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Special Issue on Artificial Intelligence for Human Computer Interaction

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This special issue[1] on Artificial Intelligence for Human Computer Interaction follows the positive experience of the AI*HCI workshop[2], which took place on 4th of December 2013 in Turin in conjunction with the XIII Conference of the Italian Association for Artificial Intelligence (AI*IA 2013). The main aim of the special issue is to provide some answers on how Artificial Intelligence (AI) can be used in the context of Human Computer Interaction (HCI) research community. This issue presents six contributions that address how adaptation, personalization and recommendations have been investigated and applied to several domains such as tourism, personal information management, information scheduling, the provision of emotional support, and the modeling of videogame player engagement.

In particular, Ardissono et al. propose a mixed-initiative scheduling model which enables the user to collaborate with the calendar manager in the exploration of the possible solutions to a scheduling problem and in the selection of the most convenient one to be applied. The paper describes the mixed-initiative scheduling model and the MARA (Mixed-initiAtive calendaR mAnager) in which it is applied. A preliminary test with users provided encouraging results concerning the efficacy and usefulness of MARA's features.

Braunhofer et al. present a set of user studies showing how the implementation of an "active learning strategy", aimed at predicting user ratings on the basis of user characteristics (mainly user personality), can effectively face the well-known cold-start problem affecting Recommender Systems (RS), and in particular mobile context-aware RS in the tourism domain. They have developed two extended versions of the matrix factorisation algorithm to identify what items the users could and should rate and to compose personalised recommendations.

Goy et al. propose a new approach to the problem of Personal Information Management (based on the notions of files and hierarchical folders) based on collaborative semantic tagging. They present Semantic T++, a system supporting users in collaboratively handling digital resources, based on the notion of "tables" (thematic Web-based collaborative workspaces), populated by "objects" (shared digital resources). Semantic T++ exploits a formal semantic representation of such objects to support users in organizing, selecting and using them. Its core is represented by an ontology which models table objects as "information elements" having properties and relations mainly (but not only) related to their content. Reasoning techniques can be applied to infer knowledge useful to provide users with a flexible access to table objects, based on different criteria, which can be defined and combined by the user on the basis of her needs. In order to evaluate the model, they developed a proof-of-concept prototype, and the test results show advantages in the access to personal and shared resources.

Pinotti et al. describe the development and testing of a Cooperative Lane Change Assistant (C-LCA)

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[2]http://aihci.di.unito.it/index.html

system. The system takes into account the real-time driver's cognitive state by means of a cognitive distraction classifier, and implements road cooperation strategies between the vehicles thanks to a cooperative driver model. Three different test sessions were conducted on a static driving simulator and here described. In each test session, the participants carried out several analogous runs of a reference protocol test, derived from the Lane Change Task. Using the data collected during the first test session, the cognitive distraction classifier was developed using Machine Learning techniques. In the remaining two sessions, a specific C-LCA HMI prototype with visual and acoustic interfaces has been evaluated. The results show that the C-LCA reduced the workload during the lane change manoeuvres compared both with the baseline and with the assistance of a non-cooperative warning system. Moreover, the users expressed satisfaction about the proposed Visual Interface and Acoustic Interfaces.

Smith et al. describe the evaluation aimed at defining an algorithm for selecting different categories of support to be used by an intelligent virtual agent to provide emotional support to carers - people who provide regular support for a friend or relative who could not manage without them - experiencing different types of stress. This study uses seven scenarios that depict different types of stress and acquire emotional support messages for them. The authors then categorize and evaluate the emotional support for different types of stress. They found that telling the carers they are appreciated and offering support are the best types of emotional support. Additionally, they found that how well a supporter sympathises with a situation affects the type of support they consider suitable.

Finally Schiavo et al. describe an approach to infer the level of videogame player engagement, based on the theory of flow in the gaming experience. The inference process is based on the analysis of non verbal behavioral cues such as head movements, facial expressions, keyboard and mouse activities. The authors have used simple and non-obtrusive hardware (webcam and keyword and mouse equipment) to collect non-verbal behavioral cues, and then they presented in the paper the design and the results of an empirical study aimed at gathering data and model the player's engagement. They used an adapted version of the Experience Sampling Methodology to gather the ground truth and trained a Support Vector Machine classifier for recognizing the affective states, reaching an accuracy of 73%. The results showed that the level of engagement is reasonably predicted by considering the head movements and facial expressions only. Their findings could aid in developing digital games able to use the information about the player's affective state to adapt their content and support the game experience.