CHIST-ERA Projects Seminar 2016 – Bern, April 27-29

Posters

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ViSen – Tagging visual data with semantic descriptions

Green ICT, towards Zero Power ICT (Call 2011)
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GEMSCLAIM – GreenEr Mobile Systems by Cross LAyer Integrated energy Management
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Context- and Content-Adaptive Communication Networks (Call 2012)
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DISEDAN – service and user-based DIstributed SElection of content streaming source and Dual AdaptatioN
MACACO – Mobile context-Adaptive CAching for COntent-centric networking

Intelligent User Interfaces (Call 2012)
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IMOTION – Intelligent Multimodal Augmented Video Motion Retrieval System
JOKER – JOKe and Empathy of a Robot/ECA: Towards social and affective relations with a robot

Adaptive Machines in Complex Environments (Call 2013)
AdaLab – Adaptive Automated Scientific Laboratory
ALOOF – Autonomous Learning of the Meaning of Objects
COACHES – Cooperative Autonomous Robots in Complex and Humans Environments

Heterogeneous Distributed Computing (Call 2013)
DIONASYS – Declarative and Interoperable Overlay Networks, Applications to Systems of Systems
DIVIDEND – Distributed Heterogeneous Vertically IntegrateD ENergy Efficient Data centres
HPDCJ – Heterogenous parallel and distributed computing with Java

Human Language Understanding: Grounding Language Learning (Call 2014)
AMIS – Access Multilingual Information opinionS
ATLANTIS – ArTificial Language uNdersTanding In robotS
IGLU – Interactive Grounded Language Understanding
M2CR – Multimodal Multilingual Continuous Representation for Human Language Understanding
MUSTER – MUltimodal processing of Spatial and TEmporal expRessions
ReGROUND – Relational symbol grounding through affordance learning

Resilient Trustworthy Cyber-Physical Systems (Call 2014)

COPES – COnsumer-centric Privacy in smart Energy gridS

DYPOSIT – Dynamic Policies for Shared Cyber-Physical Infrastructures under Attack

I-DRESS – Assistive interactive robotic system for support in dressing

SECODE – Secure Codes to Thwart Cyber-physical Attacks

Demo/Poster:	Poster
Representative name:	Claude BARRAS
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Country:	France
Topic:	From Data to New Knowledge (D2K)
Project:	CAMOMILE

Title:

CAMOMILE collaborative annotation platform

Abstract:
In the context of the CHIST-ERA CAMOMILE project (Collaborative Annotation of multi-MOdal, multI-Lingual and multi-mEdia documents), we developed a collaborative annotation framework for multimodal, multimedia, multilingual data focusing on the annotation of people. We present the organization and the implementation of the framework server along with several application cases.

Demo/Poster:	Poster
Representative name:	Liming Chen
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Topic:	From Data to New Knowledge (D2K)
Project:	ViSen

Title:
tba

Abstract:
tba

Demo/Poster:	Poster
Representative name:	Prof Erol Gelenbe
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Country:	United Kingdom
Topic:	Green ICT, towards Zero Power ICT (G-ICT)
Project:	E-CROPS

Title:

Optimising Energy Harvesting for Communications

Abstract:
The ECROPS project has developed new methods and technologies to fully exploit energy harvesting for communication systems and wireless sensors. A new paradigm of "energy packet networks" has been created for the analysis and networked optimisation of such systems. Optimum power transmission levels have been obtained to achieve minimum energy consumption. New devices have been designed and demonstrated using MEMS technology.

Demo/Poster:	Poster
Representative name:	Jesus Gómez Vilardebó
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Topic:	Green ICT, towards Zero Power ICT (G-ICT)
Project:	E-CROPS

Title:

Energy Harvesting Communication Networks Optimization (The E-CROPS Project)

Abstract:
This poster outlines the main theoretical and technical achievements of the ECROPs project (complementing the project presentation).

Demo/Poster:	Poster
Representative name:	Thomas Fahringer
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Topic:	Green ICT, towards Zero Power ICT (G-ICT)
Project:	GEMSCLAIM

Title:

Greener Mobile Systems by Cross Layer Integrated energy Management

Abstract:
tba

Demo/Poster:	Poster
Representative name:	Peter Thoman
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Topic:	Green ICT, towards Zero Power ICT (G-ICT)
Project:	GEMSCLAIM

Title:

Gemsclaim: Greener mobile systems by cross layer integrated energy measurement

Abstract:
In the GEMSCLAIM project, numerous cross-layer technologies for the reduction of energy consumption were investigated. We present three such results in particular: (i) synergies between the programmer-, compiler- and runtime-levels to more accurately express application region semantics, (ii) integration of per-application parallel runtime systems and overall OS-level steering, and (iii) leveraging of hardware energy profiling data within a high-level simulation environment.

