TRA100/TRA105 Digitalization in sports

Measurements

Sensor development
- strain gauge sensors
- IMUs
- GPS
- Biomedical sensors
- power meters
- high speed cameras

Data analysis
- Statistics
- Multidimensional data
- Data driven methods
- Big Data
- Machine learning
- Artificial intelligence

Interaction design/
User interfaces
- Athlete user interface
- Coach-Athlete interaction
- Virtual reality
- Augmented reality
Course aim

To introduce the students to digital technologies applied in sports and health promoting activities.

The scope covers

• Hardware sensors for measurements and data acquisition
• Tools for data analysis including machine learning and artificial intelligence
• The two categories meet in the area of user interface and interaction design where the feedback loop will be closed and hopefully result in benefits for the practitioner.
Learning objectives

- After completed course all students are expected to have fulfilled the general learning objectives of TRA100 or TRA105, depending on whether they follow the advanced track or the basic track. Specifically, all students are expected to
- Be familiar main concepts describing the society’s digital transformation and able to discuss its implication for humans
- be familiar with some main digital tools and techniques used for motion tracking in preventive health care and sport applications
- understand basic principles behind widely used sensor technologies.
- be familiar with the principles of error propagation and assessment of measurement uncertainties
- be familiar with some of the main concepts from artificial intelligence (AI), e.g., data-driven methods and machine learning
- be familiar with some of the modern tools and sensors for interaction design such as virtual reality/augmented reality
- be able to synthesize and apply knowledge, as specified in points 2-5 above, to tackle or master problems with open solution spaces
Data driven skiing technique identification

Technique identified with random forest algorithm.
Other projects last year

• Data driven match analysis in football
• Developed an algorithm that predicts peak player intensity over various periods, e.g., most intense 5”, 30”, 1’ etc
• Interactive running: Development of a smart-phone application that based on IMU and GPS data identifies running technique and illustrate graphically how the runner relates to runners on different level and with different background
Choose this course if you are interested in

• applying your competence on challenge-driven problems within digitalization

• Interdisciplinary collaboration with researchers, world-class athletes and coaches and commercial actors in the sport sector

• Working in teams

• Develop your engineering skills on real problems covering measurements, error propagation, data analysis and feedback
Apply for the course

• At latest on May 31
  • by sending an email including a motivation letter, CV and transcripts
  • to danku@chalmers.se

• We aim at 20 students in balanced groups of 3-6 per group

• In case of many applicants there might be a selection process based on qualifications from CV, transcripts and motivation letter
  • In your motivation letter you may propose a project to solve in the course
  • you may also be assigned a project or come up with it later if you lack concrete ideas at the time of application