Adaptive Computing (and Agents) for Enhanced Collaboration (ACEC 2018)

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Abstract—The 16th edition of the “Adaptive Computing (and Agents) for Enhanced Collaboration” (ACEC) track at WETICE 2018 focuses mostly on the area of adaptive agent-based techniques for the enterprise. The objective of the track is to bring together researches from the fields of software agents and adaptive computing to present results and discuss in the context of adaptive techniques and enterprise collaboration. This report briefly reports on the content of accepted papers.

Keywords: adaptive computing; agent-based computing; service-oriented computing; enterprise collaboration

I. INTRODUCTION

Applications that today characterize our everyday lives require support for dynamic, flexible, and open collaboration. Such applications often involve parts and interactions that were not foreseen at design time, and they normally have to cope with unexpected scenarios. At the same time, the level of collaboration supported by such applications is significantly based on service and agent technologies. In particular, examples of application areas where such technologies are used to support collaboration are: Computer Supported Collaborative Work, Workflow and Supply Chain Management, Automation in Virtual Enterprises, and Automated Distributed Component Composition.

The 16th episode of the track on Adaptive Computing (and Agents) for Enhanced Collaboration (ACEC) held at WETICE 2018 in Paris is mainly focused on the following two relevant application areas:

- Adaptive and agent-based services;
- Adaptive techniques for organizational/enterprise use of emerging Web paradigms, such as, Cloud computing, and mobile applications.

Such application areas represent important themes where software agents can leverage their distributed and decentralized nature along with their proactive and autonomous characteristics to provide effective solutions for complex problems that are difficult to address using more traditional technologies. In particular, the complex level of collaboration witnessed in the two application areas addressed by the track can be supported effectively by service and agent technologies.

II. OVERVIEW OF PAPERS

The paper “Human Trust in Robots When Performing a Service” by K. Byrne and C. Marin targets the important problem of trust in the future society where robots will be ubiquitous and possibly undistinguishable from humans. The presence of robots is becoming more apparent as technology progresses and the market focus transitions from smart phones to robotic personal assistants such as those provided by Amazon and Google. The integration of robots in our societies is an inevitable tendency in which robots in many forms and with many functionalities will provide services to humans. This calls for an understanding of how humans are affected by both the presence of and the reliance on robots to perform services for them. In this paper authors explore the effects that robots have on humans when a service is performed on request. Authors exposed three groups of human participants to three levels of service completion performed by robots. Authors record and analyse human perceptions such as propensity to trust, competency, responsiveness, sociability, and team work ability. The results presented in the paper demonstrate that humans tend to trust robots and are more willing to interact with them when they autonomously recover from failure by requesting help from other robots to fulfil their service. This supports the view that autonomy and team working capabilities must be brought into robots in an effort to strengthen trust in robots performing a service.

The paper “Adaptive Workflows of Home-Care Services” by C. Di Napoli, M. Valentino, L. Sabatucci and M. Cossentino discusses an innovative platform architecture in the scope of assistive robotics. With the increased number of elderly people in developed countries, assistive robotics is gaining more attention allowing to support home care assistance. In the paper, assistive robotics is adopted to monitor the activities of daily living of patients with mild neurological disorders to limit the human monitoring, usually representing a burden for family members. In order to improve the effectiveness and user acceptance level of the robotic system, a middleware layer, able to automatically generate monitoring plans for home care patients, is proposed in the paper. The plans are generated as workflow...
of services, each one representing a monitoring task that can be executed by different devices, including humans, in different ways. Authors show that a service-oriented approach allows generating adaptive monitoring plans for patients with different levels of neurological disorders, taking into account the dynamic nature of their personality profiles, as well as of the environment they live in.

The paper, “MAS-based Approach for Scheduling Intensive Workflows in Cloud computing” by M. Mokni, J. Hajlaoui and Z. Brahmi targets the critical issue of scalability in future immense Cloud infrastructures. Cloud computing is becoming a popular model to deliver information technology that offers different services on demand over the Internet. This technology is dedicated to distribute computing resources and their consumption as software services. With the availability of data gathered from sophisticated scientific tools, workflows have proven their utility to implement relevant scientific realizations. Scheduling algorithms are primordial to efficiently automate these intensive workflows, and many attempts have been made to develop new heuristics relying on a Cloud resource model. The majority of these heuristics address one or two-dimensional Quality of Service (QoS) issues. Instead, the paper considers multi-dimensional QoS metrics for scheduling which include metrics on execution time, cost, reliability, availability, and which ensure maximum balancing and exploitation of resources in order to minimize the energy consumption. In this paper, authors propose a multi-agent approach to schedule critical workflows in Cloud Computing in such a way that all tasks will be executed with minimal possible time and energy consumption.

Finally, the paper by E. Missaoui and S. Bhir, “Normative Approach for Non-Functional Requirements Specification and Verification of Holonic Multi-agent Systems”, discusses some challenging problems related to Holonic Multiagent System (HMAS). The norms concept (obligations, permissions, and prohibitions) adapts well to the definition of HMAS. HMAS forms a promising approach to software engineering for the modeling and development of hierarchical complex systems (e.g., intelligent transportation systems, and smart city management systems). During the construction of such systems, different requirements can be considered: functional and non-functional requirements. However, most normative models for multi-agent systems focus only on functional and behavioral requirements specification, while non-functional requirements are crucial in the development of critical intelligent systems. One of the main challenges currently faced in HMAS research is that of non-functional requirements specification and verification. In particular, how to express and enforce non-functional requirements in hierarchical critical systems? One of the main solutions is to employ the use of norms. Norms can be considered as a powerful way to specify the non-functional requirements of hierarchical critical systems. In this paper, authors propose a normative approach that allows the specification and verification of the non-functional requirements of hierarchical and critical intelligent systems, using a set of norms. Non-functional requirements define the properties of the system, according to defined criteria. The proposed normative approach is also illustrated by a case study describing the smart city management system.

III. CONCLUSION

The papers accepted for presentation at the track reflect the aim of the call, addressing one or more of the suggested topics. In our opinion, a very positive aspect of accepted papers is the fact that most of them address problems that will characterize future enterprises, and they are not limited to the problems of the enterprises of today. Papers discuss about synergic integration among humans and robots in the enterprises of the future. They discuss scalability problems that will affect the infrastructure that will support the everyday business of future enterprises. They also targets societal problems of the people living in the smart cities of tomorrow, where future enterprises will influence the life of people more than they do today. We sincerely hope that these research works will have a significant impact to the enterprise world.

In conclusion, we invite all interested researchers to have a look at the WETICE 2019 call for papers, where we will proudly announce the 17th edition of the ACEC track.

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