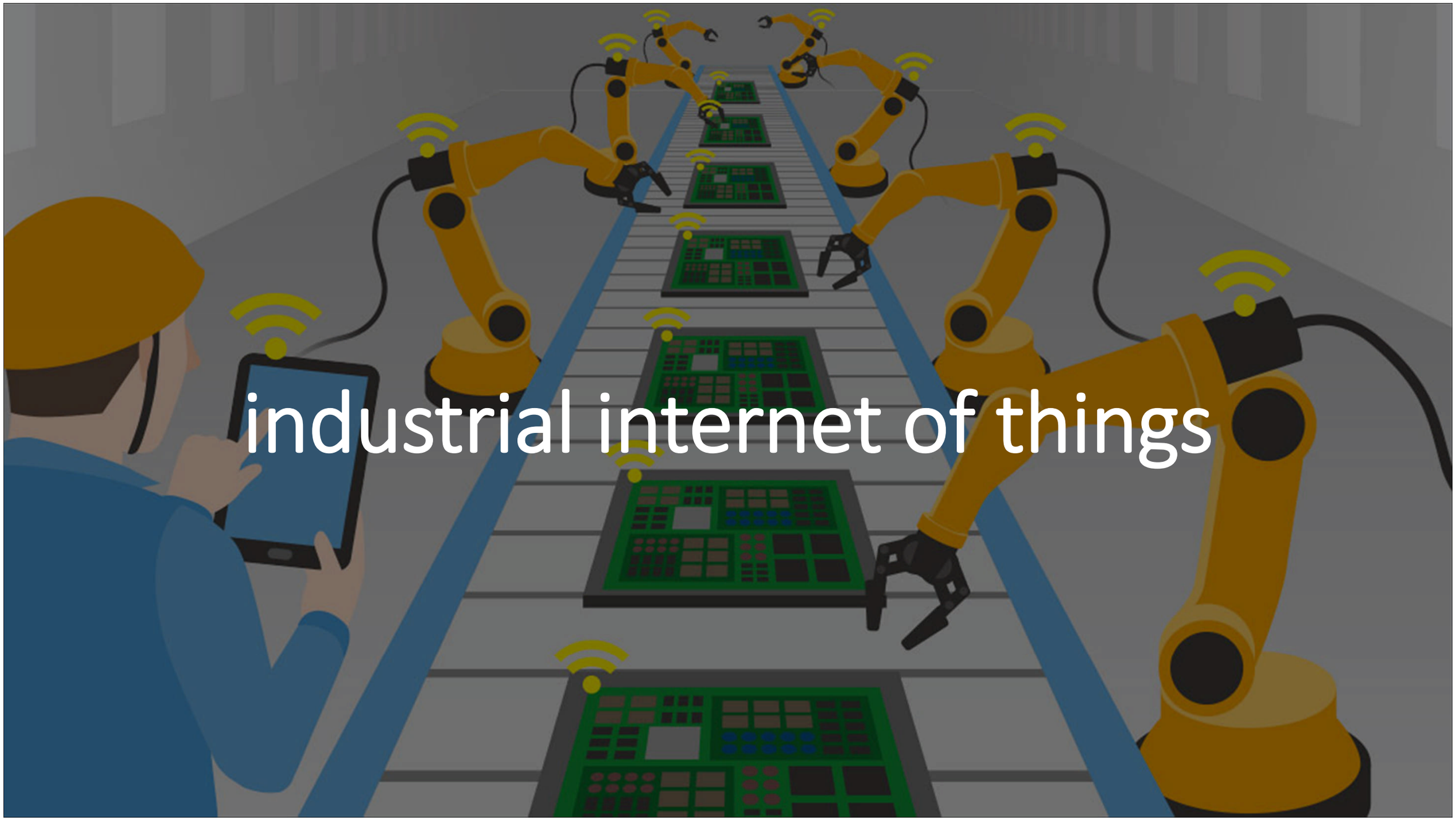
