

Call for Papers

Knowledge-Driven Activity Recognition in Intelligent Environments

Special Issue of Pervasive and Mobile Computing

Guest Editors: Liming Chen, Chris Nugent, Diane Cook, Zhiwen Yu

Introduction:

With the advance and prevalence of low-cost low-power sensors, computing devices, wireless communication and networks, pervasive and mobile computing has evolved from a vision to a realistically achievable and deployable computing paradigm. Research is now being conducted in many areas, ranging from low-level data collection, intermediate-level information processing, to high-level applications and service delivery. It is becoming increasingly evident that the prevalence of intelligent environments to work and to live in within which flexible multimodal interactions, proactive service provisioning, and context aware personalized activity assistance will be commonplace.

Activity recognition has emerged as a decisive research issue linked to the successful realisation of intelligent environments. This relates to the fact that any intelligent behaviour of an environment must be relevant with regard to the user's ongoing activities. This has been an active and fast growing research area. While early work focused on recognising activities using monitoring and analysis from images and videos, recent research has moved towards the use of multiple tiny dense sensors which may be embedded throughout the environment. Current approaches typically rely on the state-of-the-art in machine learning ranging from unsupervised to supervised techniques and from discriminant to generative models. Though substantial progress has been made, many issues still remain unsolved, such as the feasibility, scalability and manageability of attaching sensors to all items involved in all activities, and of developing algorithms to learn every activity for a large number of activities in a diversity of pervasive ambient intelligent environments.

To reduce the scale of deployed sensors along with the computational expense of the activity learning process in addition to making pervasive and mobile computing a realistically achievable and applicable solution, researchers have turned to exploit domain knowledge such as user activity profiles, domain-specific constraints and common sense heuristics, to address a subset of the aforementioned problems. Nevertheless, it is challenging to capture, model and represent domain knowledge, both explicit and implicit, for disparate real-world working and living environments. Even more challenging is the sharing, re-use and re-purposing of domain knowledge in different use scenarios to support users in their decision making process.

The proposed Special Issue seeks principles, concepts, methodologies, frameworks, techniques and tools for addressing the above challenges. Furthermore, the Special Issue seeks to discover the success and implications of these techniques in both real and simulated intelligent environments. It solicits original, cutting-edge and state-of-the-art theoretical and applied contributions that:

- conceive novel methodologies, frameworks and processes towards knowledge-rich activity recognition,
- investigate effective (automated and automatic) principles and technologies for acquiring, modelling, representing and sharing domain knowledge in the context of user activity profiling,
- develop reusable tools that deliver convincing intelligent support for knowledge-driven activity recognition, and/or scalable prototypes that demonstrate novel application of knowledge-driven activity recognition, and
- discuss trends and directions of future knowledge-driven activity recognition theories and applications.

We are particularly interested in work which reports on the usage of ontologies and semantic technologies in the aforementioned research.

Topics:

Original contributions, not currently under review or accepted by another journal, are sought in all areas related to domain knowledge driven activity recognition, including (but not limited to) the following:

- Domain knowledge based methodologies and frameworks for activity recognition

- Domain knowledge acquisition, mining and learning
- Generic approaches to modelling domain specific constraints and heuristics
- Activity modelling, representation and reasoning and activity ontologies
- User activity profile/preference modelling
- Approaches to dynamic progressive activity recognition
- Activity recognition methods and algorithms
- Managing uncertainty in the activity recognition process
- Approaches to domain knowledge sharing, reuse and re-purposing
- Technology infrastructure, middleware, tools and APIs for knowledge-rich activity recognition
- Challenges with interoperability and data exchange in relation to activity recognition.
- Use cases and representative application systems in both real-world and simulated intelligent environment scenarios

Submission Guidelines:

Prospective authors should prepare manuscripts according to the *Guide for Authors* as published in the Journal website at http://www.elsevier.com/wps/find/journaldescription.cws_home/704220/authorinstructions. Manuscripts should be submitted through the online PMC manuscript submission system at <http://www.ees.elsevier.com/pmc/>.

Schedule:

Deadline for paper submission: 28-Feb-2010
 Completion of first review: 30-April-2010
 Minor/Major revision due: 30-June-2010
 Final decision notification: 31-July-2010
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