Editorial

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We are pleased to introduce this special issue. The purpose of this special issue is to collect a high-quality selection of contemporary research articles on the topic of 'Applications of multi criteria decision analysis in medical engineering and informatics'. The reason underlying the special issue is that over the past few decades, innovations in medical engineering and informatics have led to a significant increase in the complexity of information and management systems. This has led to new challenges for systems engineers, business managers and other decision makers who must cope with the complexity of medical plans and processes. In this context, it is strategic to identify multiple criteria decision analysis (MDA) methods which can be applied to the task of medical engineering and informatics. It seeks to promote interdisciplinary collaboration between those interested in the theoretical, practical and clinical aspects of medicine and to foster the application of computers and mathematics to problems arising from medical sciences. In fact, multicriteria decision methods (MCDM) are particularly effective for group decision making scenarios, and therefore have been used around the world in a wide variety of decision situations. MCDM help policy makers and decision makers find a compromising and satisfactory solution that best suits the stakeholders.

In this light, we have selected five papers in this special issue to address the applications in medical engineering and informatics as a powerful tools in reaching medical development. The topics covered in these articles include healthcare management, strategic decision making, multi criteria model and techniques and their implications.

In the first paper entitled 'An integrated approach of AHP-DEMATEL methods applied for the selection of allied hospitals in outpatient service', we present a hybrid methodological approach based on the Decision Making Trial and Evaluation Laboratory (DEMATEL) method and analytic hierarchy process method to define the best allied hospital for an integrated network of outpatient service. A case study is presented.

In their paper entitled 'Prioritisation of service quality dimensions for healthcare sector', Rafikul Islam et al. present SERVQUAL as the main tool to measure service quality and analytic hierarchy process (AHP) is applied to prioritise the five dimensions of SERVQUAL for healthcare sector (i.e., tangibles, reliability, responsiveness, assurance and empathy). In addition to this, AHP is applied to prioritise the various items representing each of the dimensions. The results show that reliability and assurance are the two most important service quality dimensions in the healthcare sector. The priorities of dimensions and their items are also determined with respect to a selected demographic factors on the part of the respondents.

Ilya Ivlev et al., in their paper entitled 'Multiple-criteria comparative analysis of magnetic resonance imaging systems' present a decision model to identify the most suitable magnetic resonance imaging (MRI) system for regional hospitals in the Czech Republic and to define the most appropriate multiple-criteria decision analysis (MCDA) model for medical-equipment selection. Comparative modelling of various MCDA methods (AHP, TOPSIS, PROMETHEE II and SAW) is performed.

In their paper entitled 'Increasing the level of certainty in medical diagnosis. Using AHP/ANP with compatibility index *G* in support of medical diagnosis' by Claudio Garuti and Mario Sandoval presents the development of a web-based tool, in support of medical decision making called Medical Sapiens (MS), oriented to improve diagnostic accuracy and diminishing the uncertainty of the initial diagnosis. It has being developed along four years working with several senior physicians from Medicine Faculty of Andes University, and is currently being installed in a public hospital and in a private sport centre in Santiago, in its testing mode. The results of this work shows that medical certainty grows up significantly when applying this new approach for the diagnosis issue, mainly due its better way of coping its intrinsic complexity.

In the last paper entitled 'Multi-criteria decision making for evaluating healthcare policies: the benefit/cost analysis by the analytic hierarchy process' by Gabriella Marcarelli analyses the policies evaluation process in healthcare context. The research aims to apply the AHP for supporting a hospital manager to choose the best healthcare policy for a certain disease, by analysing the benefits, evaluated in terms of life quality and effectiveness, and the costs connected to each alternative policy.

Finally, we would like to thank all the authors who submitted their manuscripts for this special issue as well as the referees who reviewed these papers for their efforts, time and invaluable suggestions. We also like to thank the Associate Editor of *International Journal of Medical Engineering and Informatics*, Prof. Dr. Dinesh Mital, and his team for this opportunity to serve as guest editors.