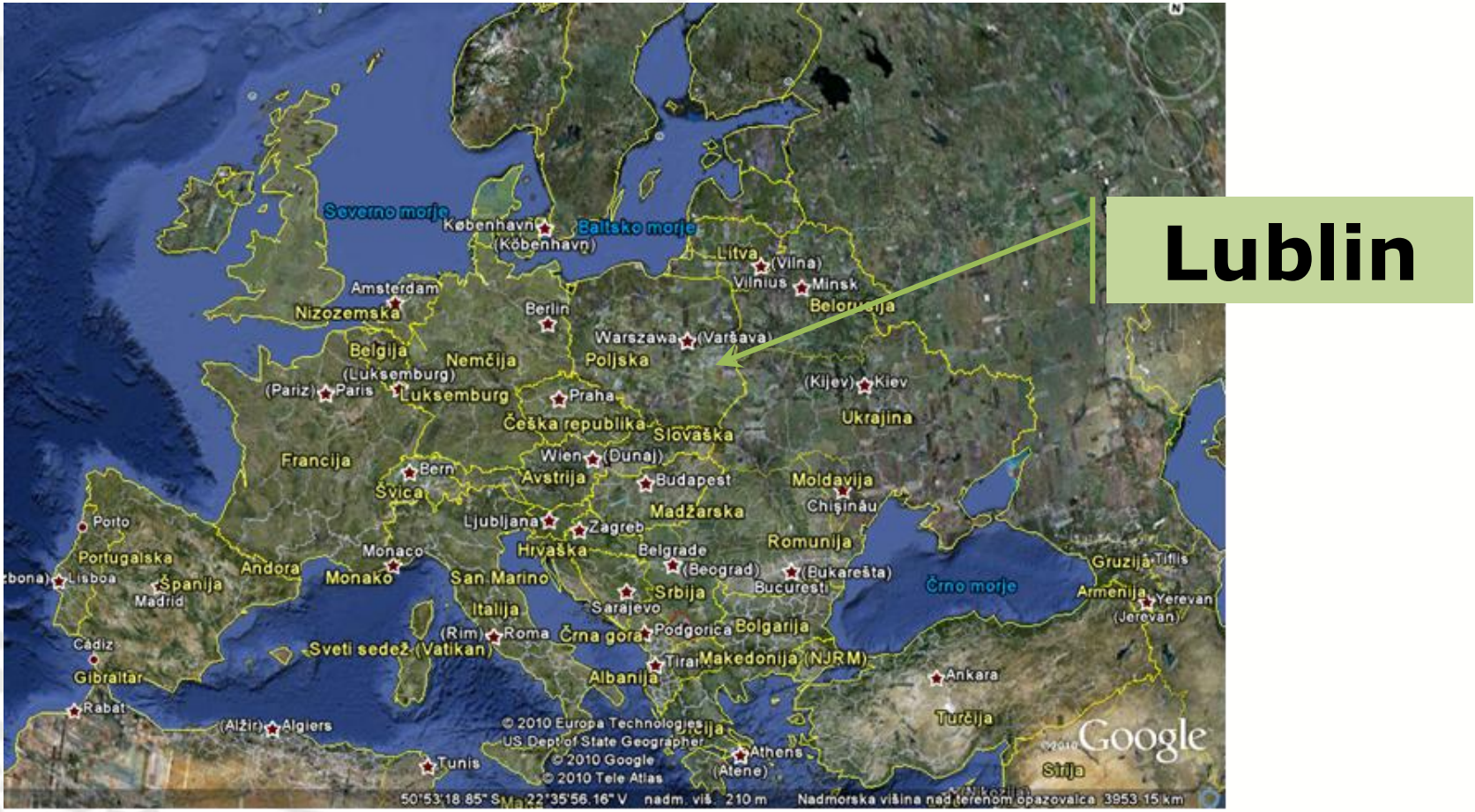
Department of Computer Science

Electrical Engineering and Computer Science Faculty

Lublin University of Technology

Lublin, Poland




Lublin
CITY OF INSPIRATION

Lublin
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Where West meets East

- Lublin's identity during centuries was created by people from various cultures, religions and nationalities: Polish, Jewish, Ukrainian, Roma, Tatar, German, Dutch, Scotch, Italian, Catholic, Orthodox, Protestant, Muslims.
- In Lublin West meets East which creates a new value.
- An extraordinary example of this is the St. Trinity Chapel in Lublin Castle, which is of Gothic construction with Byzantine frescoes.

Lublin – the University's City

- Maria Sklodowska-Curie University
- Lublin Catholic University
- Agriculture University
- Medical University
- **Lublin University of Technology**

- Several no-government colleges (-> I level of HE, B.Sc.)

- >80,000 students
- 360,000 people in Lublin

Lublin University of Technology

- 1953 - Evening Engineering High School
- 1977 – Lublin University of Technology
- State university (government)
- >24,000 graduated students
- 13 different study courses with several specialisations
- Present:
  - about 8,000 students
  - 1,000 academic teachers
  - over 100 full professors

Civil Engineering and Architecture Faculty
Site in Polish

Mechanical Engineering Faculty
Site in Polish

Fundamentals of Technology Faculty
Site in Polish

Electrical Engineering and Computer Science Faculty
Site in Polish

Environmental Engineering Faculty
Site in Polish

Management Faculty
Site in Polish

LUT structure

- 6 Faculties:
  - Civil Engineering and Architecture Faculty
  - **Electrical Engineering and Computer Science Faculty**
  - Mechanical Engineering Faculty
  - Environmental Engineering Faculty
  - Fundamentals of Technology Faculty
  - Management Faculty

Electrical Engineering and Computer Science Faculty

- 12 Departments
- Present:
  - over 100 academic teachers
  - over 1,700 students

