

INDUSTRY 4.0

Assistance Systems: AI for Employees Support

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AGENDA

1. **INDUSTRY 4.0 IN OSTRAVA**
2. **ASSISTANCE SYSTEMS**
3. **CONFERENCES**
4. **FACULTY STUDY**
5. **CONCLUSION**



WHY OSTRAVA AND INDUSTRY 4.0?

Ostrava is a city in the north-east of the Czech Republic and is the capital of the Moravian-Silesian Region. Ostrava is the third largest city in the Czech Republic.

Ostrava grew to prominence thanks to its position at the heart of a major coalfield, becoming an important industrial centre. It used to be nicknamed the country's "steel heart" thanks to its status as a coal-mining and metallurgical centre.



FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Faculty of Electrical Engineering and Computer Science was founded on January 1, 1991 and with more than 2,500 students it represents one of the largest faculties within the VŠB - Technical University of Ostrava. The real foundations of the faculty were laid in 1970 by opening the first year of independent study in the field of power engineering.



INDUSTRY 4.0



START



1. DATA ACQUISITION & PROCESSING

Collection and analysis of data on processes, quality, products, manufacturing resources and employees. The goal is for process or quality improvement.

A

B



3. NETWORK & INTEGRATION

Digital connection between departments, sectors, and supply chains. The objective is to improve collaboration, coordination and transparency

A

B



2. ASSISTANCE SYSTEMS

Technologies that support employees at work and help them focus on their core tasks e.g. augmented reality – application of smart glasses with AI support

A

B



5. SELF-ORGANIZATION & AUTONOMY

Intelligent products that control their own production. Data is automatically analyzed, and the system reacts autonomously

A

B



4. DECENTRALIZATION & SERVICE ORIENTATION

Products and processes are divided into modules. The control system is decentralized, and there is a change in the service orientation.

A

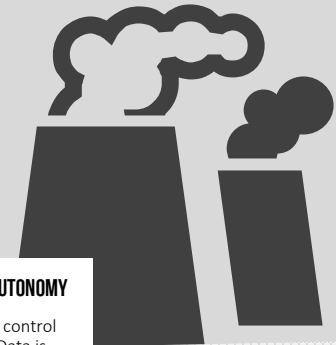
B

A

The field associated with the Industry 4.0 technologies and applications are fundamentally ready for the market but are not yet sufficiently used by the middle class.

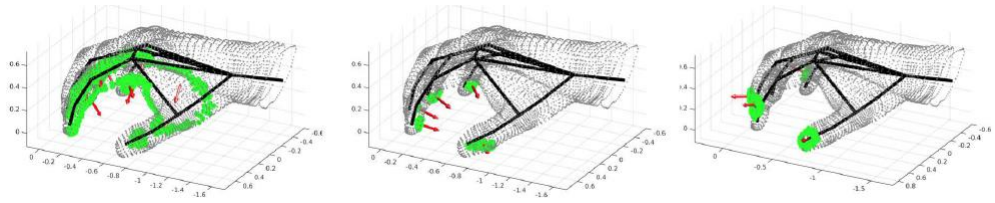
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The technologies and applications in this field are not yet ready for application.



Assistance Systems

Human action recognition using RGB-D



AI support for strategy planning



PROJECTS

Prognostics And Computer Aided Maintenance

PACMAN - H2020

Project ID: 686782

Aircraft System Prognostic solutions integrated into an airline E2E maintenance operational context.

The key objective of the proposal is to demonstrate benefits of aircraft system prognostics solutions integrated into an airline E2E maintenance operational context. This will be achieved by development of following innovative components:

- A novel prognostic architecture that includes both on-board and ground elements shall be demonstrated using a large passenger aircraft selected Aircraft System.
- Specific prognostics capabilities such as data collection, data processing, symptom generation, failure mode identification and predictive trending shall be demonstrated within an advanced Integrated Health Monitoring and Management (IHMM) system.
- A revolutionary augmented reality (AR) mobile tools as gesture recognition, speech recognition and near-to-eye (NTE) displays that aids maintenance execution by bringing the necessary information directly to the engineer at remote repair sites shall be developed and demonstrated.



PROJECTS

Augmented Reality LAB (ARL)

RRC/08/2016

Local government project.

Build Augmented Reality Laboratory for support employees at work and help them focus on their core tasks with application of smart glasses with AI support

Strategy planning for Augmented reality.