Demo/Poster:	Poster
Representative name:	Jean-Marie Dilhac
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Country:	France
Topic:	Green ICT, towards Zero Power ICT (G-ICT)
Project:	SMARTER

Title:

Smart Multifunctional Architecture & Technology for Energy-aware wireless sensoRs

Abstract:
SMARTER project aims at integrating on a flexible substrate a wireless and battery free system designed to perform structural health monitoring in an aircraft. The main innovations deal with the integration of a single device performing both energy harvesting and stress measurement, of integrated supercapacitors, of high efficiency energy management / signal processing / wireless communication integrated circuits. The poster will present the more recent achievements in the above areas, together with the global integration process.

Demo/Poster:	Poster
Representative name:	Prof. Jaafar Elmirghani
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Topic:	Green ICT, towards Zero Power ICT (G-ICT)
Project:	STAR

Title:
tba

Abstract:
tba

Demo/Poster:	Poster
Representative name:	Wei Chai
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Country:	Malaysia
Topic:	Context- and Content-Adaptive Communication Networks (C3N)
Project:	CONCERT

Title: A Context-Adaptive Content Ecosystem under Uncertainty (CONCERT)

Abstract: The objective of CONCERT is to develop a content ecosystem encompassing all relevant players which will be able to perform intelligent content and network adaptation in highly dynamic conditions under uncertainty. This ecosystem will have as basis emerging information-/content-centric networking technologies which support intrinsic in-network content manipulation. The project will consider uncertainty aspects in the following two application domains: a) social media networks based on user generated content and b) CDN-like professional content distribution. Three dimensions of uncertainties will be addressed: heterogeneous and changing service requirements by end users, threats that may have adverse impacts on the content ecosystem, as well as opportunities that can be exploited by specific players in order to have their costs reduced. In order to manage and exploit the uncertainty aspects, CONCERT defines a two- dimensional content and network adaptation framework that operates both cross-layer and cross-player. First, the decision on any single adaptation action needs to take into account context information from both the content application layer and the underlying network. Second, we consider joint content and network adaptation in order to simultaneously achieve optimised service performance and network resource utilisation. Finally, some complex uncertainty scenarios require coordinated content and network adaptation across different ecosystem players. In this case, inconsistent or even conflicting adaptation objectives and different levels of context knowledge need to be reconciled and are key research issues.

In order to achieve adaptation solutions capable of coping with different uncertainties, the project will develop advanced learning, decision-making and negotiation techniques. Learning is required for deriving accurate system behavioural patterns according to the acquired context knowledge. This will then drive decision-making functions for taking the most appropriate adaptation actions to address these uncertainties. Negotiation techniques are required for resolving potential tussles between specific content/network adaptation objectives by different players in the content ecosystem. The project will consider both centralised and distributed approaches in which learning and decision-making processes on adaptation actions can be performed either at the central adaptation domain controller or in a decentralised manner across multiple network elements. In the latter case, emerging information-/content-centric networks will become much more intelligent, with content-aware devices performing self-adaptation according to their own context knowledge but through coordination in order to achieve global near-optimality and stability.

Demo/Poster:	Poster
Representative name:	Piotr Krawiec
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Country:	Poland
Topic:	Context- and Content-Adaptive Communication Networks (C3N)
Project:	DISEDAN

Title:

Adaptation & Buffer Management Algorithm for HTTP adaptive streaming

Abstract:
Adaptation & Buffer Management Algorithm (ABMA) is a new adaptive solution, which ensures that the rebuffering probability is under given threshold during the video streaming. The proposed adaptation solution adjusts the queue size for absorbing short-time network variability while allowing streaming rate switching for adapting to long-time bandwidth variability. Enhanced version of the algorithm, called ABMA+, which selects video representation based on the predicted probability of video freezing, avoids heavy online computation so it could be widely deployed on different terminals.

Demo/Poster:	Poster
Representative name:	Marco Fiore
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Country:	Italy
Topic:	Context- and Content-Adaptive Communication Networks (C3N)
Project:	MACACO

Title:

Spatiotemporal Data Analytics for Mobile Traffic

Abstract:

Cellular network operators collect and store data concerning the traffic generated by mobile subscribers, by exporting production databases or deploying dedicated probes within the radio access and/or core portions of their networks.

This data consists of time-stamped and geo-referenced records of the digital activity of vast populations - in the order of millions of users for large operators. Such a rich source of knowledge represents a clear opportunity to many reseach communities, and allows scaling up studies across disciplines such as physics, sociology, epidemiology, transportation, or networking. The poster describes data analytics aimed at characterizing macroscopic spatiotemporal profiles of the mobile demand, which have applications in the design of upcoming cognitive cellular networks.

Demo/Poster:	Poster
Representative name:	Kamini Garg
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Country:	Switzerland
Topic:	Context- and Content-Adaptive Communication Networks (C3N)
Project:	MACACO

Title:

Leveraging User-interests to Anticipate Context and Content

Abstract:
This work focuses to predict next location of people along with their activity in Location Based Social Networks (LBSNs). Our prediction algorithm leverages spatio-temporal visiting patterns of users and their interest profiles.

Demo/Poster:	Poster
Representative name:	Sahar Hoteit
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Topic:	Context- and Content-Adaptive Communication Networks (C3N)
Project:	MACACO

Title:
Characterization, analysis and modeling of MACACO human behavioral traces

Abstract:
In this poster, we present the characteristics of real-world data traces collected by partners of MACACO project. Our study includes the analysis of content consumption as a function of the different types of applications as well as the mobility characterization as a function of two different mobility metrics: the radius of gyration and the center of mass.

