JARCA'2016

XVIII JARCA Workshop on Qualitative Systems and Applications in Diagnosis, Robotics and Ambient Intelligence

El Toyo, Almería (Spain) 23-27 June 2016

GOBIERNO DE ESPAÑA MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

UNIVERSIDAD DE SEVILLA

Universität Bremen*

fidetia

Proceedings of the

XVIII JARCA Workshop on Qualitative Systems and Applications in Diagnosis, Robotics and Ambient Intelligence

Almería, Spain, 23-29 June 2016

Edited by

Dr.-Ing. Zoe Falomir Llansola
Spatial Cognition Centre
Universität Bremen, Germany

and

Prof. Dr. Juan Antonio Ortega
Departamento de Lenguajes y Sistemas Informáticos
Universidad de Sevilla, España

Published in CEUR-WS.org Vol-1812 on March 2017

General Chair
Juan Antonio Ortega (Universidad de Sevilla)

Program Committee Chair
Zoe Falomir (Universität Bremen)

Organizing Committee
Jorge Yago Fernández (Universidad de Sevilla)

Scientific Committee
Núria Agell (ESADE-URL)
Cecilio Angulo (U. P. Catalunya)
Pedro Arias (Universidad de Vigo)
Andreu Català (U. P. Catalunya)
María José Escalona (U. Sevilla)
Luis González (U. Sevilla)
Isabel Martí (Soluciones Tecnológicas para la Salud y el Bienestar S.A.)
Natividad Martínez (U. Reutlingen)
Quim Meléndez (U. Girona)
Mario Muñoz Organero (U. Carlos III)
Lledó Museros (U. Jaume I)
J. Antonio Ortega (U. Sevilla)
Francisco Ruiz (U. P. Catalunya)
Albert Samá (Universitat Politècnica de Catalunya)
Germán Sánchez (ESADE-Universitat Ramon Llull)
Luis Sánchez Fernández(U. Carlos III)
Ismael Sanz (U. Jaume I)
Ralf Seepold (U. Konstanz)
Miguel Toro (U. Sevilla)
Jesús Torres (U. Sevilla)
Josep Vehí (U. Girona)
Francisco Velasco (U. Sevilla)

Preface

This book contains the accepted papers at XVIII JARCA Workshop on Qualitative Systems and Applications in Diagnosis, Robotics and Ambient Intelligence[1]. JARCA'16 workshop was held in Almería on 23–29 June 2016. ARCA network on Qualitative Systems and Applications in Diagnosis, Robotics and Ambient Intelligence, which celebrated its XVIII Workshop in 2016, started as a Spanish network in 1998. Nowadays, it integrates researchers from Spain and Germany collaborating in different projects related to Qualitative Reasoning, Robotics and Ambient Intelligence.

In this JARCA proceedings there are 9 accepted papers presented by researchers from Spain and Germany. Each submitted paper was reviewed by two program committee members. Other works presented at JARCA'16 but not appearing here were submitted to a Thematic Issue on *Human-centred AmI: Cognitive Approaches, Reasoning and Learning (HCogRL)* at the *Journal of Ambient Intelligence and Smart Environments (JAISE)* indexed by Journal Citation Reports.

A short introduction to the content of JARCA'16 Proceedings is provided next.

In the paper titled *Estimating the Stress for Drivers and Passengers using Deep Learning* by V. Corcoba *et al.*, the authors propose an approach to predict the stress level on drivers and passengers based on deep learning algorithms. This approach employs the Heart Rate Variability (HRV) and telemetry from the vehicle in order to anticipate the incoming stress. It has been validated in a real environment on distinct routes. The results show that it predicts the stress by 86 % on drivers and 92% on passengers. This algorithm may be used to develop driving assistants that recommend actions to smooth driving, reducing the workload and the passenger stress.

In the paper *A Scalable Data Streaming Infrastructure for Smart Cities* by J. Arias Fisteus *et al.*, the authors present a server infrastructure designed in the context of the HERMES project to collect data from sensors and to aggregate it in streams for their use in services of a smart city.

In the paper *Parameter set selection and classification of sleep phases tracing biovital data* by A. Klein *et al.*, the authors analyse existing methods for sleep stage classification based on the following parameters: body movement, heartbeat and respiration. In order to find different behaviour patterns in the several sleep stages, the authors analyse (using 10 different methods) the average values of 15 whole night polysomnography (PSG) recordings -obtained from the DREAMS Subjects Database- looking for heartbeat, body movement and respiration patterns.