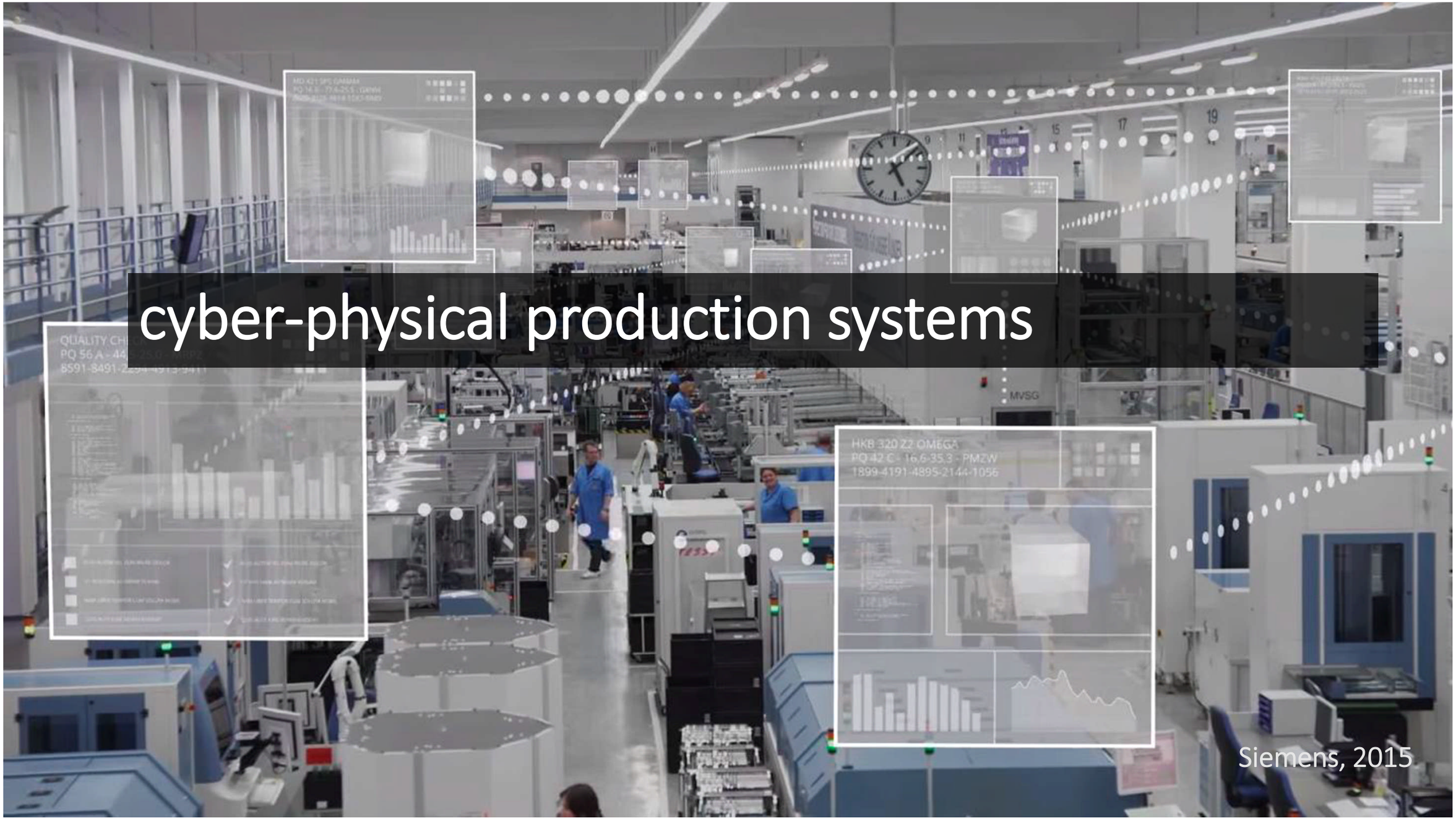
machine vision