Demo/Poster:	Poster
Representative name:	Guangshuo Chen
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Topic:	Context- and Content-Adaptive Communication Networks (C3N)
Project:	MACACO

Title:
On the Quest for Representative Behavioral Datasets: Mobility and Content Demand

Abstract:
Mobile datasets are widely used as firsthand sources for human mobility research. These datasets are often incomplete or have heterogeneous spatiotemporal resolutions, e.g. a dataset is often aggregated or in lack of fields. In many cases, a reliable dataset in human mobility research comes from sampling or merging original datasets, a challenging task. In this paper, we present our experience on creating a reliable dataset describing mobile data traffic in individual's spatiotemporal view. We focus on individuals having enough geographical information and merge their call records from one dataset with the data traffic records extracted from another dataset. Based on this dataset, we perform an analysis of user demand on mobile data traffic in terms of spatial and temporal behaviors. For each subscriber, sessions are put into a 3-dimensional space in terms of space, time and volume and are clustered by applying DBScan. Characteristics of are revealed from the statistical analysis on clusters. Subscribers are also categorized according to their clusters.

Demo/Poster:	Poster
Representative name:	Alexey Andrushevich
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Country:	Switzerland
Topic:	Intelligent User Interfaces (IUI)
Project:	eGlasses

Title:

User interaction with smart glasses

Abstract:
The eGlasses project focuses on developing an open platform for multisensory electronic glasses that support new intelligent interaction methods. Information perceived by eGlasses is automatically processed based on user interactions (e.g. controlled by eye-tracking) or without them (e.g. using context-based analysis). The processing unit combines multisensory data and information discovered from measured data sets (e.g. respiratory rate from a video sequence). During the meeting the eGlasses prototype will be presented. Additionally, selected interaction methods and applications of the eGlasses platform will be illustrated.

Demo/Poster:	Poster
Representative name:	Heiko Schuldt
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Country:	Switzerland
Topic:	Intelligent User Interfaces (IUI)
Project:	IMOTION

Title:

IMOTION - Intelligent Multi-Modal Augmented Video Motion Retrieval System

Abstract:
With the proliferation of video recording devices embedded into a large variety of (mobile) devices and the resulting abundance of digital video, finding a particular video sequence in collections that increasingly grow is more and more becoming a major challenge. Existing approaches to retrieve videos are mostly based on manually added keywords and thus require on prior knowledge about the origin and context of a particular video to work properly. In this demo we present the IMOTION video retrieval system which follows a novel and innovative approach for searching in large video collections. It supports the search for video sequences on the basis of (one or several) still images, (one or several) user-provided sketches, sample video sequences, and -most importantly- the specification of motion via flow fields; and it allows to seamlessly combine all these modes. Moreover, IMOTION uses deep neural net-based semantic feature extractors and is thus able to search for objects to be present within the target sequence.

Demo/Poster:	Poster
Representative name:	Stéphane Dupont
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Topic:	Intelligent User Interfaces (IUI)
Project:	IMOTION

Title:
tba

Abstract:
tba

Demo/Poster:	Poster
Representative name:	Sophie Rosset
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Country:	France
Topic:	Intelligent User Interfaces (IUI)
Project:	JOKER

Title:

The Joker project: challenges and results

Abstract:
Our objectives are to provide a generic intelligent user interface for use with various platforms such as robots or ECAs, a collection of multimodal data with different socially-oriented behavior scenarios in two languages (French and English) and an evaluation protocol for such systems. JOKER emphasizes the fusion of verbal and non-verbal channels for emotional and social behavior perception, interaction and generation capabilities.

We have built several versions of the JOKER system which features real-time reactions with a perception module (sensing user's facial expressions, voice, audio and speech content), a social interaction module modelling user and context, with memories, and a generation and synthesis module for maintaining social engagement with the user. Two different platforms have been tested at LIMSI-CNRS (with NAO) and TCD (with an ECA). The ASR module from LIUM has been tested in English and French.Representative data sets have been collected for English and French. Metrics and protocols are designed to evaluate our progress in intelligent user interface development. Several modules such as affect burst detection from Koç, laughter synthesis from UMONS will be added in the next versions of the platforms.

The final JOKER platforms will process fusion of verbal and non-verbal information and will invoke two types of decision: intuitive and cognitive decisions. They will function in the noisy real-life world. It will be extendable by third parties to develop further adaptive and multi-modal companion devices for various applications (elderly assistance, educational systems…) being usable, natural, effective and empowering for users.