In the paper *Towards Modelling Group-Robot Interactions using a Qualitative Spatial Representation* by D. Paillacho *et al.*, the authors tackle the problem of finding a suitable qualitative representation for robots to reason about activity spaces where they carry out tasks interacting with a group of people, and a qualitative spatial model for group robot interaction is proposed to define Kendon-formations. The evolution of these Kendon-formations is also studied, that is, how one formation is transformed into another.

In the paper *Exploring the Cognitive-Affective-Conative Image of a Rural Tourism Destination Using Social Data* by I. Sanz *et al.*, the authors explore the structure of the cognitive, affective and conative components of tourism destination image (TDI) using social data. They report the progress in the implementation of a pilot system for the study of TDI using data extracted from social media which is being built using the SLOD-BI semantic infrastructure for Vilafamés town (a rural tourist destination in Eastern Spain) as a use case.

[1]JARCA'16: `http://madeirasic.us.es/jarca16/?lang=en`

In the paper *A Proposal of Improvements based on New Technologies for the Satisfaction of Passengers on Board Passenger Ship* by T. Vázquez Vázquez *et al.*, the authors study different opinions of experts in the sector of passenger transport by sea on board of different types of ships. Their main aim is to develop global applications in real time that allow to offer services on board according to the habits of the passage. They conclude that the evaluation of passenger satisfaction assessments, based on opinion polling on different services provided on passenger ships, should show which are the most valued and least valued on-board services, which are considered to be the most appropriate to propose formulas for improvement measures.

In the paper *Is Spain more efficient than the other countries of EU-28? Searching the answer through DEA and Malmquist Index* by T. Sanz *et al.*, the authors analyze Natural and Managerial efficiency of the 28 countries of EU from 2005 to 2013 using the Malmquist index (MI) and considering crosses on the efficiency frontiers between years with windows of two years. As input variables, gross capital formation (GCF), final energy consumption, renewable energy consumption and employment have been used. Gross domestic product (GDP) has been taken as desirable output and greenhouse gas emissions as undesirable output. The obtained results indicate that Spain has a similar behavior to those countries that have more time in the EU, both in terms of Managerial efficiency and Natural efficiency.

In the paper *Using MDE for the Reconciliation of Entities in Large Data Sources* by J.G. Enríquez *et al.*, the authors propose an approach based on the Model-Driven Engineering (MDE) paradigm and the virtual-graph technology to solve the problem of entity reconciliation in large volumes of data. MDE provides a solution scalable to any domain. And the virtual-graph technology allows to use any type of algorithm based on graphs to find a solution to a specific problem and to avoid storing all the information available in the same structure. This solution is applied to the management of large volumes of data related to the historical heritage of the Andalusian region in Spain.

In the paper *Dynamic Management of Appointments in Sanitary Environments: A Systematic Literature Review* by V. Cid de la Paz Furest *et al.*, the authors provide an extensive systematic literature review about the use of dynamic programming in the management of appointments in health centers, in order to analyze the current state of this technology in the health environment, and to identify keys for future research.

Acknowledgements

This book of proceedings is partially supported by the projects of the Spanish Ministry of Economy and Competitiveness HERMES (TIN2013-46801-C4-1-R , TIN2013-46801-C4-2-R) and Simon (TIC8052) of the Andalusian Regional Ministry of Economy, Innovation and Science and with the cooperation of Fidetia (Fundación para la Investigación y el Desarrollo de las Tecnologías de la Informacin en Andalucía).

The support from the project *Cognitive Qualitative Descriptions and Applications*[2] (CogQDA) funded by the Universität Bremen and from the Bremen Spatial Cognition Centre is also gratefully acknowledged.

We would like also to thank the members of the Scientific Committee for their valuable work during the reviewing process and the additional reviews.

We also thank Easychair, which was used to manage paper submissions and reviewing the proceedings, and CEUR Workshop Proceedings (CEUR-WS.org) for indexing these proceedings.

Dedicated to Dr. Jose Manuel Márquez

We would like to dedicate this book of proceedings to Dr. Jose Manuel Márquez, who unfortunately is no longer among us, and who participated very actively in previous JARCA workshops. We will always have you in our hearts.

Zoe Falomir
Juan A. Ortega
JARCA'16 Chairs
March 2017

[2]CogQDA: https://sites.google.com/site/cogqda/

Table of Contents: JARCA'16