Main research interest (DSC/e related)

Interactions with systems, products and services yield enormous amounts of data that can improve the design and help create better products and services in the future. Our focus is on highly interactive systems, engaging people through games and (complex) social interactions to express themselves and enact positive change. Through thorough data collection, analysis and modeling, the impact of real-world interventions can be quantified and made relevant for researchers and design stakeholders.

We explore novel interaction concepts targeting the subconscious, learning and education, serious games and well-being – and use data to apply machine learning in the design of interactive systems. Our vision is to generate new insights, often as design knowledge, that help scale contextual, situated and personalized modes of interaction.

Scientific staff (DSC/e related)

Approximately half of our group activities are focusing on data driven research. Key involved staff:

Prof. Matthias Rauterberg (head of the group)
Designing Interactive Systems

Dr. Jun Hu
Social Computing and IoT

Dr. Emilia Barakova
Social Robotics

Dr. Mathias Funk
Adaptive Data Design in a Systems Context

Dr. Erik van der Spek
Serious Games

Furthermore 8 PhDs are working on Data Science projects.

Success stories

TIMO was designed as a computer game specifically for diagnostic purposes with immersive environments, and multimodal interaction being used as part of the psychological assessment in ADHD diagnosis. This project was a collaboration between University of Genoa and TU/e under Erasmus Mundus Joint Doctorate in Interactive and Cognitive Environment (EMJD-ICE) Program, and Kempenhaeghe, Center for Neurological Learning Disabilities.

Automatic Mental Health Assistant project was part of the MARS-500 experiment carried out at the Institute for Biomedical Problems in Moscow. The European Space Agency and the Russian Academy of Sciences jointly conducted this large scale experiment in order to simulate a manned mission to Mars. We contributed with a diagnostic game based decision tool to measure crew coherence in subconscious states.

Project examples

- Smart Technologies for Stress Free Air Travel, sponsored by EC-‘Aeronautics and Space’. Development of a new service for the Inflight-Entertainment-System based on bio-signals (e.g., heart rate) to reduce passengers’ stress on long haul flights.
- With Learning Analytics in the context of puzzle games we empirically showed how different players converge towards different winning or losing strategies. This analysis was supported by fully deterministic instrumentation of the game play and the combined application of clustering analysis and process mining.
Data science is an **interdisciplinary field** that uses a variety of techniques to **create value** based on extracting knowledge and insights from **available data**. Data science is applied everywhere: in business, health, industry, finance, government, education, and also in scientific research.

The Data Science Center Eindhoven (DSC/e) is TU/e’s response to these challenges and possibilities. By bringing top scientists and students from **over thirty research groups** from different TU/e departments together on specific topics, we can tackle the most challenging scientific and societal challenges. All involved groups made a **one-page description** of their main research interests and the involved staff with their key expertise, like the one you’re holding now.

### Mathematics and Computer Science
- Algorithms
- Applied Geometric Algorithms
- Architecture of Information Systems
- Data Mining
- Mathematical Image Analysis
- Probability
- Security of Embedded Systems
- Software Engineering & Technology
- Statistics
- Stochastic Operations Research
- System Architecture & Networking
- Visualization
- Web Engineering

### Electrical Engineering
- Cognitive Internet of Things
- Control Systems
- Electrical Energy Systems
- Signal Processing Systems

### Built Environment
- Building Lighting
- Information Systems in the Built Environment
- Real Estate Management & Urban Planning
- Urbanism and Urban Architecture

### Industrial Engineering & Innovation Sciences
- Human Technology Interaction
- Information Systems
- Innovation, Technology Entrepreneurship & Marketing
- OPAC: Freight Transport & Logistics
- OPAC: Maintenance & Manufacturing
- OPAC: Supply chain management
- Philosophy & Ethics

### Biomedical Engineering
- Cardiovascular Biomechanics
- Computational Biology
- Medical Image Analysis