

Guest Editorial Preface

Special Issue on “Data Analysis for Agriculture”

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This special issue has been organized in conjunction with the international workshop on “Agricultural and Environmental Information and Decision Support Systems” (AEIDSS 2015) held by the International Conference on “Computational Science and its Applications” (ICCSA 2015), June 22–25, 2015 (Banff, Alberta, Canada). The authors of the papers presented at this workshop have been invited to submit an extended version of their manuscript to this special issue, but the special issue call for papers was also open to external contributions. Five papers have been submitted to this special issue, and three have been accepted for publication after revisions. Three reviewers have evaluated each submission.

The papers of this special issue address various current topics in informatics, such as text and web mining, geospatial database, machine learning, and advanced formal methods for developing DSS. Here we describe the main contributions found in the three articles. The first paper entitled “Identification of associations between clinical signs and hosts to monitor the web for detection of animal disease outbreaks” introduces a new method based on data mining for detecting emerging animal infectious diseases with the help of the World Wide Web. The authors explore the combination of text and web mining approaches to automatically extract and identify relevant terms (clinical signs and hosts) from the web and build association between these terms. This research mainly considers new and exotic infectious animal diseases. As a validation process, selected domain experts give answers to an online questionnaire to evaluate the relevance of the terms and their associations as results of the applied method. The authors of the second paper entitled “Potential nitrogen load from crop-livestock systems: a spatial database for a multi-scale assessment and mapping” conceive and implement a new agro-environmental spatial database in order to improve the analysis of environmental pressures due to Nitrogen potential load from mineral and manure fertilization. The geospatial database integrates agricultural and livestock farming datasets at different spatial levels and scales (cadastral, groundwater, sub-basin, ...) from the Umbria region, Italy. Agro-environmental indicators are calculated from the database and visualised through several maps to improve the decision making process of administrative people about the Nitrogen potential load. The last paper, “Two-level classifier ensembles for detecting

coffee rust in Colombian crops,” presents a new predictive method to better estimate coffee rust, a leaf disease, in Colombian crops. Based on machine learning theories and ensemble methods, this suggested method combines two-level classifiers, which are Back Propagation Neural Networks, for the first level, and Regression Tree M5 and Support Vector Regression, for the second level.

As shown in these short descriptions of the papers, this special issue presents new research advances in techniques related to data analysis for agriculture. The application examples provided by the authors clearly show the role of these new technologies in the fields of agriculture, environment and ecology and their potential for the next few years.

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Sandro Bimonte, born in 1978, is a researcher at IRSTEA (TSCF). He obtained his PhD at INSA-Lyon, France (2004-2007). He carried out researches at IMAG (2007-2008), France. He is Editorial Board member of International Journal of Decision Support System Technology, and International Journal of Data Mining, Modelling and Management and member of the Commission on GeoVisualization of the International Cartographic Association. His research activities is in Spatial Data Warehouses and Spatial OLAP, Visual Languages, Geographic Information Systems, Spatio-temporal Databases and GeoVisualization

André Miralles received his Mechanical Engineer degree in 1976 (INSA Toulouse). In 1978, he was employed as researcher at the French Institute for Agricultural and Environmental Engineering where he works since. He leads during 5 years' hydraulic investigations on three-dimensional stream generating into the fishway devices equipping the dams to facilitate the upstream migration of the anadromous fishes (salmon, etc.). Then, he is in charge of the laboratory doing on one hand standardized tests of the sprayers applying pesticides on the cereals or on the orchards and, on the other hand, the researches to improve the spraying techniques and the application techniques of the products. It is involved in different European projects and leads some of them. He assumes also the charge of President of the CIETAP, French committee where the manufacturers of sprayers, the industrialists of chemistry, the representatives of the government and the scientists exchange ideas and organize conferences or the exposures. In 2000, he moves to a position of computing researcher and received his PhD in Computing Science in 2006 (University of Montpellier). Currently, he works in the Joint Research Unit named Territories, Environment, Remote Sensing & Spatial Information. His main interest is focused on the design of new methodologies for software development allowing a better flexibility and a better interactivity with the users. For that, he carries out researches on the Model Driven Architecture and on business design patterns of the agricultural and environmental domains. He applies his currently research in data processing in an important project involving many research teams working on pesticides in order to improve the data capitalisation but also the diffusion and the sharing of the knowledge. He is Associate Editor of the International Journal of Agricultural and Environmental Information Systems and Guest Editor of the Special issue on Environmental and agricultural data processing for water and territory management.

Frédéric Hubert is a Professor at Laval University in Canada (Québec). Frédéric Hubert received his PhD degree and his Master degree at Université de Caen in France. His fields of research are in geographical information systems, geo-visualisation, geospatial business intelligence, spatial contexts and geospatial Web services.