M.Sc. specialisations offered

- Computer Networks
- Data Analysis Systems
- Mobile Systems and Multimedia Technology
- Operations of IT Systems
- Software Engineering
- Systems and Multimedia Applications
- Telecommunication Systems
- Web Applications Development

Foreign students

- Erasmus (appr. 100 per year, mainly from Spain and Turkey)
- Double diploma M.Sc. (mainly from UA, KZ – 18 in this year in Computer Science)
- Short time (two weeks) M.Sc. internships (KZ – appr. 50 per year)

M.Sc. courses
(from 2014/15 academic year)

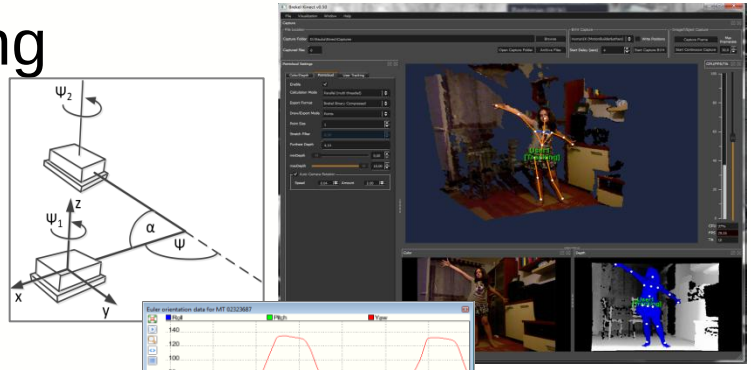
- In English:
  - Mobile Application Development
  - Mobile Systems and Networks
- In Russian:
  - Computer Engineering (Компьютерная инженерия)

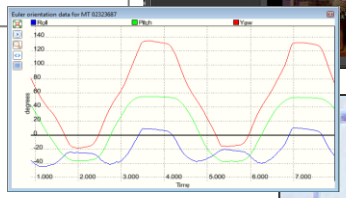
DCS structure

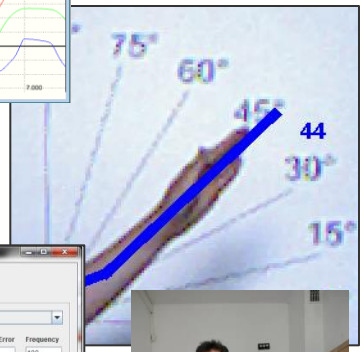
- Head of Department
  (Prof. D. Czerwiński)
- Division of Programming and Computer Graphics
  (Prof. J.Montusiewicz)
- Division of Computer Science and Numerical Analysis
  (Prof. T. Zientarski)
- Division of Software Engineering and Database Systems
  (Dr. M. Miłosz)
- Division of Information Security
  (Dr. G. Kozieł)
- Division of Internet of Things
  (Prof. M. Charytanowicz)

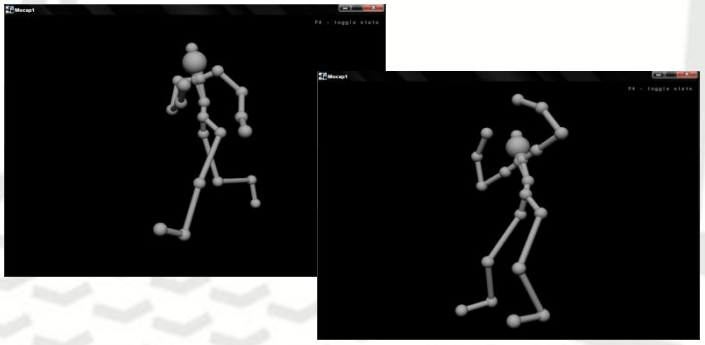
Human motion acquisition

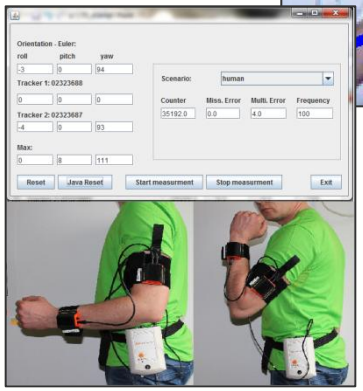
- Hierarchical human model
- Motion detection and recording using mobile devices:
  - acceleration, location and orientation change recording
  - collected data analysis
  - detection of specific user actions