embedded electronics


Collaborative robotics

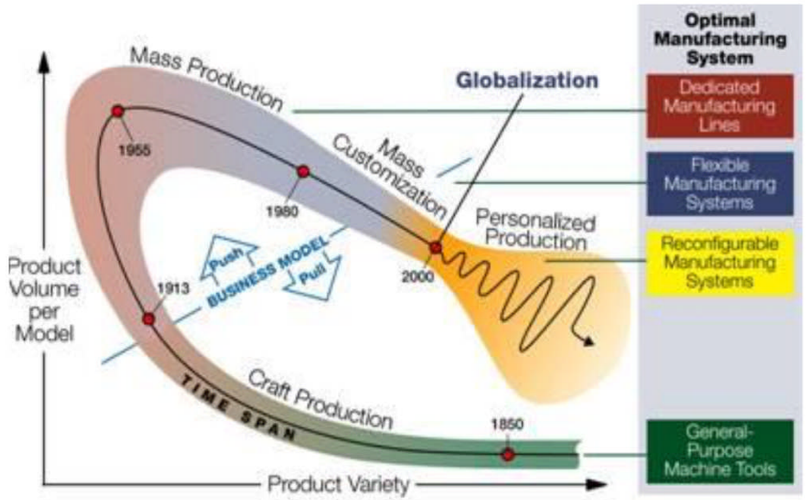

industrial internet of things

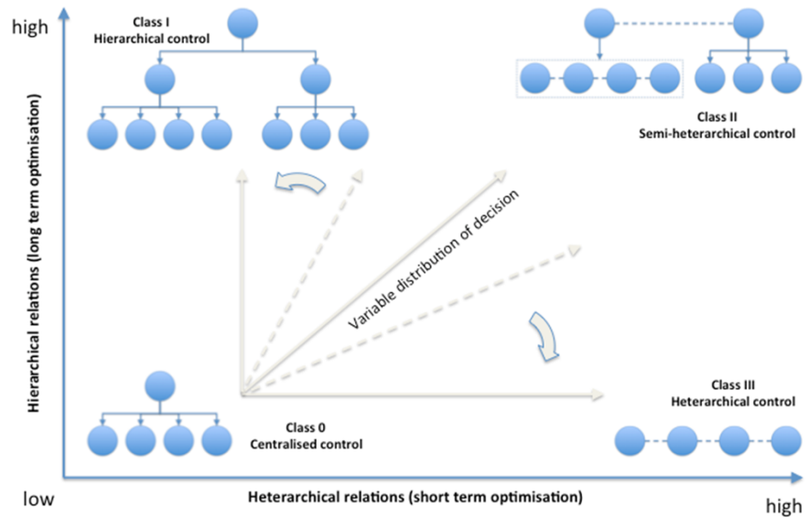

cyber-physical production systems
HKB 320 Z2 OMEGA
PQ 42 C - 16,6-35,3 - PMZW
1899-4191-4895-2144-1056
Siemens, 2015

Technology and data as enablers in modern manufacturing environments.

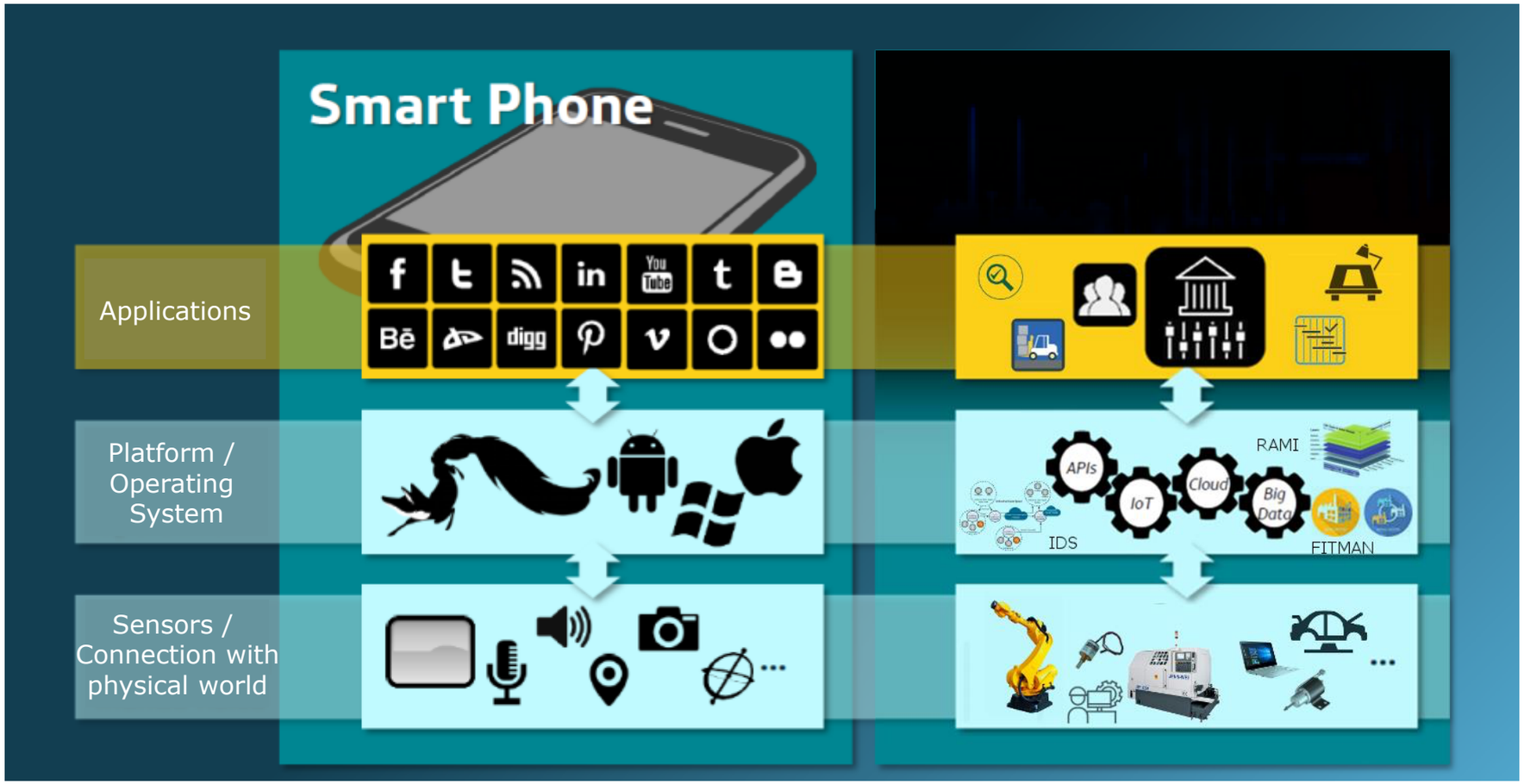
In personalised production, control systems need to manage product variability and disturbances, and to implement agility, flexibility and reactivity.

