CISSS: Context-awareness in Intelligent Systems and Smart Spaces

Special session at UBICOMM 2016, Venice, Oct 9-13, 2016
http://www.iaria.org/conferences2016/UBICOMM16.html

Moeiz Miraoui

Umm Al-Qura University, KSA

mfmiraoui@uqu.edu.sa

Abstract—**Context-awareness is a key factor for the development of both intelligent systems and smart spaces. It improves the quality of adapted services by providing them according to the current context. Services in smart spaces and intelligent systems should be provided in a proactive manner (without explicit user intervention) and context-awareness is intended to facilitate services adaptation. The intelligence degree of smart spaces and intelligent devices (especially hand held ones) could be enormously enhanced with the context-awareness aspect. the goal of this special session is to provide researchers with an opportunity to discuss how smart spaces and intelligent systems can better deal with context-awareness.**

Keywords-component; context-awareness; smart spaces; intelligent systems;service; adaptation.

I. INTRODUCTION

Recent advances in sensors network, wireless communication technologies and the dramatically increase of devices with considerable computing ability have brought us towards the era of pervasive and ubiquitous computing. Technology is moving beyond the personal computer towards a growing trend of embedded microprocessors in everyday objects. Devices in pervasive environment should dynamically and proactively (without explicit user intervention) adapt their behavior to current context changes in order to provide adequate service to the users and support them in their every daily lives. devices should become more autonomic, requiring minimum or no human intervention. Context-awareness has emerged as a key enabling technology for future intelligent systems such as smart devices, smart spaces, etc. Context awareness is a highly desirable property for intelligent systems and it shall be well understood and represented in a clear and concise manner. However, how to dynamically adapt services according to the constantly changing context conditions still remain as huge challenges in both smart spaces and intelligent systems. The purpose of the special session on Context-awareness in Intelligent Systems and Smart Spaces is to explore recent advances in the realization of context-aware systems especially in smart devices and smart spaces and to identify the challenges and opportunities that this research area will face in the near future.

II. OVERVIEW OF THE SESSION PAPERS

The special session consists of three papers written by researchers involved in the development of context-aware systems. In the first paper entitled "machine learning technologies in smart spaces", the authors Soumia Belaidouni and Moeiz Miraoui present a review of literature where they present different techniques used for machine learning in general, and, in the field of smart spaces in particular. The authors show how the use of machine learning techniques in smart spaces could improve context-aware services in smart spaces. They detail different purposes of machine learning like recognition, prediction, adaptation, optimization, etc. They present different types of learning like supervised learning, unsupervised learning, semi supervised learning and reinforcement learning, as well, research papers.

In the second paper entitled "Energy Saving in a Smart Waiting Room Using Context-aware Services Adaptation", the authors Moeiz Miraoui and Manel Guizani propose a context-aware services adaptation approach for a smart waiting room. Their approach could improve both person's comfort and energy saving in such spaces. They present a description of a typical waiting room with the most common appliances. Authors present their vision on how the waiting room should operate smartly in order to save energy and improve user's comfort by using a context-aware services adaptation. The paper focus on clear steps for context elements establishment based on a clear definition of context. Their context-aware services adaptation method uses the Naive Bayes machine learning technique.

In the last paper entitled "A modification of Wu and Palmer Semantic Similarity Measure", the authors Djamel Gassoum, Moeiz Miraoui and Chakib Tadj present a modification of the Wu and Palmer semantic similarity measure, which could improve similarity measure between contexts in pervasive systems. They show the importance of similarity measure in context-aware services adaptation where devices should operate in similar manner of a previously known context. They present an improvement of one of the most developed semantic similarity measures applied to the ontological / taxonomic representation of the context namely the Wu and Palmer semantic similarity measure. The benefits of their modified measure namely its

implementation simplicity and power to give close similarities to the reality unlike several other changes proposed in the literature. It also meets the criteria of semantic similarity measures namely the non-negativity, the identity, the symmetry and uniqueness.

III. CONCLUSION

We believe that the papers included in this special session on Context-awareness in Intelligent Systems and Smart Spaces will give the conference participants a clear view on the importance of context-awareness for the improvement of the quality of provided services in both intelligent systems and smart spaces. Through all these presentations, important context-aware services adaptation techniques will be illustrated to support creative thinking about new research and projects on the areas of intelligent systems and smart spaces.