Introduction

The general topic of the workshop on Human Centered Processes (HCP) concerns the problem of understanding and modelling human expertise in industrial settings. The particularity of the HCP approach is focusing on natural cognition and considering as fundamental the contribution of cognitive sciences.

This workshop follows a series of previous Human Centered Processes conferences. The first conference was held in Brest (France, 1999) and was mainly devoted to the application of cognitive approaches in various fields of process control and other complex industrial problems usually managed by Operational Researchers. The second conference, held in Luxembourg (2003), was dedicated to distributed decision and man-machine cooperation. Both these conferences put special emphasis upon cognitive models of decision making. The third conference (Delft, Netherlands, 2008), focused on the human actor and software agent collaboration in safety and time critical systems-of-systems.

The original group has been involved for years in the special working group "Human Centered Processes" belonging to EURO, the Association of European Operational Research Societies. Now the group is reorganizing, and a new emphasis is given to complementing traditional Operational Research practices with cognitive issues, often neglected in industry but relevant, such as knowledge engineering, discovery of rules, updating and maintenance of rules, rule-based systems, models designed to aid complex human decision-making.

This idea poses a challenge over the organization and design of contemporary manifacturing, against the idea of systems totally detached from human cognitive procedures. Theaim is to make possible a joint scientific and industrial research intended for analyzing and modelling advanced manufacturing, information, or actionsystems that are strongly dependent on a balanced integration between human and machine skills: collaborative working, cooperation, user adapted interaction, etc. This original attitude has recently met the development of Cognitive Sciences, with the particular emphasis on a multidisciplinary approach, suggesting the idea of helps realizing Human Centered Designs and Technologies. The complementarity of cognitive and traditional approaches provides a great number of additional dimensions that allow to design and analyze more complete and complex systems.

HCP 2011 is not devoted to a main topic, in order to encouragethe maximum scientific exchange between practitioners in different research topics. These Proceedings collect accepted papers, that have been sorted into different topics or lines of debate fields. The variety of themes does not mean unrelatedness. On the contrary, all of these contributionsare attempts to show how human cognitive processes are essential in designing and supporting complex systems, where the amount of required automatization cannot overcome the underlying cognitive patterns based on human strategies.

A first aspect analyzed in the workshop contributions is the relationship between designer and customer, directly concerning the problem of user support. In particular **M. Norese, E. Liguigli** and **C. Novello** deal with the problem of understanding users' real needs through a direct cooperation between them and designers, and with the creation of cognitive maps to summarize information obtained from different sources. In administration and management new perspectives are opened by using graphs that take into account the role of different contexts in influencing different lines of reasoning: **H.Tahir** and **P. Brézillon** apply this approach in database management, with the goal of developing an intelligent assistant for administrators; **X.Fan, P. Brézillon, R. Zhang** and **L. Li** use a similar approach for a workflow management system applied to the scientists' decision making processes.

Another area of interest relates to improving safety, particularly by understanding the limits of interfaces. **P. Carvalho, J. Gomes** and **M.Borges** examined safety problems arising in nuclear power plants, where most critical processes depend on control room operator's interaction with interfaces. They used cognitive task analysis to examine problems in operator training and propose

a new interface design that helps the operator in incident management. **C. Calefato, L. Minin** and **R. Montanari** are interested in the car driving behavior. Their research is aimed at improving the safety systems by constructing a user model that allows to predict the driver's behavior. The aim is to build intelligent vehicles by combining the study of vehicle technology with the performance of drivers. **A. Chialastri**'s contribution describes a new designer perspective in aviation: going beyond the classical "human friendly" design, to create systems better defined as "pilot friendly", that take into account the pilots' experience. In this perspective, a shift is required from "reactive" interventions after accidents to "proactive" actions.

Three papers concern support systems for health and welfare. **S. Apolonio, L. de Deus, M. Borges** and **A. Vivacqua** carry out a study using Google Docs as a collaborative writing aid for hearing impaired people. They found that this tool is effective in helping the interaction with non-impaired people. **M-A. Sujan, S. Pozzi, C. Valbonesi** and **C. Ingram** deal with the general ability of keeping control when adverse events happen. They describe some resilient behaviors in hospitals, using namely personal trading, shared awareness and seeking help. Using qualitative analysis of reports, their study shows that those behaviors are based on personal experience and initiative, often without enough support from the organization. **F. Cavallo, M. Aquilano, G. Anerdi, M.C. Carrozza, P. Dario** and **A. Greco** present the results of a European project aimed at developing a roadmap for intelligent systems providing personal assistance to elder and impaired people. Originally proposed ubiquitous computing techniques ("Ambient Assisted Living") are extended to cognitive aspects.

Along with risk prevention some proposals focus on human error analysis. **E. Schreuder** and **T. Mioch** address the problem of cognitive lockup, a difficulty that arises when a person is faced with a series of disturbing situations. They put this problem in relation to time pressure, and carried out an experiment that shows how an almost finished task may delay the consideration of another more urgent task. **M. Frixione** and **A. Lieto** are concerned with a classical problem, highly problematic in AI and Cognitive Engineering, namely concept representation. They use evidence from experimental psychology to sketch an architecture for a "dual process" concept representation in formal ontologies taking into account the heterogeneity of human cognition.

On the whole, contributions to this workshop show that a human-centered approach is not only useful but necessary in joint academic and industrial research, where analyzing and modelling advanced manufacturing, information, or action systems is strongly dependent on a balanced integration between human and machine skills. In this endeavour, the multidisciplinary nature of cognitive sciences (particularly Psychology, Philosophy, and Computer Science) plays a crucial role in the necessary integration of technical perspectives with ones concerning people.

Elena Carrea, Alberto Greco, Carlo Penco