Facing these challenges requires highly flexible, intelligent and self-adaptive production systems, equipment and control systems, which can react to continuously changing demand, can be smoothly brought into operation, and can extend equipment life cycle.





Smart components platforms / ecosystems



What about standards, business models, skills, trust, .. ??

Industry 5.0?

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CHALLENGES OF CYBERSECURITY AND "CYBER TRUST"

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The Twelfth International Conference on Evolving Internet - INTERNET 2020
October 18, 2020 to October 22, 2020 - Porto, Portugal

MOTIVATION

DATA

“facts or numbers collected to be examined and considered and used to help decision-making.”

“information in an electronic form that can be stored and used by a computer.”

in *Cambridge Dictionary*

MOTIVATION

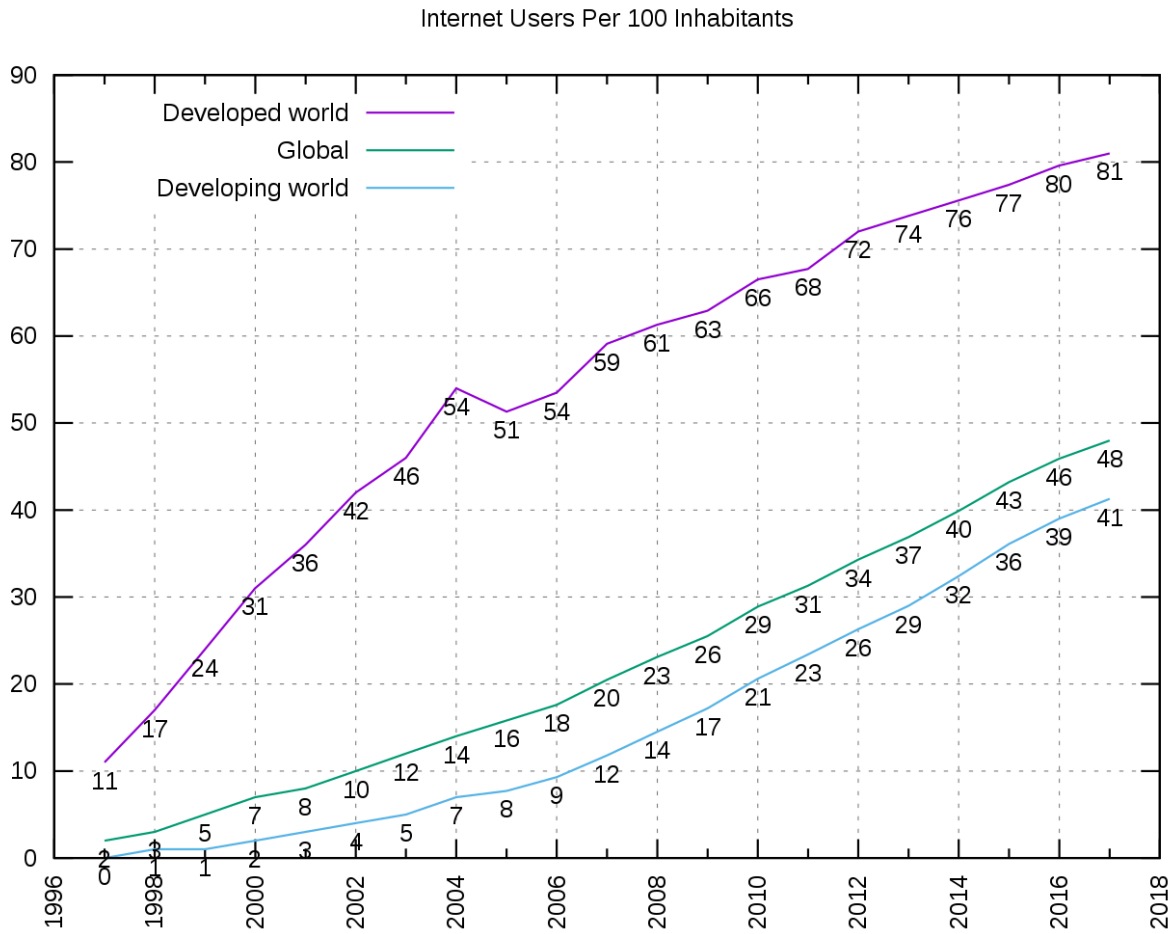
On the data and its “value":

- Data is crucial for the companies
- Mainly in digital format
- Different types of sources
- Valuable and worth protecting

Can we quantify its value (€€) ?