Demo/Poster:	Poster
Representative name:	Larisa Soldatova, Barbara Caputo, Martin Carpenter, Katherine Roper, Daniel Trejo Banos
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Topic:	Adaptive Machines in Complex Environments (AMCE)
Project:	AdaLab

Title:

AdaLab: Adaptive Automated Scientific Laboratory

Abstract:
The AdaLab (an Adaptive Automated Scientific Laboratory) project aims to develop a framework for semi-automated and automated knowledge discovery for teams of human and robot scientists. Such a framework will integrate and advance knowledge representation, ontology engineering, machine learning, bioinformatics, and automated experimentation. The application area of the AdaLab framework is in cell biology and has biomedical relevance to cancer and ageing, however the core technologies are generic and can be applied for other scientific areas. The AdaLab project has a potential to significantly advance the state-of-the-art in automating scientific discovery. It supports the increasingly main-stream vision that in the future many scientific discoveries will be made by teams of human and robot scientists, and that such collaborations between human and robot scientists will produce scientific knowledge more efficiently than either could alone. The expected project results will include a framework for dealing with uncertainties, new machine learning methods for the generation and efficient testing of complex scientific hypotheses and novel biomedical knowledge about cell biology. Information about the AdaLab project is available at: www.adalab.mib.manchester.ac.uk/

Demo/Poster:	Poster
Representative name:	Rocco De Rosa
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Topic:	Adaptive Machines in Complex Environments (AMCE)
Project:	ALOOF

Title:

Autonomous learning of the meaning of objects

Abstract:

When working with and for humans, robots and autonomous systems must know about the objects involved in human activities, e.g. the parts and tools in manufacturing, the professional items used in service applications, and the objects of daily life in assisted living. While great progress has been made in object instance and class recognition, a robot is always limited to knowing about the objects it has been trained to recognize. The goal of ALOOF is to enable robots to exploit the vast amount of knowledge on the Web in order to learn about previously unseen objects and to use this knowledge when acting in the real world. We will develop techniques to allow robots to use the Web to not just learn the appearance of new objects, but also their properties including where they might be found in the robot's environment. This poster shows the achievements obtained during the first year of the project in the field of robot knowledge gap detection, learning from Web resources for recognizing objects in situated settings, robotic perception and semantic Web mining.

Demo/Poster:	Poster
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Topic:	Adaptive Machines in Complex Environments (AMCE)
Project:	COACHES

Title: Cooperative Autonomous Robots in Complex and Human Environments

Abstract: Public spaces in large cities are increasingly becoming complex and unwelcoming environments. Public spaces progressively become more hostile and unpleasant to use because of the overcrowding and complex information in signboards. It is in the interest of cities to make their public spaces easier to use, friendlier to visitors and safer to increasing elderly population and to citizens with disabilities. Meanwhile, we observe, in the last decade a tremendous progress in the development of robots in dynamic, complex and uncertain environments. The new challenge for the near future is to deploy a network of robots in public spaces to accomplish services that can help humans. Inspired by the aforementioned challenges, COACHES project addresses fundamental issues related to the design of a robust system of self-directed autonomous robots with high-level skills of environment modelling and scene understanding, distributed autonomous decision-making, short-term interacting with humans and robust and safe navigation in overcrowding spaces. To this end, COACHES will provide an integrated solution to new challenges on:

1   a knowledge-based representation of the environment,

2   human activities and needs estimation using Markov and Bayesian techniques,

3   distributed decision-making under uncertainty to collectively plan activities of assistance, guidance and delivery tasks using Decentralized Partially Observable Markov Decision Processes with efficient algorithms to improve their scalability and

4   a multi-modal and short-term human-robot interaction to exchange information and requests.

COACHES project will provide a modular architecture to be integrated in real robots. We deploy COACHES at Caen city in the "Rives de l'Orne" mall. COACHES is a cooperative system consisting of fixed cameras and the mobile robots. The fixed cameras can do object detection, tracking and abnormal events detection (objects or behaviour). The robots combine these information with the ones perceived via their own sensor, to provide information through its multi-modal interface, guide people to their destinations, show tramway stations and transport goods for elderly people, etc.... The COACHES robots will use different modalities (speech and displayed information) to interact with the mall visitors, shopkeepers and mall managers. The project has enlisted an important an end-user (Caen la mer) providing the scenarios where the COACHES robots and systems will be deployed.

Demo/Poster:	Poster
Representative name:	Etienne Riviere
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Topic:	Heterogeneous Distributed Computing (HDC)
Project:	DIONASYS

Title:

Declarative and Interoperable Overlay Networks

Abstract:
An increasing number of everyday objects and appliances are interconnected to each other and to servers in the Cloud, in order to provide a variety of useful services. Often, systems are also grouped together to form Systems-of-Systems. Today, however, system-of-systems composition is typically ad-hoc and fragile. The DIONASYS project aims to allow programmers to reason, manipulate and deploy distributed systems and systems-of-systems with a higher level of abstraction. It favours declarative approaches to express the behaviour of a system, or of a composition of multiple systems, rather than implementing it at a fine grain. DIONASYS is demonstration-driven and builds a large-scale experimentation testbed that will be composed of cluster of small computers, geographically distributed across the partners' sites and including a SDN testbed for inter-site communication. This poster will present the current research orientations of the project.