Faculty project.



MODERN MASSIVE DATA

Project with Škoda auto

- Modern Massive Data Sets analysis address algorithmic and statistical challenges. The goals of these algorithms are to explore novel techniques for modeling and analyzing massive, high-dimensional, and nonlinearly-structured scientific and internet data sets; and to bring together computer scientists, statisticians, mathematicians, and data analysis practitioners to promote the cross-fertilization of ideas.
- One of the biggest challenges for Modern Massive Data Sets, we face today, is digitization. Digitization is the main part of cyber-physical systems (CPS) which introduces the fourth stage of industrialization, commonly known as Industry 4.0.



Future Smart Technologies for the Industry 4.0 Era

13th year of the European Week of Regions and Cities took place in Brussels. During the week, there were more than 120 performances, workshops and discussions.

Specialized workshop on the topic “Future Smart Technologies for the Industry 4.0 Era” was realized by the Czech Office for Research, Evolution and Innovation (CZELO), together with participating universities VŠB – Technical University of Ostrava, Czech Technical University in Prague, University of Žilina and Silesian University of Technology Gliwice.

The platform took place in the Constant Representation Room of the Czech Republic in EU under patronage of Ing. Evžen Tošenovský, member of the European Parliament and a member of the Commission for Industry, Research and Energetics. The workshop has been attended by more than 80 visitors.



INDUSTRY 4.0 FOR STUDENTS

- COOP education, we have a co-operative education program with companies that are offering positions.
- Project learning or project-based learning, is a dynamic approach to teaching in which students explore real-world problems and challenges, simultaneously developing cross-curriculum skills while working in small collaborative groups.
- We have accreditation for Industry 4.0 program. We started on September 2016.
- We have accreditation for Cyber security program. We started on September 2016.



CONCLUSION

INDUSTRY 4.0

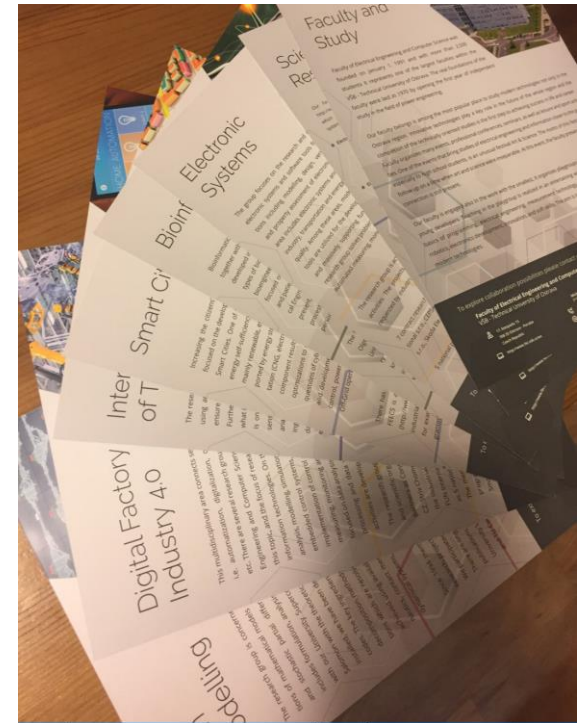


FEECS RESEARCH OPORTUNITY

FACULTY IS DIVIDED TO 27 RESEARCH GROUPS

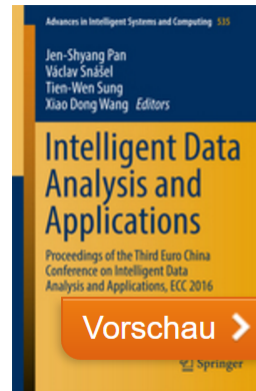
Research groups cover the following topics:

- Smart Cities
- Electronics Systems
- Digital Factory – Industry 4.0
- Bioinformatics, Healthcare
- Internet of Things
- Mathematics Modelling



Conferences

- ECC 2017 – Euro-China conference Malaga, Spain



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Intelligent Data Analysis and Applications

Proceedings of the Third Euro-China Conference on Intelligent Data Analysis and Applications, ECC 2016

Herausgeber: **Pan**, J.-S., **Snášel**, V., **Sung**, T.-W., **Wang**, X.D. (Eds.)

- IITI 2017 – Varna

Thank You