Can we quantify the loss (€€) ?

MOTIVATION



Source: International Telecommunications Union

IoP ⟶ IoT

MOTIVATION

Net of insecurity

A flaw in the design

The Internet's founders saw its promise but didn't foresee users attacking one another

In "The Washington Post", published on May 30,2015

by Craig Timberg

SECURITY BY DESIGN?

MAIN THREATS

Spam

Data theft

Social enginnering

Malware

(spear) Phishing

DoS

Typosquatting

Extorsion (*ransom*)

Cyberstalking

Man-in-the-middle

MAIN THREATS

SOFISTICATION

ENCRIPTION

ANONIMIZATION

DISTRIBUTED

IMPACT

LOSSES

CHALLENGES

- Too many!
- The arising of social enginnnering
- The wide spread of Industry4.0, IoT, IIoT and CPS
- To monitor human’s behaviours and attitudes of cybsersecurity
- Security as a need, that has a cost
- Cybersecurity as a global commitment (IT and CEO)

CYBER [AWARENESS | TRUST]

CHALLENGES

1. PREVENTION

- CYBERHYGIENE
- EDUCATION AND TRAINING
- AUDITING AND CONTROL

2. PROTECTION

3. DETECTION

4. FORENSICS

SPECIFIC SOLUTIONS

- ANTI-VIRUS
- NETWORK INTRUSION DETECTION
- BACKUPS
- FIREWALLS
- (…)

CHALLENGES OF CYBERSECURITY AND "CYBER TRUST"

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Enhancing the Business Processes Using Artificial Neural Networks

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Higher Polytechnic School
Universidad Francisco de Vitoria

The Fifteenth International Multi-Conference on Computing in the Global Information Technology
ICCGI 2020
October 18, 2020 to October 22, 2020 - Porto, Portugal

Artificial Neural Networks (I)

- Artificial Neural Networks (NN) are useful tools for classification, prediction and recognition of patterns.
- There are several Artificial NN models, the most relevant are:
  - Feedforward NN
  - Multilayer Perceptron NN
  - Radial Basis Function NN
  - Convolutional NN
  - Recurrent Neural Network (RNN)
  - Modular NN
  - Sequence-To-Sequence Models NN

Artificial Neural Networks (II)

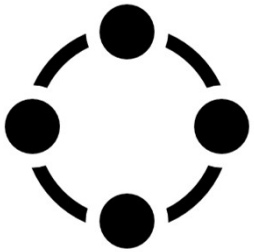
- Artificial NN have been used in several fields:
  - Biology [1][2][3], business [4][5], medicine [6], etc.
- Their effectiveness has been proved in the industry:
  - Reducing the process execution times (improving just-in-time).
  - Optimizing the operational expenditures.
  - Avoiding human errors by automating tasks.

Previous Research (I)

- We have applied the Artificial NN in some of the processes in the Telecommunication Industry:
  - In the sales process:
    - To anticipate the forecast financial compliance, calculating the order books (OB), net sales (NS) and unadjustment margin (UM) of deals studying and processing the accounting records in the Corporate Systems.
      - Mouronte-López, M.. (2019). IMPROVING BUSINESS OVERSIGHT IN THE INFORMATION TECHNOLOGY INDUSTRY . *DYNA*, 94(3). 247. DOI: http://dx.doi.org/10.6036/9215
    - To know in advance the result of projects in negotiation, analyzing the values of the previous projects for: unplanned impacts, deviations from the estimated budget and from planned delivery date as well as the evaluation by the customer.
      - Mouronte-López, M.. (2020). PREDICTING SUCCESS OF ICT PROJECTS THROUGH ARTIFICIAL NEURAL NETWORKS . *DYNA*, 95(5). 460. DOI: http://dx.doi.org/10.6036/9724

Previous Research (II)

- In the spare parts management processes:
  - To reduce the operating expenditure and to improve the inventory management, processing the past equipment demand.
    - Mouronte-López, M.L. Optimizing the Spare Parts Management Process in a Communication Network. *J Netw Syst Manage* **26,** 169–188 (2018). https://doi.org/10.1007/s10922-017-9412-5



References (I)

- [1] Malmgren H (2000) Artificial Neural Networks in Medicine and Biology. Paper presented at the ANNIMAB-1 Göteborg, May 13-16, 2000
- [2] Ferreira MS, Galo MDLBT (2013) Chlorophyll a spatial inference using artificial neural network from multispectral images and in situ measurements. Anais da Academia Brasileira de Ciências 85:519-532
- [3] Samborska, Izabela & Aleksandrov, Vladimir & Sieczko, Leszek & Kornatowska, Bożena & Goltsev, Vasilij & Cetner, Magdalena & Kalaji, Hazem. (2014). Artificial neural networks and their application in biological and agricultural research. NanoPhotoBioSciences. 02. 2347-7342.