Demo/Poster:	Poster
Representative name:	Babak Falsafi
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Topic:	Heterogeneous Distributed Computing (HDC)
Project:	DIVIDEND

Title:

Optimistic Concurrency in Rack-Scale Computing

Abstract:
Scale-Out NUMA (soNUMA) is a rack-scale computer architecture, programming model, and communication protocol for low-latency, distributed in-memory processing. soNUMA layers an RDMA-inspired programming model directly on top of a NUMA memory fabric via a stateless messaging protocol. To facilitate interactions between the application, OS, and the fabric, soNUMA relies on the remote memory controller – a new architecturally-exposed logic widget integrated into the node's local coherence hierarchy. As part of the CHIST-ERA DIVIDEND project we are exploring architectural support for optimistic concurrency in soNUMA. Our results indicate that with modest modifications to the soNUMA logic, concurrent reads to multi-block objects can be supported directly in hardware with no (software) locking overhead.

Demo/Poster:	Poster
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Topic:	Heterogeneous Distributed Computing (HDC)
Project:	HPDCJ
Title: tba **Abstract:** tba	

Demo/Poster:	Poster
Representative name:	Piotr Bala
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Topic:	Heterogeneous Distributed Computing (HDC)
Project:	HPDCJ

Title:

Heterogenous parallel distributed programming with PCJ

Abstract:

PCJ is an award winning library for parallel computations in Java. In particular, at Supercomputing 2014, the PCJ library received HPC Challenge Class 2 Best Productivity Award, which recognize the efficient way of programming parallel applications.

The PCJ library (http://pcj.icm.edu.pl) implements partitioned global address space (PGAS) model and was inspired by languages like Co-Array Fortran, Unified Parallel C and Titanium. In contrast to listed languages, the PCJ does not extend nor modify language syntax. The PCJ library put emphasis on compliance with Java standards. The programmer does not have to use additional libraries, which are not part of the standard Java distribution. Compared to the other solutions PCJ does not need a dedicated compiler to preprocess code.

The PCJ library runs on any HPC system equipped with Java runtine environment. It shows good performance and scalability up to thousands of cores. The PCJ library has been already used to parallelize different benchmarks as well as large scale parallel applications such as raytracing, FFT, MapReduce, Sequence Alignment or Genetic Algorithm.

Demo/Poster:	Poster
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Topic:	Heterogeneous Distributed Computing (HDC)
Project:	HPDCJ

Title:

Graph Analysis performed with Parallel Computing Java

Abstract:
Nowadays the use of accelerators as commodity co-processors has increased due to their massive parallel architecture, high memory bandwidth, higher computing/bandwidth ratio, and their floating point capacity. The majority of the technologies, which includes frameworks and libraries for efficiently utilising accelerators, are C/C++ oriented, such as Nvidia CUDA or OpenCL. The current solutions for using Java without extensions on accelerators are either in the form of direct Java binding via JNI (Java Native Interface) to CUDA/OpenCL or in the form of more user friendly programming API (Application Programming Interface) which translates Java byte-code at runtime to CUDA/OpenCL. Despite this, we will show that the Parallel Computing Java (PCJ) library allows us to rapidly implement

various key algorithms for graph analytics such as node importance, graph simplification and comparison, focusing more on performance optimisations than worrying about memory management.

Demo/Poster:	Poster
Representative name:	Kamel Smaïli
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Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	AMIS

Title:

An overview of AMIS project

Abstract:

The idea of the project is to develop a multilingual help system of understanding without any human being intervention. What we would like to do, is to help people understanding broadcasting news, presented in a foreign language and to compare it to the corresponding one available in the mother tongue of the user. The concept of understanding is approached in this project by giving access to any information whatever the language in which it is presented. In fact, with the development of internet and satellite TV, tens of thousands shows and broadcasting news are available in different languages, it turns out that even high educated people, do not speak more than two or three languages while the majority speaks only one, which makes this huge amount of information inaccessible.

Consequently, the majority of TV and radio programs as well as information on internet are inaccessible for the majority of people.

The understanding process is considered here to be the comprehension of the main ideas of a video. The best way to do that, is then to summarize the video for having access to the essential information. Henceforth, AMIS will focus on the most relevant information by summarizing it and by translating it to the user if necessary. Another aspect of AMIS is to compare two summaries produced by this system, from two languages on the same topic whatever their support is: video, audio or text and to present the difference between their contents in terms of information, sentiments, opinions, etc.

Demo/Poster:	Poster
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Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	AMIS

Title:
tba

Abstract:
tba

Demo/Poster:	Poster
Representative name:	Katrien Beuls
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Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	ATLANTIS

Title:

ATLANTIS

Abstract:
This poster presents the ATLANTIS project proposal and outlines the first steps taken in the project that started very recently. ATLANTIS attempts to understand and model the very first stages in grounded language learning, as we see in children until the age of three: how pointing or other symbolic gestures emerge from the ontogenetic ritualisation of instrumental actions, how words are learned very fast in contextualised language games, and how the first grammatical constructions emerge from concrete sentences. This requires a global, computational theory of symbolic development that informs us about what forces motivate language development, what strategies are exploited in learner and caregiver interactions to come up with more complex compositional meanings, how new grammatical structures and novel interaction patterns and formed, and how the multitude of developmental pathways observed in humans lead to a full system of multi-modal communication skills. This ambitious aim is feasible because there have been very significant advances in humanoid robotics and in the development of sensory-motor competence recently, and the time is ripe to push all this to a higher level of symbolic intelligence, going beyond simple sensory-motor loops or pattern-based intelligence towards grounded semantics, and incremental, long-term, autonomous language learning.

