Rationale

Today, in Multi-Agents Systems (MAS) environment, the cognitive capabilities of humans are often exceeded in such highly dynamic situations (e.g. traffic) leading to excessive workload, stress, out of the loop operators with reduced situation awareness and impoverished acquisition and maintenance of expertise (Woods & Sarter 2000). Current Human Machine Systems (HMS) poorly support the complex interaction and interplay of human and system actions.

A shift has progressively occurred from a mere interaction between humans and machines, mostly based on a master(human)-slave(machine) relation, to a new situation where humans and machines are now inherently cooperating, to achieve some common, superordinate goals or tasks using distributed shared resources. Because the transition has been slow and smooth it has mostly remained unnoticed in the industry and consequently the system development methodologies are still based on the previous, master-slave paradigm. While there are already some activities going on, the missing key enabler today are new affordable methods, techniques and tools which go beyond assistance systems and consequently address the whole cooperative systems development process from a MAS perspective in order to tackle the challenges posed by future cooperative environments.

In this context, stakeholders from industry and research fields will take an overview about the progress on the development of the core of reasoning frameworks: the Proactive Decision Engine. Any framework that makes use of reasoning and learning algorithms (no matters the domain) needs the development of this conceptual block, that provides as outputs information enriched with data coming from sensors, user, legacy systems and context models.

For this special session, we call contributions that can address the following challenges, related to cooperative and proactive systems design:

- Naturalistic decision making models
- Intelligent context-aware information retrieval
- Intelligent user state information retrieval (from human-agent perspective)
• Cooperative system state prediction, during design-time and during run-time (from machine-agent perspective)
• Multimodal information fusion
• Context modeling and reasoning techniques
• Design of multimodal, pro-active and adaptable human-machine interface

Topics

In this special session we intend to join together industry and academic players, in order to present and discuss recent advancements on High Performance Embedded and Cooperative Human-Machine Systems. This includes different applicative domains (transport, health, emergency services and so on) and aims at discussing the transferability of approaches across such domains and the possibility to develop a common and shared approach in the future.

In general, the main focus of the special session will be twofold: from one side, the prediction of the state of the human agents and their interaction with other agents of a cooperative system; from the other side, the presentation of the proactive information retrieval where the ultimate goal is to seamlessly access relevant multi-modal information in a context-sensitive way. Moreover, the session will also explore the challenges related to capturing and acting upon user intentions, thus providing the appropriate information and services according to the situation. Multiple aspects determining the ability of the user to perform in a given situation need to be considered, including user’s role, the related emotional state and stress level, as well as general conditions. Finally, another important focus is the design of graphical user interfaces for these HMS, which proactively provide relevant information trying to optimize the choices available to the user while keeping the user in control.

Therefore, contributions to this special session include, but are not limited to, the following topics:

• Data fusion in the scope of Proactive Decision Engine design and development.
• Filtering and de-cluttering algorithms.
• Proactive Decision Engine in embedded architectures.
• Detection of emotional states using hybrid portable information media and data mining algorithms.
• Cognitive modelling of operator behaviour, including modelling of distributed cognition.
• Modelling of human-machine interaction and cooperative systems.
• Brain-computer interfaces.
• Measurements/metrics for human behaviour.
• Patterns detection techniques in historical data.
• Monitoring of the human operators’ psychophysiological and ocular activities to infer e.g. situation awareness, workload, stress, task performance, attentional demand, etc.
• Proactive Decision Engine design methodologies in different domains.
• Simulation platforms that allow simulating interaction between human and machine agents, as well as tracking tools to diagnose the state.
• Task/resource re-allocation between human and human as well as human and machine.
Form of the Special Session

The goal of this special session is to offer the possibility to researchers from European and non-European countries to get an overview of the different approaches concerning the aforementioned topics. In that context, the research outcomes of current research European projects related to development of frameworks and architectures based on proactive decisions and cooperative systems will be presented. In parallel, new possibilities for synergies between European companies and research institutes will be explored in the context of future European funded projects. In particular, this special session aims at identifying common methodological, theoretical and technical challenges, in order to pave the way towards common, generic and standardized cooperative and proactive development methodologies.

Paper Submission

Paper submission for Special Session on Proactive Decision Engines design and development is available through the official web page of INDIN’2013 conference (http://www.indin2013.org).

The paper will be Scientific presentation: your contribution should describe a scientific approach to one of the topics mentioned above. Your paper should not exceed the limit of 6 pages.

Paper Acceptance

The papers that will be accepted for publication will be included in IEEE Xplore. Each accepted paper must be presented at the conference by one of the authors. Papers not presented will not be included in IEEE Xplore.

The final manuscript must be accompanied by a registration form and a registration fee payment proof. All conference attendees, including authors and session chairpersons, must pay the conference registration fee, and their travel expenses.

Important Dates

- Deadline for submission of papers (regular, special sessions) ⇒ February 28, 2013
- Notification of acceptance ⇒ April 19, 2013
- Deadline for submission of final manuscripts ⇒ May 24, 2013

Special Session Organizers

- Fabio Tango (CRF) (fabio.tango@crf.it)
- Andreas Luedtke (Offis) (andreas.luedtke@offis.de)
- Jose Alberto Saez (Leitat) (jasaez@leitat.org)
- Elena Tsiporkova (Sirris) (elena.tsiporkova@sirris.be)
- Silvia Castellvi (Atos) (silvia.castellvi@atos.net)

Thank you for your collaboration