

Editorial

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This special issue puts together some carefully selected papers presented in the Ninth Mexican International Conference on Artificial Intelligence (MICAI, www.micai.org) celebrated in 2010 in Pachuca, Mexico. Every year, this conference attracts researchers and practitioners of the Artificial Intelligence from all around the world. The conference acceptance rate is about 27%. The versions of the papers in this volume are substantially extended and include new data when compared with the original papers presented at MICAI. The papers propose solutions to various problems that are related to Artificial Intelligence and use machine learning strategies to obtain these solutions.

The paper “*The primary language of ancient battles*” written by Boris Stilman, Vladimir Yakhnis and Oleg Umanskiy (USA), discusses the application of linguistic geometry model in the analysis of ancient battles of the great ancient general Hannibal who fought several major battles during the times of the Romans, more than 2,000 years ago. Authors give an extensive and well-documented recount of the battles and how their outcome could be both predicted and analyzed using linguistic geometry tools. These models have not only the historic interest but also are applied to modern battle scenarios with great success.

The paper “*Gradient descent algorithms for quantile regression with smooth approximation*” by Songfeng Zheng (USA) introduces a smooth function to approximate

the check loss function used by quantile regression model, so that the gradient-based optimization methods could be employed. Two algorithms are proposed for minimizing the smoothed objective function, the first method directly uses gradient descent algorithm, resulting the Gradient Descent Smooth Quantile Regression model; the second approach minimizes the smoothed objective function in the framework of functional gradient descent by changing the fitted model along the negative gradient direction in each iteration, resulting the Boosted Smooth Quantile Regression algorithm. In comparison with alternative quantile regression models, both proposed algorithms achieve higher prediction accuracy and are more efficient in removing non-informative predictors. Furthermore, the Boosted Smooth Quantile Regression is able to work in high dimensional spaces.

In the paper “*Classifying cognitive states of brain activity via one-class neural networks with feature selection by genetic algorithms*”, Omer Boehm, David Hardoon and Larry Manevitz (Israel) address an interesting problem related to the recognizing cognitive activities from brain activation. They argue that this problem must be handled as a one-class, instead of two-class. Thus, they use a one-class neural network, and a genetic algorithm to increase the accuracy classification. Their results show a level of accuracy up to 90%, which is comparable with the state-of-the-art based on two-class classification.

In the paper “*A WordNet-based semantic approach to textual entailment and cross-lingual textual entailment*”, Julio Javier Castillo (Argentina) presents a methodology to build a system for recognizing textual entailment by only using semantic similarity measures based on WordNet. The paper explains the manner to generalize WordNet-based semantic measures to build sentence level semantic metrics to be used in both, mono-lingual and cross-lingual textual

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entailment. The results presented in this paper demonstrate that it is a viable option.

The paper “*A new fast fuzzy Cocke-Younger-Kasami algorithm for DNA strings analysis*” by Herón Molina-Lozano (Mexico) explains a methodology for modifying the Cocke-Younger-Kasami algorithm to perform DNA strings analysis. Context-free grammars are used to generate sequences of characters in a string. Recognition using grammars is similar to the general approaches used throughout the pattern recognition. Thus, it is possible to detect if a string belongs to a specific context-free grammars with the Cocke-Younger-Kasami algorithm. In his work, the author proposes a fuzzy version of this algorithm and demonstrates that his algorithm modification implies a serious reduction of the algorithm complexity, i. e., from the original $O(n^3/6)$, to the obtained $O(n^2)$, and optimizes the usage of the memory as well.

In their paper “*Problem of knowledge discovery in noisy databases*”, Vadim Vagin and Marina Fomina (Russia) tackle the problem of knowledge discovery in noisy databases. Three kinds of noise models are handled in this

work, i. e., absence of attribute values, distortion of certain attribute values, and the mixture of two values which is called scrambling. It is proposed that the usage of certain generalization algorithms and then the prediction of the unknown values can be executed.

The work “*Online music tracking with global alignment*” is presented by Antonio Camarena-Ibarrola and Edgar Chávez (Mexico). It studies the problem of tracking musical performances on-line. Most of the known works have attempted to align the target audio to the musical performance; however, in this paper the authors propose searching the k-nearest neighbors to the audio segment most recently received. Then, some heuristic is utilized to decide the current position inside the target audio. This proposal is a global alignment tool without cumulative error capable to recover from false locations.

We hope that the readers of the journal will find it interesting to observe the various machine learning based solutions and applications of Artificial Intelligence that has the vital importance for development of the computer science.