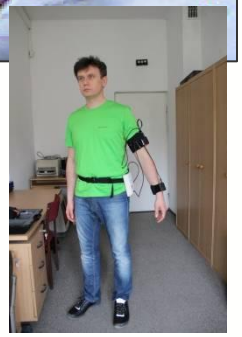






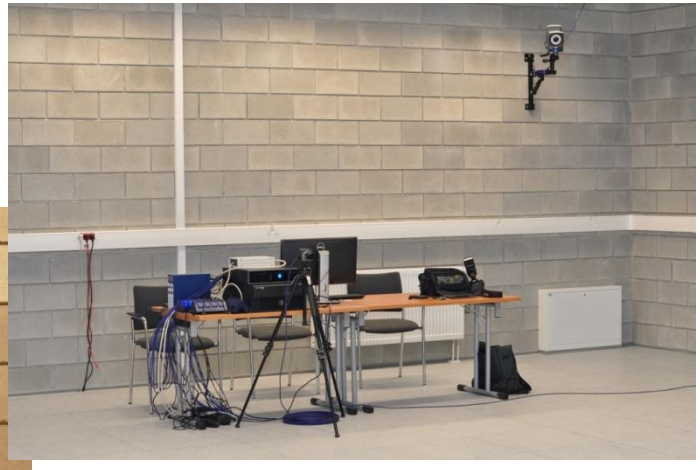


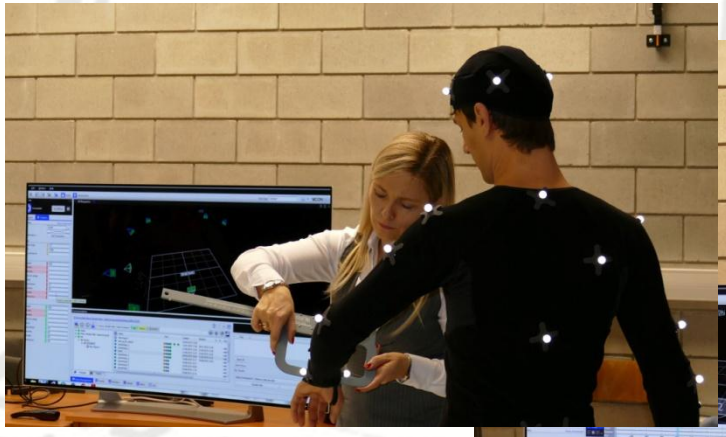


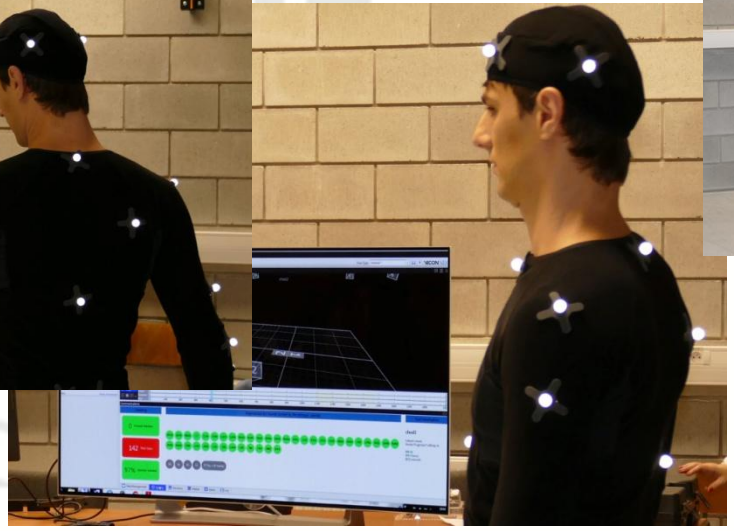


Motion capture

- collected movement data analysis, databases and data mining systems
- automatic gestures recognition
- 3D motion acquisition professional system (ground reaction forces, electrical muscle activity recording – wireless EMG system)
- rehabilitation process verification
- optimization of sports training

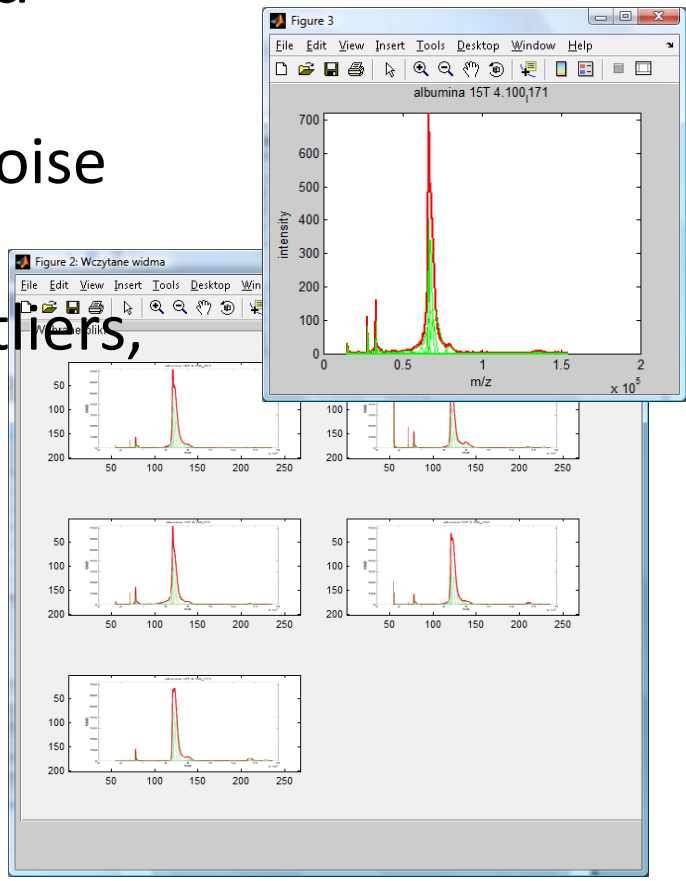






Bioinformatics

- Multivariate analysis of mass spectrometry data using normal distributions and statistical methods:
  - data preprocessing (normalization, noise reduction,
  - baseline correction, correction of outliers, calculation of the mean spectrum)
  - Gaussian Mixtures decomposition
  - Data classification

