Preface

The business goal in healthcare is to increase the quality of services in healthcare and thus reduce costs. This objective contributes to improving the quality of life of patients, in some cases reducing mortality and morbidity. To achieve this goal, the use of intelligent systems in the decision-making process becomes essential. The workshop was focused on demonstrating how to take advantage of using computational intelligence, ensuring interoperability and security, and overcoming local and temporal barriers in order to support society’s needs and the development of innovative systems and applications to support healthcare decision making.

In this workshop, innovative and exciting works were presented, and the discussion about how intelligent systems can contribute to improving the quality of the decision process in healthcare was promoted. This workshop involved several topics associated with business informatics when applied to healthcare (image processing, clustering, geographic information system, logic programming, and case-based reasoning and natural language). These works represent an interesting focus of research.

Eight papers were submitted and five of them were accepted for presentation.

The first work is focused on presenting an automated hepatic steatosis assessment through liver biopsy image processing. The approach consists of preprocessing the images in order to identify potential fat regions, and analysing these regions to mark them as fat regions or not. This method seems to give good results and does not need data training. Moreover, it seems to be efficient on low-resolution data, which is interesting in terms of speed and feasibility. The authors use image processing techniques to automatically classify biopsy images according to hepatic steatosis diagnosis.

In the second work, the authors employed the K-means algorithm to cluster the patients into two groups using the patient’s real data extracted from an intensive care unit. The models were built based on two different data mining tools. By discovering the common characteristics of the admitted patients, it is possible to improve their outcomes. In this study clustering techniques were applied to real data collected from admitted patients in intensive care units. The best results presented a Silhouette of 1, with a distance to centroids of 6.2e–17 and a Davies-Bouldin index of –0.652.

The next paper dealt with the development of a mobile geographic information system (GIS). The system guides the user to the closest medical centre. GIS systems have invaded most areas of everyday life, and their magnitudes continue to grow due to the importance and quality of generated geospatial information. Furthermore, medical care has become a major challenge for any country to serve the patient in a very small time and with human and rational materials. In this work, a mobile GIS based on geospatial data and data on medical centres was designed. It offers tools that provide a geospatial map containing the location of the nearest medical centres.

In the fourth paper, the authors aimed to predict an individual’s age based on rib cage dimensions by combining two methods: logic programming and case-based reasoning. This work was focused on the development of an artificial intelligence grounded decision support system to predict an individual’s age, based on such measurements. The work used the descriptions from chest x-rays (i.e., maximum width and height) and a computational framework was built on top of a logic programming case base approach to knowledge representation and reasoning, which caters to the handling of incomplete, unknown, or even contradictory information. This work also used clustering methods based on similarity analysis among cases to distinguish and aggregate collections of historical data in order to reduce the search space, therefore enhancing the cases retrieval and the overall computational process. The accuracy of the proposed model was satisfactory, being close to 90%.

Finally in the last paper, the authors carried out a study aiming to analyse unstructured text (x-rays reports) in an effort to try to find patterns in brain death events. They analysed qualitatively and
quantitatively diagnostics computed tomography (CT) done to the brain using text analysis tools such as natural language processing. In this work, a set of related words that can mean patterns in computed tomography reports was detected. This work used real data provided by a Portuguese Hospital containing information on deaths and brain CTs. This analysis allows for new research and perspectives of structured and unstructured texts in this field.

ISAHealth 2016 is a forum that motivated interest. The works submitted presented case studies with great impact in the healthcare arena. The workshop brought together researchers who are working in the area of intelligent system and business informatics. The cross-domain integration and appraisal of different fields related to intelligent systems and applications provides an atmosphere to foster perspectives and opinion discussions.

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