Demo/Poster:	Poster
Representative name:	Jean Rouat
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Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	IGLU

Title:

The IGLU project

Abstract:

We will present the IGLU project :

Through a developmental approach where knowledge grows in complexity while driven by multimodal experience and language interaction with a human, we propose an agent that will incorporate models of dialogues, human emotions and intentions as part of its decision-making process. This will lead anticipation and reaction not only based on its internal state (own goal and intention, perception of the environment), but also on the perceived state and intention of the human interactant.

Demo/Poster:	Poster
Representative name:	Loic BARRAULT
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Country:	France
Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	M2CR

Title:
  M2CR: Multimodal Multilingual Continuous Representation for Human Language Understanding

Abstract:
Communication is one of the necessary condition to develop intelligence in living beings. Humans use several modalities to exchange information: speech, written text (both in many languages), images, gestures, and many more. There is evidence that human learning is more effective when several modalities are used. There is a large body of research to make computers process these modalities, and ultimately, understand human language. These modalities have been, however, generally addressed independently or at most in pairs. However, merging information from multiple modalities is best done at the highest levels of abstraction, which deep learning models are trained to capture.

The M2CR project aims at developing a revolutionary approach to combine all these modalities and their respective tasks in one unified architecture, based on deep neural networks, including both a discriminant and a generative component through multiple levels of representation. Our system will jointly learn from resources in several modalities, including but not limited to text of several languages (European languages, Chinese and Arabic), speech and images. In doing so, the system will learn one common semantic representation of the underlying information, both at a channel-specific level and at a higher channel-independent level.

Pushing these ideas to the large scale, e.g. training on very large corpora, the M2CR project has the ambition to advance the state-of-the-art in human language understanding (HLU).

M2CR will address all major tasks in HLU by one unified architecture: speech understanding and translation, multilingual image retrieval and description, etc.

By these means, we hope to help to advance the field of human language.

Demo/Poster:	Poster
Representative name:	Guillem Collell
E-mail:	gcollell@kuleuven.be
Country:	Belgium
Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	MUSTER

Title:

Improving Word Representations for Semantic Recognition in Language by Adding Visual Contextual Knowledge

Abstract:
In the recent years, the emergence of deep learning models has greatly advanced computer vision and natural language processing (NLP). These models allow producing feature representations for images and words. For example, convolutional neural networks (CNN) and Mikolov's et al. skip-gram model are popular means to extract such features from images and text corpora respectively. These representations are typically employed either in concept similarity tasks or used as a features in classification. However, the integration of visual and textual input modalities in a single model is still incipient and approaches are quite rudimentary so far. The attempts typically build multimodal representations by directly concatenating image feature vectors to the word vectors. These simple -yet effective- models show promising results that consistently outperform the unimodal approaches taken as a baseline. In addition, previous work mostly uses the language modality to improve performance in visual recognition tasks. We believe that the inverse is still an important gap to be covered. In this respect, our work in the MUSTER project makes use of visual information to improve language understanding. This project aims at providing principled ways to integrate visual contextual knowledge into language understanding. To this end, a mapping between image and word vector spaces is built in order to assist language tasks. In this poster presentation we focus on deep learning methods of training word representations augmented with visual information. We will show promising preliminary results on classical tasks such as semantic word similarity and word meaning disambiguation, and on more advanced semantic recognition tasks such as semantic role labeling and spatial role labeling. Semantic role labeling regards the task of recognizing the semantic function of a sentence's constituents (e.g., recognizing the "who", "does what", "to whom", "where", "when" and "how"). Spatial role labeling refers to the recognition of objects and their spatial relationships in language. Our work is an important first step to integrate perceptual world knowledge in machine understanding of language.

Demo/Poster:	Poster
Representative name:	Marie-Francine Moens
E-mail:	Marie-Francine.Moens@cs.kuleuven.be
Country:	Belgium
Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	MUSTER

Title:

Improving Word Representations for Semantic Recognition in Language by Adding Visual Contextual Knowledge

Abstract:

Guillem Collell and Marie-Francine Moens, Department of

Computer Science, KU Leuven Belgium

In the recent years, the emergence of deep learning models has greatly advanced computer vision and natural language processing (NLP). These models allow producing feature representations for images and words. For example, convolutional neural networks (CNN) and Mikolov's et al. skip-gram model are popular means to extract such features from images and text corpora respectively. These representations are typically employed either in concept similarity tasks or used as a features in classification. However, the integration of visual and textual input modalities in a single model is still incipient and approaches are quite rudimentary so far. The attempts typically build multimodal representations by directly concatenating image feature vectors to the word vectors. These simple -yet effective- models show promising results that consistently outperform the unimodal approaches taken as a baseline. In addition, previous work mostly uses the language modality to improve performance in visual recognition tasks. We believe that the inverse is still an important gap to be covered. In this respect, our work in the MUSTER project makes use of visual information to improve language understanding. This project aims at providing principled ways to integrate visual contextual knowledge into language understanding. To this end, a mapping between image and word vector spaces is built in order to assist language tasks. In this poster presentation we focus on deep learning methods of training word representations augmented with visual information. We will show promising preliminary results on classical tasks such as semantic word similarity and word meaning disambiguation, and on more advanced semantic recognition tasks such as semantic role labeling and spatial role labeling. Semantic role labeling regards the task of recognizing the semantic function of a sentence's constituents (e.g., recognizing the "who", "does what", "to whom", "where", "when" and "how"). Spatial role labeling refers to the recognition of objects and their spatial relationships in language. Our work is an important first step to integrate perceptual world knowledge in machine understanding of language.

Demo/Poster:	Poster
Representative name:	Alessandro Saffiotti
E-mail:	asaffio@aass.oru.se
Country:	Sweden
Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	ReGROUND

Title:

<div align="center">The ReGround project</div>

Abstract:
tba

Demo/Poster:	Poster
Representative name:	Luc De Raedt
E-mail:	luc.deraedt@cs.kuleuven.be
Country:	Belgium
Topic:	Human Language Understanding: Grounding Language Learning (HLU)
Project:	ReGROUND

Title:

<div align="center">An overview of the REGROUND project</div>
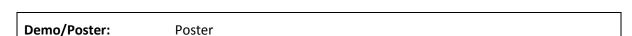
Abstract:
We shall introduce the REGROUND Project (Relational symbol grounding through affordance learning).

The problem of symbol grounding attempts to associate symbols from language with a corresponding referent in the environment. Traditionally, research has focused on identifying single objects and their properties. Similarly, affordances learning in robotics tend to focus on single objects. These approaches often do not consider the full context of the environment, which contains multiple different objects and their properties as well as relationships among the objects. Furthermore, the state of the environment (e.g., which relationships are true, etc.) affords (i.e., permits executing) certain actions. This project hypothesizes that the grounding process must consider the full context of the environment in order to perform symbol grounding and to better adapt to a new language and a new environment.

This project aims to develop a novel approach to grounding that lifts it to the relational level, where an agent reasons about the relationships between multiple symbols in the language and between multiple referents in the environment and it is able to learn affordances that capture the relationship between objects and their properties, actions, and the environment. Learning such relationships will require combining information from different modalities such as language and perception.

We will evaluate our approach with a robot that operates in a kitchen-like environment. The robot will be trained by being presented with a series of demonstrations involving inputs from multiple modalities (language and perception). Then, it will be evaluated by being placed in an unseen environment where it will be forced to adapt to its new setting and interpret, possibly unimodal input (i.e., only language or only perception), in order to correctly carry out the requested tasks.

Demo/Poster:	Poster
Representative name:	Tobias Oechtering
E-mail:	oech@kth.se
Country:	Sweden
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	COPES

Title:

COPES overview and recent results

Abstract:
In the project COnsumer-centric Privacy in smart Energy gridS (COPES) we will develop and anaylze innovative privacy enhancing energy flow control strategies to protect the privacy of the prosumers in smart grids. In this poster we will give a general overview of the project and present some recent project results.

Demo/Poster:	Poster
Representative name:	Awais Rashid
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Country:	United Kingdom
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	DYPOSIT

Title:

DYPOSIT: Dynamic Policies for Shared Cyber-Physical Infrastructures under Attack

Abstract:
The DYPOSIT project tackles the problem of large, shared cyber-physical system (CPS) infrastructures under attack. In particular, the project responds to the critical need for dynamically formulating and adapting security policies, rapidly and on-demand, in the face of unfolding attacks on a shared CPS fabric integrating multiple applications run by a variety of stakeholders. DYPOSIT tackles this fundamental research problem through a novel dynamic policies approach rooted in a socio-technical understanding of the complexity and dynamics of shared CPS fabrics under attack. DYPOSIT's approach is unique and transformative as it takes an inter-disciplinary view of reasoning about the security state of a CPS and formulating responses to CPS coming under attack. This is in sharp contrast to other approaches that remain largely focused on technical measures to provide security or solutions that cater for the resource-constrained nature of the devices employed in a CPS. Furthermore, DYPOSIT's approach to dynamic policies offers a new perspective on the role of policies in large-scale CPS settings - transforming policies from simply a means to enforce pre-defined security properties to policies as living, evolving objects that play a central role in reasoning about the security state of such a CPS and responding to unfolding attacks. Managing the complexity of formulating and adapting policies dynamically in such a setting, while resolving conflicts, is a fundamental advance towards resilient shared CPS fabrics. DYPOSIT's scientific advances are validated in an available realistic testbed, which is used to provide application scenarios depicting CPS under attack across a spectrum: highly-managed CPS such as those found in industrial control systems or future factories through to dynamically aggregated CPS, as in smart cities, large manufacturing plants or intelligent transportation systems.