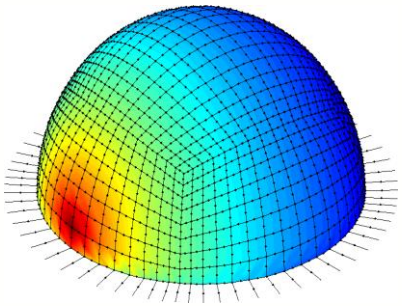


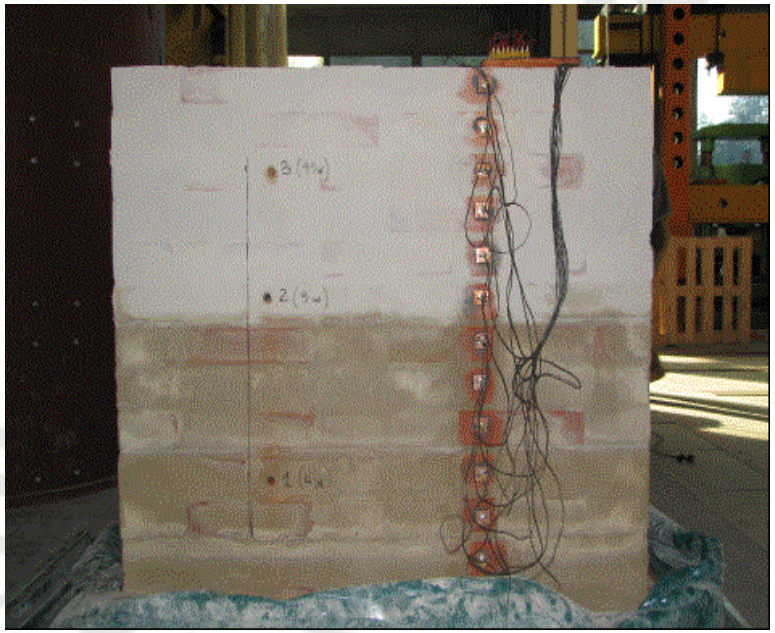
Expert systems in medicine

- Database and knowledge base for an expert system
- Rules for inference machine
- Expert system covering his action on man gastrointestinal disorders

Boundary Element Method modifications

Development of Special boundary elements and different numerical methods applied in Boundary Element Method and Finite Element Method





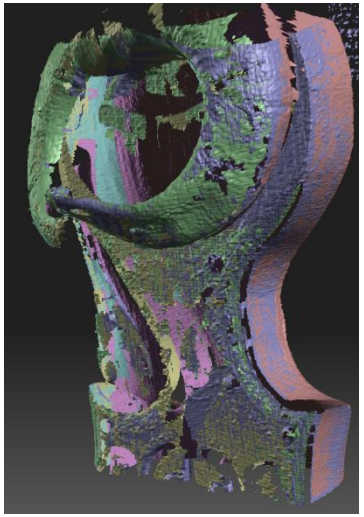
Used mainly for computer tomography and impedance tomography

Cloud computing, Grid computing

- Cloud processing of big data basing on Hadoop.
- The influence of virtual machine manager on cloud and grid systems performance.

3D scanning and model analysis of heritage objects

Katedra Informatyki



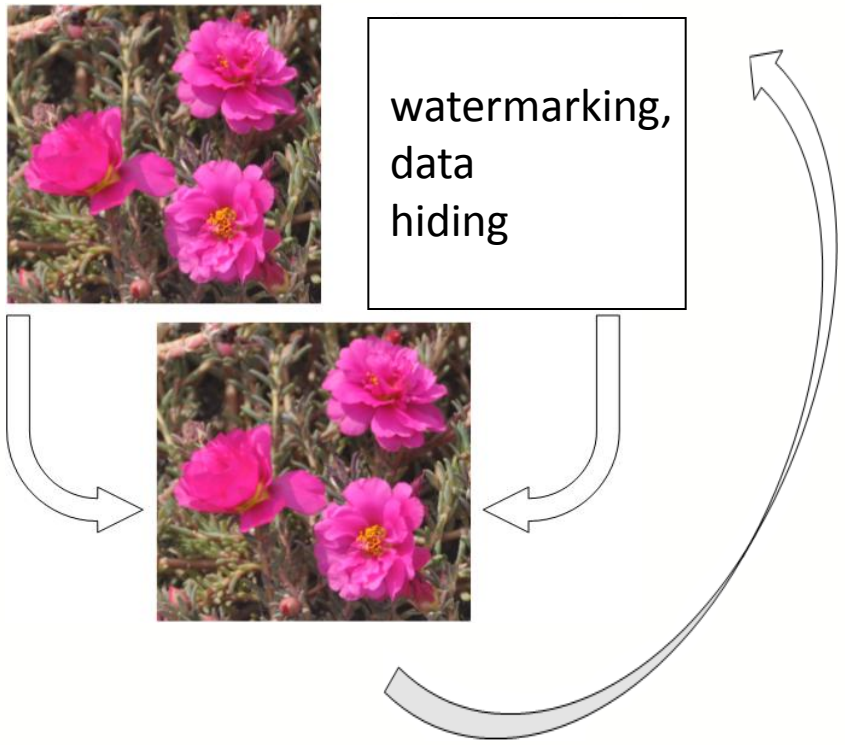
Research on:

- Selection of 3D scanning techniques for museum needs.
- Elaboration of on-line presentation methods for virtual exhibits.
- Elaboration of algorithms facilitating a process of fragmented artifacts reconstruction.