References (II)

- [4] Wang, Po-Hsun & Lin, Gu-Hong & Wang, Yu-Cheng. (2019). Application of Neural Networks to Explore Manufacturing Sales Prediction. Applied Sciences. 9. 5107. 10.3390/app9235107.
- [5] Quaddus, M. & Khan, M.. (2002). Evolution of artificial neural networks in business applications: an empirical investigation using a growth model. International Journal of Management and Decision Making , 3. 10.1504/IJMDM.2002.001225.
- [6] Egba, Anwaitu & Okonkwo, & R, Obikwelu. (2020). Artificial Neural Networks for Medical Diagnosis: A Review of Recent Trends. International Journal of Computer Science & Engineering Survey. 11. 1-11. 10.5121/ijcses.2020.11301.

Dynamic Path Planning for Industrial Robots : Challenges & Opportunities

ZAHID IQBAL
(zahid@fe.up.pt)

INTELLI 2020
18 - 22 OCTOBER 2020 – PORTO, PORTUGAL

Autonomous robots

- Robots need to be **autonomous** for placement in human environments
  - Potentially, significant scientific and **societal impact**
  - **Uncertainty** of the workspace
    - unpredictable variables (tasks, object placements, orientations …)

Dynamic vs controlled

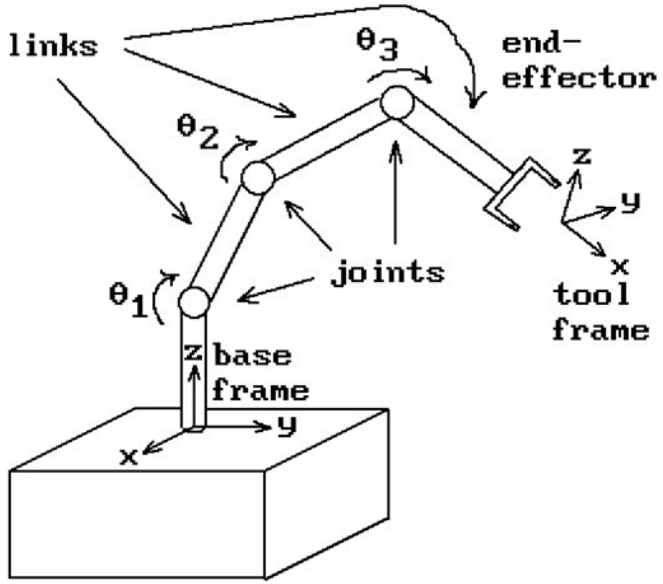
  - Autonomous robot must
    - gain information of the environment
    - remain **operational over time** without human intervention
    - be **safe** and **reliable**

STAR - Smart Tissue Autonomous Robot

Autonomous robots

- In **un-controlled environments**, robot system needs to be **robust**
  - Despite decision making, it can fail
  - **React** to undesired events

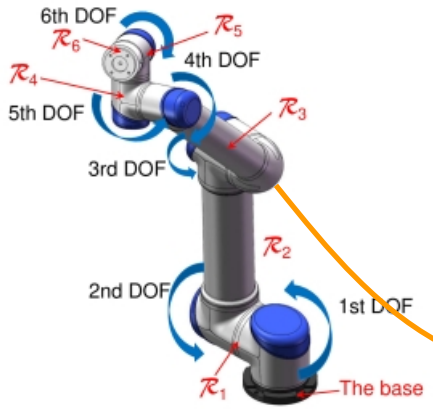
- Challenge with unstructured environment
  - **High-dimensional** state space
  - Uncertainty of mapping sensory information to certain states