Demo/Poster:	Poster
Representative name:	Sanja Dogramadzi, Praminda Caleb-Solly
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Country:	United Kingdom
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	I-DRESS

Title:

An assistive robot to support dressing

Abstract:
Support with dressing, which is the focus of this research, has the potential to transform the ability for independent living. Support for dressing is an extremely challenging task, however working as an extra pair of hands for an able carer can help to make a considerable impact in a situation where this task would be performed by two carers. The key challenges are being able to learn a specific series of actions and then make appropriate adjustments as part of the dynamic process to ensure safely and effectiveness. In developing viable solutions, a key challenge is understanding and scoping a task, particularly one that involves a human participant. It is only by conducting a critical task analysis and issues related to operational contexts, and developing working models and prototyping concepts, that the key technical challenges can be clearly determined.

This poster presents our initial experiments from using a Baxter Robot from Rethink Robotics to put on a jacket on one arm. The experiments were first conducted in conjunction with a Vicon System for tracking the arm and a mannequin was used due to safety concerns in the development stages. The first stages of the work involved trajectory planning and analysing the effort along each joint to provide feedback for correction on failure detection. However due to the non-linearity of the measures, an alternative approach rather than force optimisation was used by integrating a wireless sensor which provided accelerometer and gyroscope reading.

Additionally a simple fixed vocabulary for speech interaction was implemented to enable the user to work collaboratively with the robot in improving performance.

Demo/Poster:	Poster
Representative name:	Aleksandar Jevtic
E-mail:	ajevtic@iri.upc.edu
Country:	Spain
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	I-DRESS

Title:

I-DRESS: Assistive Interactive robotic system for support in dressing

Abstract:
The main objective of the project is to develop a system that will provide proactive assistance with dressing to disabled users or users such as high-risk health-care workers, whose physical contact with the garments must be limited to avoid contamination. The proposed robotic system consists of two highly dexterous robotic arms, sensors for multi-modal human-robot interaction and safety features.

The system will comprise three major components: (a) intelligent algorithms for user and garment detection and tracking, specifically designed for close and physical human-robot interaction, (b) cognitive functions based on the multi-modal user input, environment modelling and safety, allowing the robot to decide when and how to assist the user, and (c) advanced user interface that facilitates intuitive and safe physical and cognitive interaction for support in dressing. The developed interactive system will be integrated on commercial WAM robotic arms and validated through experimentation with users and human factor analysis in two assistive-dressing scenarios.

Demo/Poster:	Poster
Representative name:	Alexander Lenz
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Country:	United Kingdom
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	I-DRESS
Title: tba **Abstract:** tba	

Demo/Poster:	Poster
Representative name:	Greg Chance
E-mail:	greg.chance@uwe.ac.uk
Country:	United Kingdom
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	I-DRESS

Title:

IDRESS

Abstract:

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Support for dressing is an extremely challenging task, however working as an extra pair of hands for an able carer can help to make a considerable impact in a situation where this task would be performed by two carers. The key challenges are being able to learn a specific series of actions and then make adjustments as part of the dynamic process to ensure safety and effectiveness. In developing viable solutions, a key challenge is understanding and scoping a task, particularly one that involves a human participant. It is only by conducting a critical task analysis and issues related to operational contexts, and developing working models and prototyping concepts, that the key technical challenges can be clearly determined.

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Demo/Poster:	Poster
Representative name:	Emmanuel Pignat
E-mail:	emmanuel.pignat@idiap.ch
Country:	United Kingdom
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	I-DRESS

Title:

Transfer of dressing assistance skills to a bimanual robot

Abstract:
The goal of I-DRESS is to develop a robotic system that will provide proactive assistance with dressing. To this end, probabilistic models will be developed to encode the multimodal sensory and motor signals that characterize a dressing task. The parameters of these models will be learned by direct demonstration (kinesthetic teaching) or by observation (motion tracking of human demonstrator).

The poster presents ongoing work from the Idiap Research Institute that aims at extending the notion of motion primitives to a wider range of local behaviors that can arise in dressing assistance, including time-dependent and time-independent behavior primitives. We present a model based on hidden Markov Model to encode skills that can adapt to new unknown situations. This is achieved by expressing the output distribution of the model in multiple frames of reference or coordinate systems to represent the robot behavior so that it can adapt during reproduction to new situations or configurations of the user pose.

Demo/Poster:	Poster
Representative name:	Jean-Luc Anger
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Country:	France
Topic:	Resilient Trustworthy Cyber-Physical Systems (RTCPS)
Project:	SECODE

Title:

<div align="center">Secure Codes to thwart Cyber-physical Attacks</div>

Abstract:
In this project, we specify and design error correction codes suitable for an efficient protection of sensitive information in the context of Internet of Things (IoT) and connected objects. Such codes mitigate passive attacks, like memory disclosure, and active attacks, like stack smashing. The innovation of this project is to leverage these codes for protecting against both cyber and physical attacks. The main advantage is a 360° coverage of attacks of the connected embedded systems, which is considered as a smart connected device and also a physical device. The outcome of the project is first a method to generate and execute cyber-resilient software, and second to protect data and its manipulation from physical threats like side-channel attacks. Theses results are demonstrated by using a smart sensor application with hardened embedded firmware and tamper-proof hardware platform.