http://silkroad3d.com

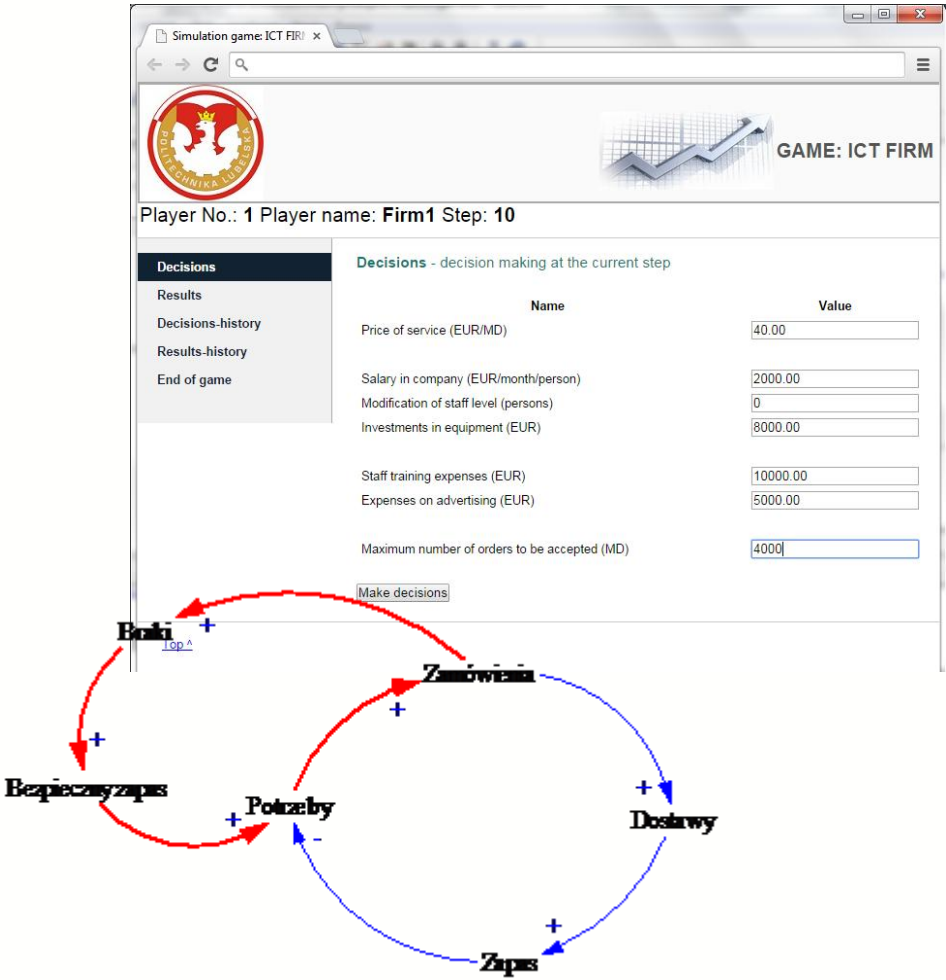
Steganography

- Information hiding tasks:
  - watermarking
  - secret communication
  - hidden volumes
  - additional information attachment



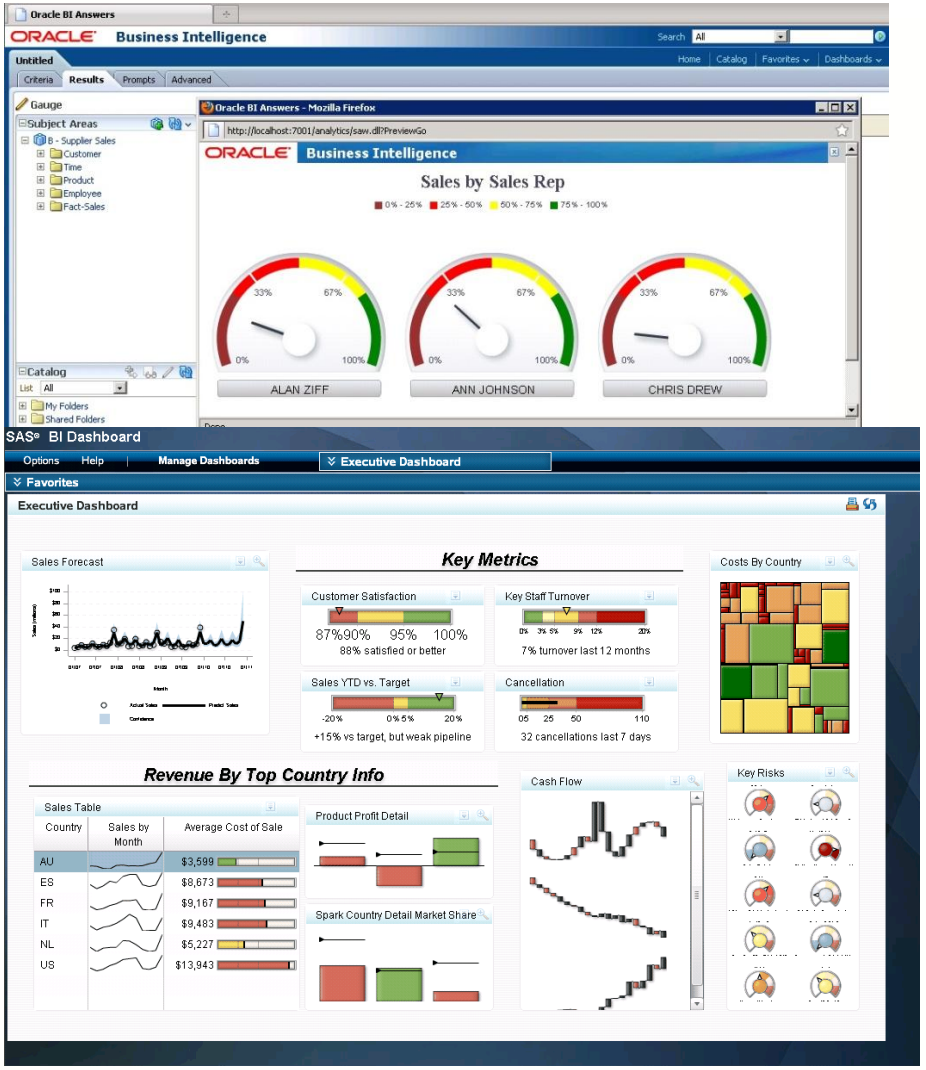
Modelling and simulation

- Creation of dynamical simulation models of enterprises and their systems
- Efficiency analysis of actions. Processes reengineering
- Elaboration of simulation decision games (Serious Games)



Data warehousing and business intelligence systems (BI)