$$q = \langle \theta_1, \theta_2, \theta_3 \rangle$$

$$C = \mathbb{R}^3$$

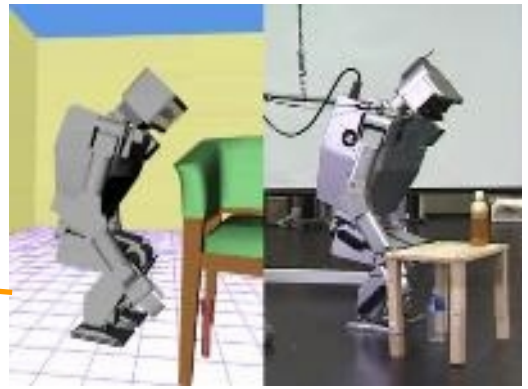
C-space complexity



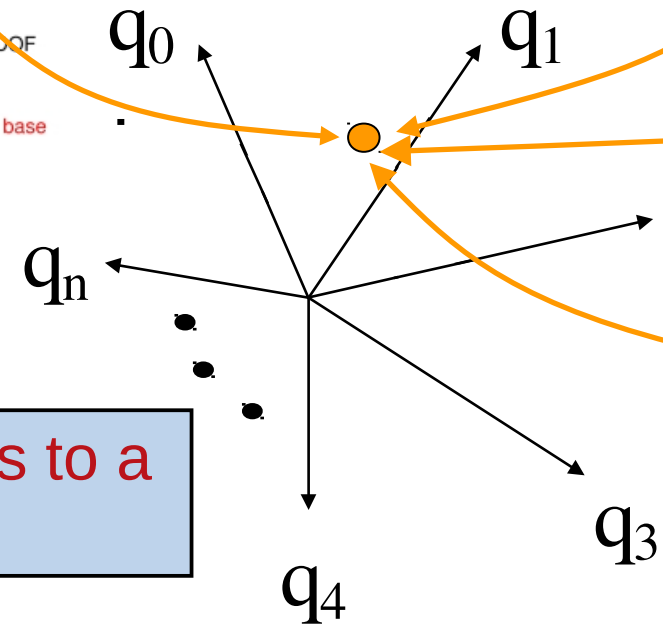
6 D

27 D

12 D



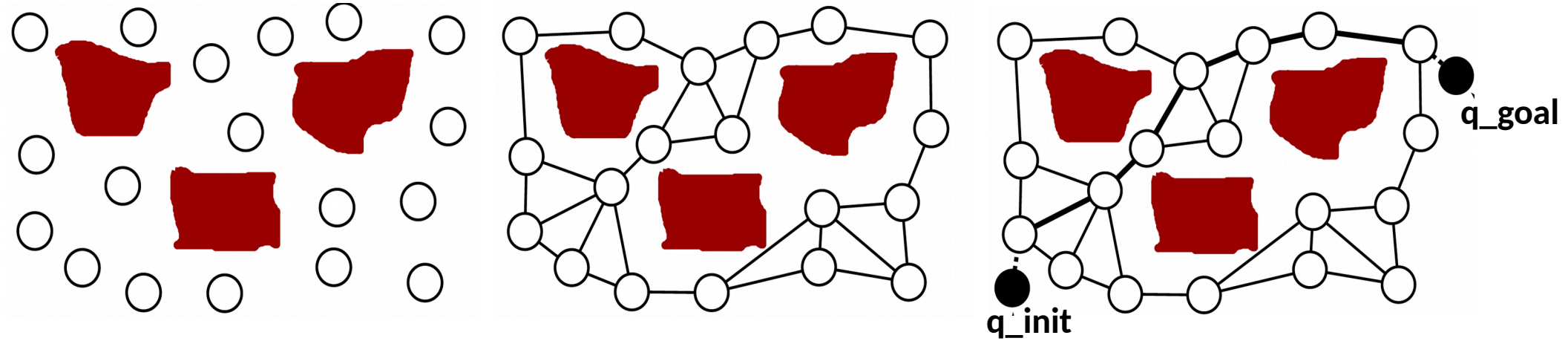
~40 D



Every robot maps to a point in C-space

Motion planning

- **Collision free** motion from start to the goal state
  - as the robot **dof** increases, configuration space C size increases which leads to high computation complexity in constructing C
  - **Sampling-based** motion planning



Motion planning

- Unstructured environment
  - **Obstacles** can appear at any time
  - Objects may change their state
  - How to **coordinate** efficiently the **sensory information** with the planner considering dynamic scenarios

- **Leverage** the structure of the real world to manage the complexity of the solution
  - Use low-dimensional workspace information, instead of explicit configuration space

Robot perception

- Robot must have adequate **perceptual capability**
- Perceive the world and **interpret** the acquired information
  - Understand the current state of the world
  - Devise plan to effect change in the state
  - **Active observation** to see the impact of its actions

- In collaboration scenarios, **object recognition** is critical
  - Objects are not mere obstacles
  - Different objects might look the same
  - The range of objects to be recognized
  - Computing the position of the objects

