

# iCareNet Winter School 2012: Context inference and ethics

March 19 – 23, 2012, Hotel Sport, Klosters, Switzerland

Program overview as of 30-01-2012



TIME	MONDAY 19 <sup>TH</sup> MARCH Status meeting; Study design and ethics  Hotel Sport seminar room	TUESDAY 20 <sup>TH</sup> MARCH Context inference, learning methods  Hotel Sport seminar room	WEDNESDAY 21 <sup>TH</sup> MARCH Recognition and workgroups  Hotel Sport seminar room	THURSDAY 22 <sup>TH</sup> MARCH Workgroup meetings  Hotel Sport seminar room	FRIDAY 23 <sup>TH</sup> MARCH Workgroup meetings, conclusion  Hotel Sport seminar room
09:00 – 13:00	Free time	Free time	Free time	Free time	<b>Parallel tracks:</b> <ul style="list-style-type: none"> <li>• <b>Workgroup meetings</b></li> <li>• <b>10:30: Advisor meeting</b></li> </ul>
13:00 – 15:00	Chair: <i>Oliver Amft, TUE</i> <ul style="list-style-type: none"> <li>• <b>Welcome message &amp; introduction.</b> <i>Oliver Amft, TUE</i></li> <li>• <b>Fellow presentations.</b> <i>(5 min per fellow)</i></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Introduction to Context Inference.</b> <i>Paul Lukowicz, DFKI</i></li> <li>• <b>Electronic Stress Assistants.</b> <i>Bert Anrlich, ETH</i></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Introduction to Physiological Signal Processing.</b> <i>Mark van Gils, VTT</i></li> <li>• <b>Model Validation.</b> <i>Joachim Buhmann, ETH</i></li> </ul>	<b>Parallel tracks:</b> <ul style="list-style-type: none"> <li>• Workgroup meetings</li> </ul>	Chair: <i>Oliver Amft, TUE</i> <ul style="list-style-type: none"> <li>• <b>Workgroups summary presentations (20min each).</b></li> <li>• <b>Event summary and feedback, closing.</b></li> </ul> Latest closing: 15:30
15:00 – 15:30	BREAK (Refreshments)				Departure.
15:30 – 17:30	Chair: <i>Oliver Amft, TUE</i> <ul style="list-style-type: none"> <li>• <b>Research Ethics.</b> <i>Jürg Lustenberger, Uni Zurich</i></li> <li>• <b>Clinical Study Design in Rehab using Technical Systems and Lit Review.</b> <i>Corina Schuster, RR</i></li> <li>• <b>Discussion.</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>An ontology-based framework for activity modelling, recognition and learning in smart homes.</b> <i>Luke Chen, Uni Ulster</i></li> <li>• <b>From Gesture Spotting to Composite Activity Recognition and Back.</b> <i>Ulf Blanke, MPI Saarbrücken / AGT R&amp;D</i></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Monitoring Activities of Daily Living with Simple Sensors.</b> <i>Ben Kröse, UvA</i></li> <li>• <b>Discussion on all lecture topics of the day.</b></li> </ul>	<b>Parallel tracks:</b> <ul style="list-style-type: none"> <li>• Workgroup meetings</li> </ul>	

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		<ul style="list-style-type: none"> <li>• <b>Temporal Data Mining - Principles and Current Research Activities.</b> <i>Bernhard Sick, Uni Kassel</i></li> </ul>	<b>Parallel tracks:</b> <ul style="list-style-type: none"> <li>• Workgroup meetings</li> </ul>		
17:30 – 18:00	BREAK				
18:00 – 19:30	<i>Chair: Oliver Amft, TUE</i> <ul style="list-style-type: none"> <li>• <b>Status update on iCareNet, activities and event week programme.</b> <i>Oliver Amft, TUE</i></li> <li>• <b>Status presentations from Workgroups.</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Dynamic Belief Revision using Bayesian Estimation.</b> <i>Waltenegus Dargie, TU Dresden</i></li> <li>• <b>Discussion on all lecture topics of the day.</b></li> </ul>	<b>Parallel tracks:</b> <ul style="list-style-type: none"> <li>• Workgroup meetings</li> </ul>	<b>Parallel tracks:</b> <ul style="list-style-type: none"> <li>• Workgroup meetings</li> </ul>	
19:30 – 21:30	Dinner at Hotel Sport	Dinner at Hotel Sport	Dinner at Hotel Sport	Dinner at Hotel Sport	

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## **Detailed program**

### ***MONDAY, 19TH MARCH***

#### **iCareNet status and introductions, research ethics and study methodologies**

(Attendance of a senior staff member of each beneficiary is requested. Associated partners are cordially invited to participate.)

