

# Artificial intelligence and digital technologies

Research and technologies for new system and process development using research results in artificial intelligence, cybersecurity and complex data analytics as key enabling technologies for real world applications.



## AI for Health

- ▶ **Deep and Structured ML** Improvements in deep learning techniques and data logs in rare diseases, mimic human cognition in the analysis, comprehension of complex medical and health care data, bioinformatics.
- ▶ **Intelligent interfaces**, artificial cognitive systems, personalized and adaptive systems, Widespread implementation of electronic health record systems, enhanced the precision of robot-assisted surgery.
- ▶ **Predictive models**. Molecular dynamics, predictive models for RNA and protein folding and protein-protein interaction, growth of genomic sequencing databases, disease diagnosis telemedicine, electronic health records, drug Interactions, creation of new drugs.
- ▶ **Epidemiological models**, large scale simulations of emerging infectious diseases and evaluation of mitigation/containment policies.

## Cloud and Big Data

- ▶ **Data and knowledge management**, elicitation, representation, integration of knowledge & semantic services, process and data intelligence.
- ▶ **Deep and Structured ML and AI** prototypical and main application domains are computer vision and multimedia, natural language processing, and bioinformatics.
- ▶ **Cloud, Fog and Edge Computing** cloud-to-thing continuum service-aware workload placement and zero-touch deployment.
- ▶ **Data Security**, identity and access management, security risk assessment and Management, security vs privacy, cyber resilient systems, critical infrastructures and cyber-physical systems.

## Complex Data Analytics

- ▶ **Predictive models**, mathematical models and ICT platforms for high dimensional data.
- ▶ **Remote sensing** Pattern recognition technologies for supporting a digital monitoring, analysis and sustainable management of resources.
- ▶ **3D optical metrology** Measurements and reality-based 3D reconstruction.
- ▶ **Deep and Structured ML and AI** prototypical and main application domains are computer vision and multimedia, natural language processing, and bioinformatics.

## User-centered Design

- ▶ **Design** of product features and functionalities with design thinking methodologies to support industrialization of digital technologies.
- ▶ **Rapid prototyping** of human-computer interfaces with agile methods (e.g. Design Sprint) to accelerate new product development.
- ▶ **User testing and co-design** in real life setting for optimization of software usability and system user experience.

## Industrial AI

- ▶ **Industry 4.0** open platforms and enabling technologies for IoT, smart manufacturing systems, applied systems for industrial automation and production, robotics, human-robot interaction.

- ▶ **Technologies for vision** video analytics, image and scene understanding, vision for augmented reality.
- ▶ **Data and knowledge management**, elicitation, representation, integration of knowledge & semantic services, process and data intelligence.
- ▶ **Natural language processing** and machine translation syntactic, semantic and pragmatic processing of written texts speech analytics, spoken and written language translation, speech-acoustic.