Human-robot interaction

- Communication with humans can be leveraged to **reduce** the **computational complexity** of unstructured environments
  - Specific **gestures / cues** from human can guide the action of the robot
    - humans can direct a robot's focus toward **relevant areas** of the state space.
    - this **focuses** attention on the task

Hw-based solutions / support

- High performance / **parallel computation** via **GPUs** would help enable real-time performance

- **RapidPlan** and RapidSense
  - handles dynamic scenarios efficiently
  - combines a hardware motion planning accelerator (MPA) with a software-based roadmap generation toolkit
  - allows people and multiple robots to work collaboratively and cooperatively within the same **workcell**

Conclusions & future work

- High computational complexity is the main limitation of many path planning algorithms, preventing **online recalculation** of trajectories within the **response-time** of the manipulator
- We can **exploit** structure present in the environment to reduce the size of the relevant **state space**

- To efficiently handle **dynamic** scenarios,
  - A **modular solution** where perception and planning are built as independent components and run in parallel
  - **Delegate** parts of the workspace enumeration as an offline exercise
  - We can input fresh voxel grids to the planning program, with a certain **frequency**
  - The **refresh rate** of the voxel grid depends on the response time of previous planning query
  - Instead of sending the entire grid, communicate only the updates

Université Gustave Eiffel

INSTITUT FRANCILIEN D'INGÉNIERIE DES SERVICES

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Sous la co-tutelle de :
CNAM
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UNIVERSITÉ PARIS NANTERRE

Cooperation and Trust In Healthcare

The case of France

Christian BOURRET

IARIA

PANEL – Cooperation and Trust
HUSO Conference - October 2020

Main Topics

Analyse the importance of trust for cooperation, especially in the **Healthcare** sector.

Examples in France with the **triple dimension of trust**: in other actors (human dimension), in tools and in organizations

With the whole issue of the production and use of **sensitive data**.

This question of trust is a key issue in our society in digital transformation which doubts its leaders (**society of mistrust**) and itself.

1 – Cooperation and Trust Challenges and Contexts

No Cooperation without Trust

Society of **mistrust** cf. Algan Cahuc

Yellow Vests revolt in « forgotten » territories / rulers and globalization consequences.

Context of the **digital transformation**

And of the **Covid epidemic**.

2 – Information and Communication Position

Social **constructivism**

ICOE : Information (data) and Communication (social links, interactions) for Organizing Ecosystems (Groups, Organizations, Territories, etc.)

Healthcare / production and use of **sensitive data**.

Social and technical **innovations**

Situation – Meaning – Action (**research action**)

3 – Trust / Complex and Interactive Systems

Different **dimensions of Trust** : in other people, in tools and in organizations.

Building Trust throug Cooperation ex. of **FAcT** – Fears-Attracts – Temptations in Mirror (Le Cardinal) Method : human and socio-technical dimensions.

Health Interface Organizations (**HIO**) as Spaces to Build Trust in Healthcare

With the support of Cooperative **Platforms**

4 – Healthcare Specificities : Tools and Territories

French problem of **Walls** between Primary Care and Hospials Sectors. Telemedicine tools.

- **Socio Technical Devices**

  Platforms cf. Support Territorial Platform (**PTA**) for **CPTS** (Territorial Professional Communities in Health).

  And the Covid epidemic context : development of **remote** medical consultations, Stop Covid tool / traceability

  EHR (Electronic Health Record), in France DMP.

- **Territories**

  Social Inequalities (individual and collective)

  Digital deserts are also **medical deserts**

  Importance of **local** and population fitted solutions.

5 – Role of Data

Specific Data : sensitive data (**privacy**).

GPDR - General Data Protection Regulation (2018) in Europe and CNIL in France.

At 3 levels : **micro** for managing patients pathways, **meso** / cooperations and organizations, **macro** for evaluation of the whole healthcare system.
Human People expertise / Data Interfaces (giving **meaning**).
Data producing and analizing Tools.

Data scientists jobs.

6 – Reliance and Cooperation for Resilience on Territories

Importance of **social links**: communication for cooperation = **Reliance**

Resilience (reactivity) / proximity / Covid crisis : both risk and opportunity

Local solutions / French **bureaucracy** ARS and administrative constraints in France (controversial ARS – Health Regional Agency linked with State).

This question of trust is a key issue in our society in digital transformation which doubts its leaders (**society of mistrust**) and itself.

Very linked with cooperations in territories.

And **different dimensions of Trust** (Le Cardinal) : in oneself, in the others (human people, socio-technical devices, organizations) and consequently, in the **future**.

The Challenge to a **New Foundation for the Welfare State** is based both on Trust and Cooperation.

Engaged citizenship and Universal or global public goods or « **Commons** ».

Thank you very much for your Attention !

Questions ?

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