Observational study designs are often used as a first step to evaluate and validate context-aware systems in HWA applications. All observational studies in iCareNet will be conducted in the actual application environment with most stakeholders (in particular, patients and clinical staff) involved, to maximise efficiency and realism of validations. Preparation and implementation of human studies requires specific and most stringent consideration of ethical aspects related to observed (monitored) study participants. This school will focus on:

1. General ethical considerations in studies with humans, including the Declaration of Helsinki, participant information and informed consent, participant privacy, data protection during and after the study completion.
2. Design and implementation of observational studies on context-aware systems, considering specifically the use of body-worn and ambient systems and gaining ethical approval for new technical developments.

#### **Topics addressed:**

- Status of iCareNet, activities and further plans.
- Discussion on Scientific and Training Objectives and accomplishments.
- Introductory/update presentations for iCareNet fellows.
- Finding and establishing an independent research topic, including literature review, innovation process, hypothesis-based research.
- How to detect and react to plagiarism.

**Detailed program**

***TUESDAY, 20TH MARCH***

Pattern recognition, behaviour modelling and context inference

One primary aim of iCareNet is to develop procedures for sensor signal pattern analysis, modelling, and context inference. Thus, sound knowledge of recognition and inference methods is a vital work prerequisite. This school will provide fellows with a deep understanding and practical skills related to methods for inferring user activity and context from pre-processed multi-modal sensor signals. The fellows are assumed to have gained basic skills in the general area of pattern recognition and inference through local courses already.

The school will go into details of pattern recognition and context inference, showing how methods perform in different recognition tasks and describe advanced techniques. Elaborate practical examples will be given and hands-on class work will be performed.

Topics addressed:

- Signal analysis and feature extraction in different sensor modalities.
- Pattern recognition (classification and spotting).
- Time series modelling methods.
- High-level context modelling.
- Semi-supervised and unsupervised learning.

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## Detailed program

### *WEDNESDAY, 21TH MARCH*

#### Pattern recognition, behaviour modelling and context inference

Continuing lecture series started on March 20.

#### Workgroup meetings

Researcher workgroups will concentrate on advancing individual SOs (addressing TO0), related to several fellows in iCareNet. Workgroups will foster networking and team-work among the network fellows, as the organisational responsibility will reside mainly with the fellows themselves, thus addressing TO8. Workgroup topics will be selected according to arising needs of several iCareNet fellows and in the competence area of an organising partner. The deliverable of each workgroup is a technical report detailing the group's achievements.

The average duration of a workgroup collaboration will be 3 to 6 months. Meetings are planned for kick-off and conclusion of the workgroup aligned to school events, otherwise telephone and internet conferences are used to minimise travelling. Collaborative work sessions (up to 3 days) will be organised based on sound justification. The involved fellows will organise workgroup activities, such as the collaborative work meetings.

Workgroups	Organising partner
<u>Pervasive service infrastructures (SO5)</u> . Research into, and specification of, a novel service frameworks that manage context information sourced in distributed wearable and ambient context systems that provide services for users or care provider information management systems. iCareNet focuses in particular on new techniques for interaction of mobile and ambient context services, as well as newly arising requirements for ad hoc collaboration of multiple mobile and ambient systems. The requirements for this infrastructure should be take from both the patient domain (i.e. personal pervasive healthcare technologies) as well as from the hospital domain (i.e. for close collaboration, treatment, and care done by clinicians inside a hospital).	ITU
<u>Tools and techniques for ground truth handling (SO3)</u> . Ground truth is an essential prerequisite for context recognition. If not for identifying training data, then it remains important for context recognition algorithm evaluations. In this workgroup, we will investigate the state-of-the-art and recent trends in ground truth acquisition pertained to context recognition problems. Considered methods include complementary sensing, dynamic experience sampling, and (post) recording annotations. The WG will investigate existing tool chains for ground truth handling in multi-modal datasets (including video, high bandwidth sensors, such as audio, event-based sensors, etc.). Subsequently, the WG will focus on extending/realising a dataset-independent annotation tool to process large open context datasets.	NIT, TUE

Early workgroup achievements and plans for continuation shall be summarised during the school event.

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## **Detailed program**

### ***THURSDAY, 22TH MARCH***

#### Workgroup meetings

For workgroup meetings see programme of March 21.

### ***FRIDAY, 23TH MARCH***

#### Workgroup meetings, summary

For workgroup meetings see programme of March 21.

The school event will close with a workgroup summary presentation and feedback session, in which participants can discuss the organisation and goals for future iCareNet school events.