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Softcomputing in bionformatics inference system design and optimization

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Abstract

Using softcomputing based techniques in order to design and implement bioinformatics inference systems requires iterative time intensive procedures. We present several cases where different softcomputing techniques have been successfully implemented and optimized toward this goal. One such system, GeXpert is a classifier system that was developed in order to integrate the data collection and integration effort in bacterial metabolic pathway datamining. With the base data management system in place, softcomputing based inference system techniques were utilized in order to improve classification results when compared with more traditional inference system methodologies. The softcomputing techniques applied included fuzzy logic, neural networks and optimization methods such as genetic algorithms. While these techniques are very popular and well known, it is not so trivial to utilize them with consistently good results. This is because the optimization of these methods is in many cases an ad-hoc process or worse a poorly documented art. In order to alleviate this difficulty, we have proposed using other softcomputing based methods in order to improve or optimize inference systems designs. A simple and intuitive meta-learning based methodology has been implemented and applied toward this goal. Obtained results are very promising and should be applicable to a variety of other classification and pattern recognition problems. These methods and algorithms are available in an integrated software package known as SimMetaLib.

Biography

Tomas Arredondo completed his Ph.D from Florida Atlantic University. He has worked extensively in the field of inference system design and optimization for bioinformatics and other applications. He is regular reviewer and program committee member of journals and conferences in the area of softcomputing and artificial intelligence. He is a faculty member of the Electronics Dept. of UTFSM and a Senior Member of the IEEE.