- Demonstration the usefulness of BI systems to manage a modern organization in different business areas
- Rating of maturity of contemporary organizations to adopt modern BI systems
- Design and implementation of BI systems to support decision making
- Evaluation of the usefulness of existing BI tools in business analytics

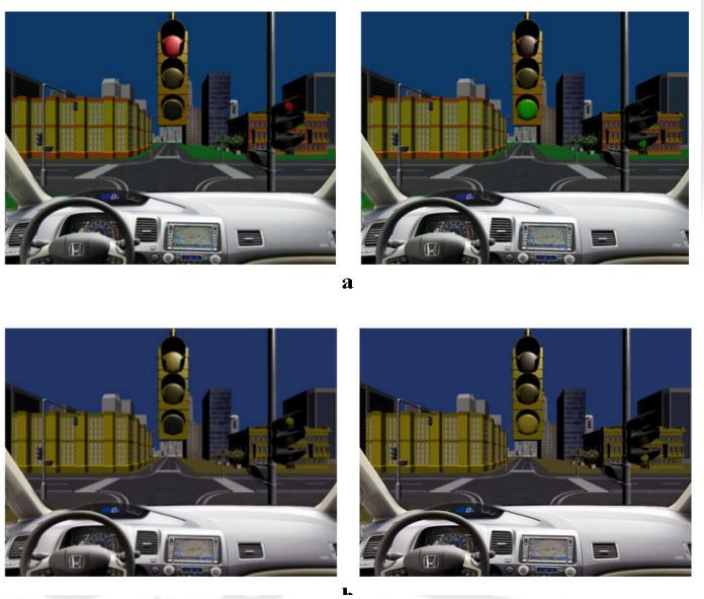


Eyetracking

- Testing usability and accessibility of computer application interfaces (desktop, web and mobile)
- Adjusting interface for people with disabilities
- Analysis of eye movements for medical diagnosis

2D, 3D graphics

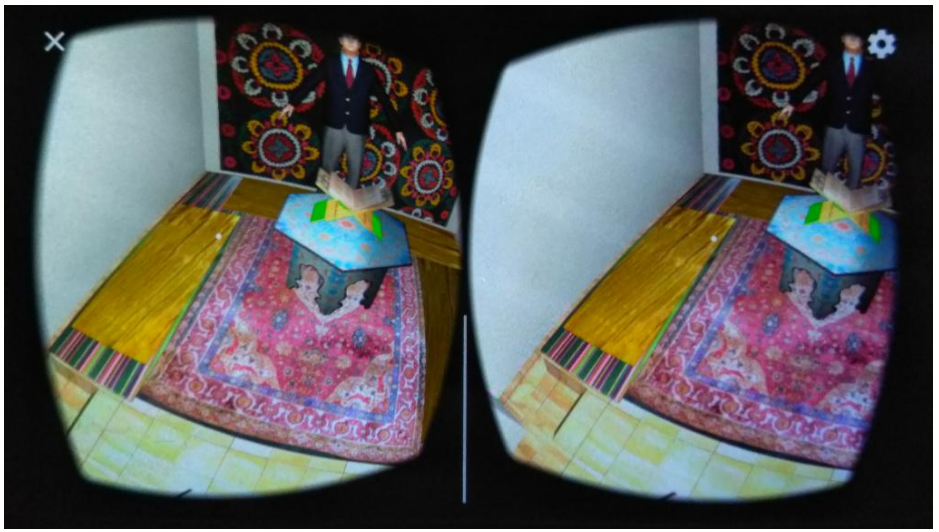
- The use of interactive gamification techniques to diagnose the color vision disorders



- The use of 2D and 3D digital reconstruction of the city appearance

Augmented and virtual reality

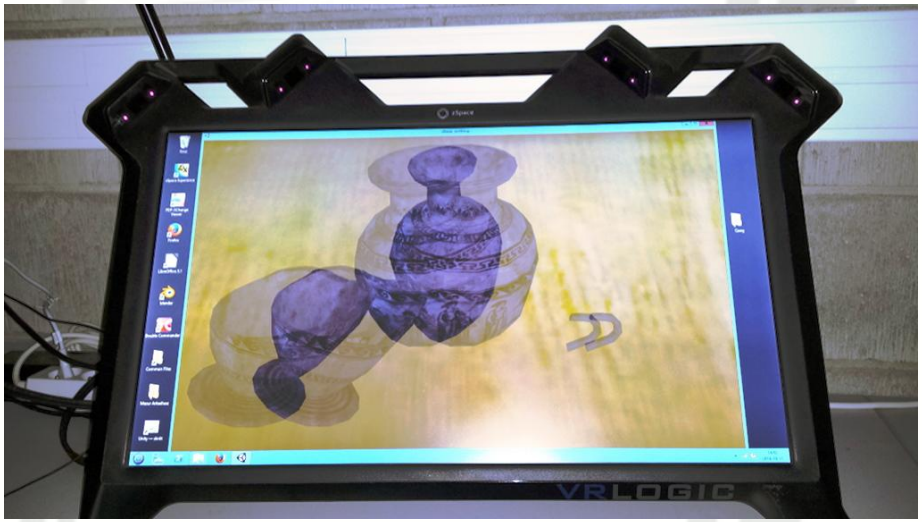
- presentation of data using the augmented reality,



