

<b>Name Module</b>	Smart Spaces
<b>Language</b>	English
<b>Contact person</b>	Dr.ir. Nirvana Meratnia (n.meratnia@utwente.nl)
<b>Specific prerequisites (regarding incoming exchange)</b>	Basics knowledge of: programming (Java, Processing), networking, data management, HMI.
<b>Participating study</b>	TI, Cr-T
<b>Starting block</b>	1 (M9)

## Theme

Smart spaces refer to environments such as apartments, offices, museums, hospitals, schools, malls, university campuses, and outdoor areas that are enabled for co-operation of smart objects and systems, and for ubiquitous interaction with frequent and sporadic visitors [1]. Prime business scenarios include smart retail environments and public areas providing better service to customers and citizens, and home and office environments making living and working more comfortable and efficient.

In this module students will learn the principles, concepts and techniques required to create and evaluate smart spaces.

[1] <http://www.eitictlabs.eu/innovation-areas/smart-spaces/>

## Content (including project)

- Smart objects and (distributed) sensing
  - Sensing technology
  - Wireless connectivity
  - Smart objects (textile, mobile phones, displays, etc.)
- Distributed intelligence and context awareness
  - Deep learning
  - Context inference
  - Feature extraction
  - Activity recognition
- Mobile and indoor localization
  - Localization and ranging technologies
  - Inertial navigation
  - Localization algorithms
- Smart interaction
  - Distributed displays
  - Robotics
  - Tangible interfaces

## Learning goals

*After completion of the module students can:*

- understand and characterize principles of smart spaces and underlying methods and technologies
- develop creative, useful, and efficient smart space solutions and services
- understand basics of context awareness, service design and engineering
- understand and design (distributed) algorithms for context awareness, reasoning, and recognition
- design smart interaction methods based on context
- design solutions for and using technologies for user interaction, localization and other areas similarly relevant for smart spaces
- structurally evaluate and analysis of complex interactive smart spaces
- project planning and management
- perform fair self-assessment and reflection based on peer reviewing

### **Educational forms**

Lectures

- 4 hours per week, 4 weeks: 16 hours in total

Self-study and MOOCs

- 1.5 days a week, 5 weeks: 60 hours in total

Challenges

- 1 challenge per topic, 4 in total, each challenge 2 days: 64 hours in total

Integrated end project

- 4 weeks design and evaluation (112 hours)

### **Assessments**

Demonstration and presentation of the Challenges: 4 times 4 hours, 16 hours total

Presentation Project plans and SoA (24 hours)

Tests (2 times 2 hours) – retry (2 times 2 hours)

Self-evaluation of challenges based on peer review (16 hours)

Final examination (4 hours)