Hanze

Programme

Qualification awarded
Master of Science

Length of the programme
18 months

ECTS credits
90

Level of qualification
Master

Mode
Full-time

Language
English

School
Engineering, Life Sciences & ICT

Locations
Groningen

Smart Systems Engineering

Profile of the programme

This is a Master's degree with a professional orientation applied to the theory and practice of sensor technology. The educational basis of the Master Sensor System Engineering is provided by developments in the professional practice of Sensor Technology. Graduates have advanced technical knowledge of sensor technology with systems overview and a problem-oriented approach that allows them to take a user/service perspective. They have competences to design architectures for big-data sensor systems and data-centric sensor applications, including the modelling of complex data flows and analysis algorithms. They are aware of real-world limitations and constraints, both physical, societal and regulatory. They have the professional skills to work in intercultural and multidisciplinary teams, to excel in interaction with customers, colleagues and partners in the value chain. The programme's main educational characteristics are:

· Competence based learning with focus on academic, technical and social and communicative learning outcomes.

· Integrated learning of knowledge skills.

· Development of professional and personal competences

· Studying in an international environment

Learning outcomes

Giving Meaning to Sensor Data

The graduate creates models to enhance the intelligence of smart sensor systems that transform raw sensor data into data interpretations by applying complex analysis methods, while considering state-of-the-art technologies and applying model-based reasoning from a multi-disciplinary perspective.

Building Intelligent Architectures

The graduate independently designs smart sensor systems architectures aimed at streaming data and high-performance processing. Within the architecture the graduate can make critical decisions on the location of system intelligence, by considering technical and financial specifications, as well as ethical and environmental considerations.

Creating Reliable Services

For expert and non-expert clients, the graduate formulates advice based on complex data or the graduate creates services that provide reliable decisions from both smart sensor systems and contextual information, using the data and data flow in an effective/efficient and responsible way. To this end, the graduate gathers requirements from the full range of stakeholders, in international setting.

Professional Skills

The graduate shows the communication and negotiation skills that allow him/her to work effectively in national and international environments. The graduate can interact efficiently and reach agreements with different professionals. The graduate demonstrates leadership skills by showing understanding of the goals of the different stakeholders involved in professional situations.

Performing Applied Research for System Design

To develop and validate smart sensor system architectures the graduate independently gathers, selects and analyses relevant information from reliable resources, formulating and critically verifying hypotheses combining literature research, model analysis, expert input and experiments.The graduate contributes to the state of the art in the field of smart sensor system technology and finds original solutions to real world problems. The graduate can reflect on the required steps regarding robustness, reliability and usability to develop a smart sensor system from a validated proof-of-concept to a market ready product.

Contributing to Sustainable Innovation

The graduate identifies opportunities for sustainable innovation starting in the design phase, that is innovation within or contributing to the carrying capacity of the planet and respecting the needs of all living species and human individuals, considering the latest development in smart sensor technology and receiving domain. The graduate can assess the impact on the sustainability of the community, company or other collaboration supporting the research and development underlying the realization of the innovation. The graduate shows reflection on the societal, environmental, and business impact, including reflection on but not limited to: privacy issues, environmental pollution aspects, intellectual property rights, legal aspects, industry standards and applicable codes of conduct.

Programme

Smart Systems Engineering	**credits**
Master Semester 1	30
SEVM19SSE - Introduction to Smart Systems Engineering	*5*
SEVM25IP - Introduction Project	*5*
SEVM19AML - Applied Machine Learning	*5*
SEVM21DFA - Data Fusion Architecture	*5*
SEVM21AF - Adaptive Filters	*5*
SEVM19PSD - Products and Services Design	*5*
Master Semester 2	30
SEVM26ICPS - Introduction to Cyber-Physical Systems	*5*
SEVM19DCA - Data Centric Architectures	*5*
SEVM26NNDL - Neural Networks & Deep Learning	*5*
SEVM26RS - Research Skills	*5*
SEVM19PSCC - Professional Skills & Community Contribution	*5*
SEVM25S2P - Semester 2 Project	*5*
Semester 3	30
SEVM21MT - Master Thesis	*30*

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