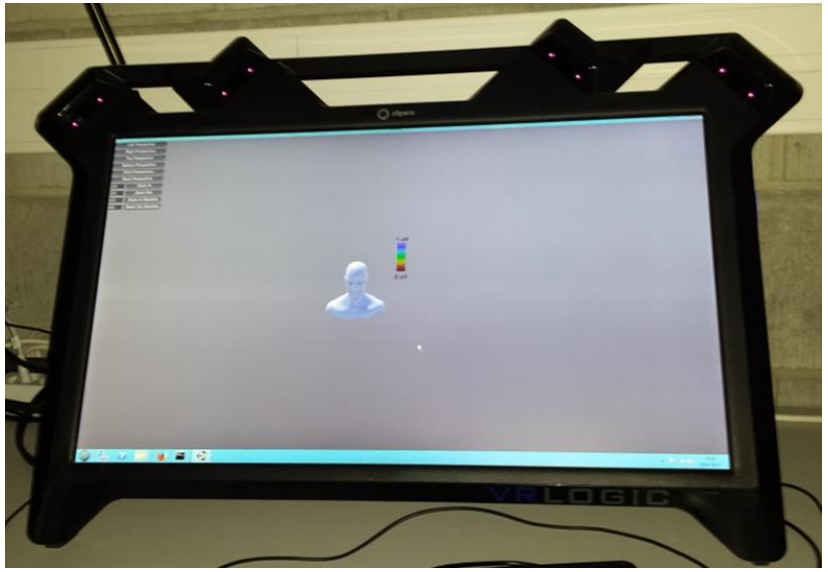
Oculus Rift II

Virtual reality – immersive environment

- VR learning, data presentation, simulations

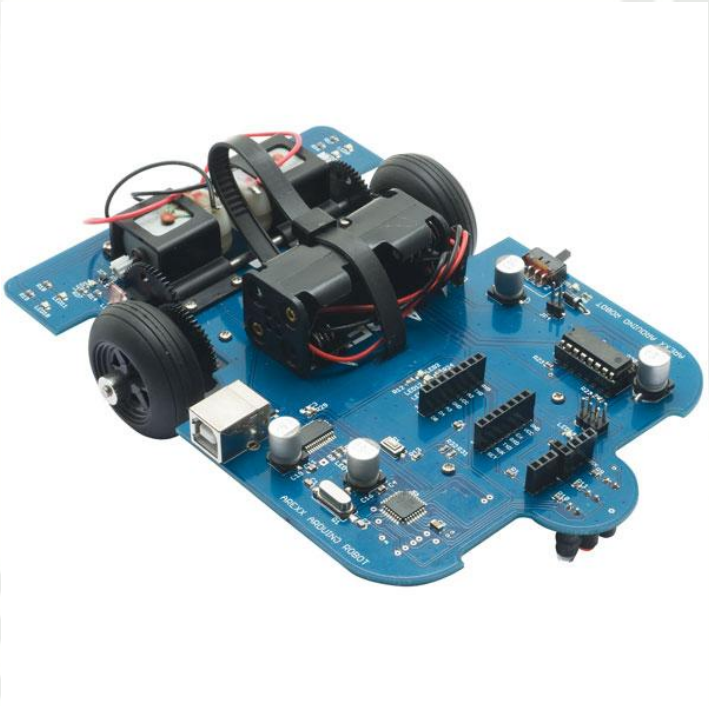


zSpace



Intelligent robots

- programming of the mobile robots

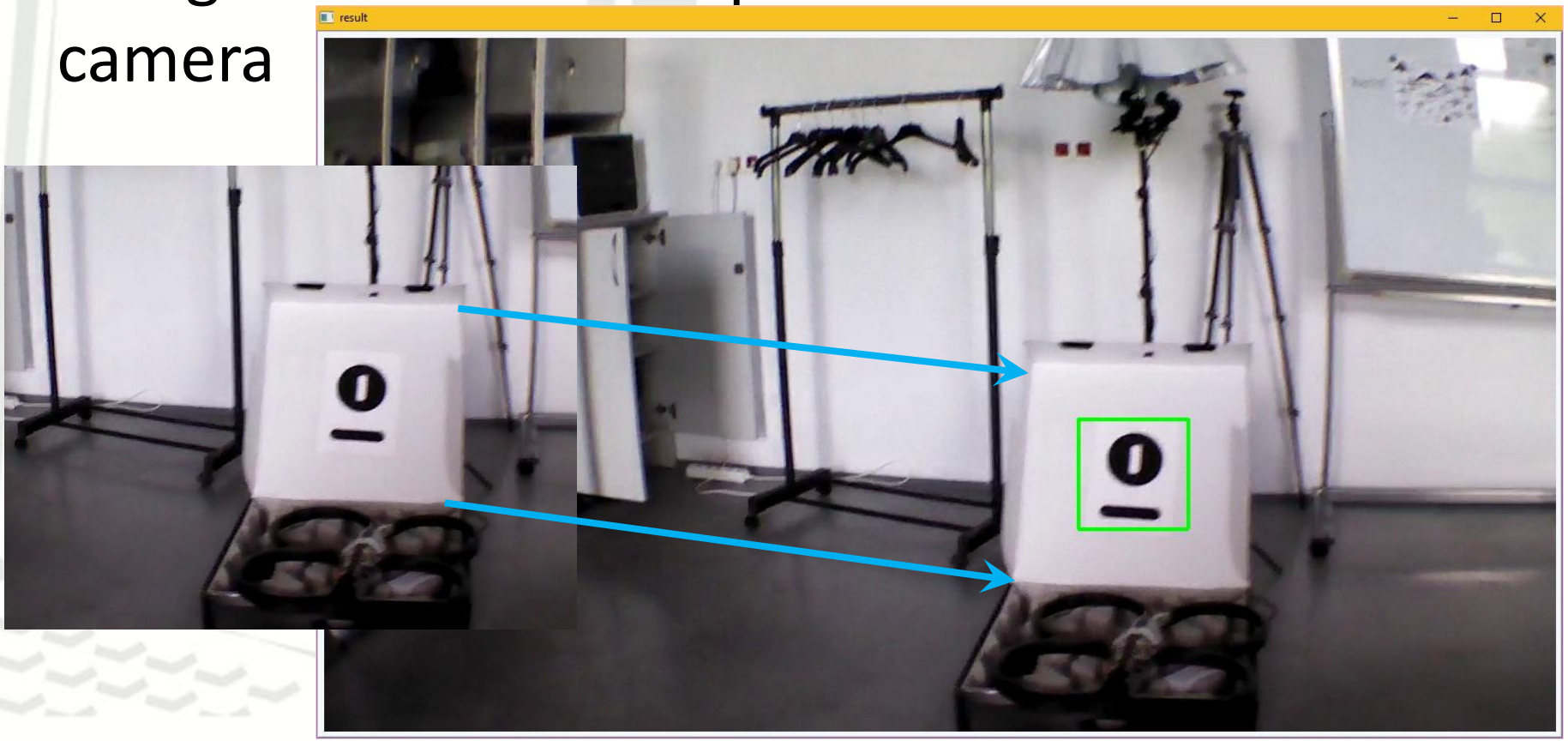


Collective programming

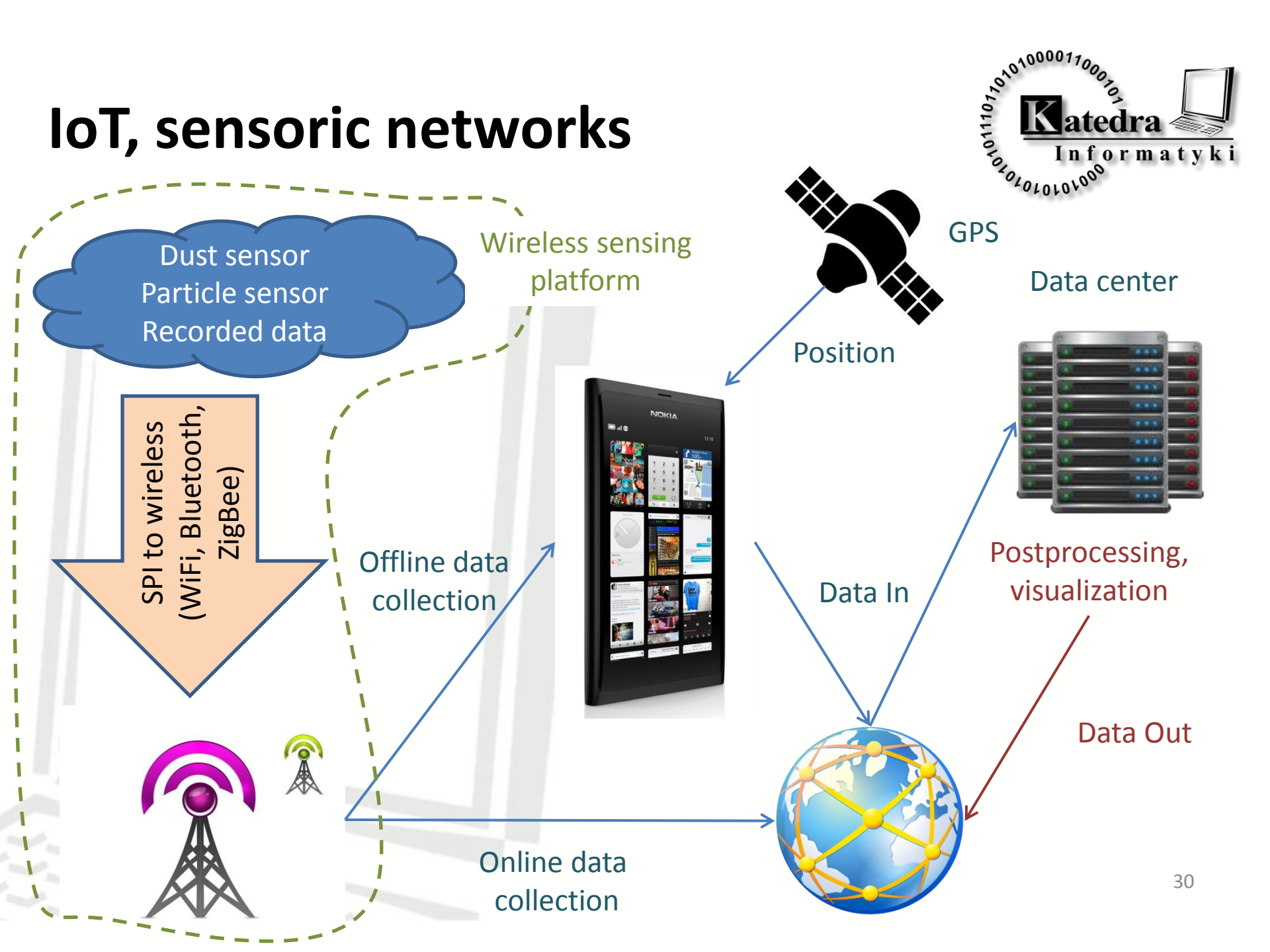
Programming of UAV to work in group

UAV computer vision

- Quadrocopter programming for object recognition in video captured from drone camera



IoT, sensoric networks



ICS – international cooperation

- University of Alicante, Alicante, Spain
- Pierre Mendes-France University, Grenoble, France
- Savonia University of Applied Sciences, Kuopio, Finland
- Beuth University of Applied Sciences, Berlin, Germany
- Politecnico di Milano, Milano, Italy
- University of South Australia, Adelaide, Australia
- Kazan National Research Technical University, Kazan, Russian Federation
- Lviv Polytechnic National University, Lviv, Ukraine
- National University of Uzbekistan – NUU
- Al-Farabi Kazakh National University – KAZNU
- ……

Contact

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- Thank You