Abstract

In this paper, we present a swarm intelligence based technique for mining rules over a medical database. Rules are a suitable method for representing real world medical knowledge because of their simplicity, uniformity, transparency, and ease of inference. Swarm Intelligence (SI) has been applied to the rule mining process as its dynamic nature provides flexibility and robustness to process of rule mining. Traditional methods of rule mining generate a large number of rules with too many terms, making the system unusable over medical data. In this paper, the attempt is to use SI as a novel method for discovering interesting rules in the medical domain. The performance of three different swarm based techniques has been compared by observing the output rules of rule sets used to classify data.

Section 1 introduces the concept of swarm intelligence and rule mining and how these can be combined. Issues that arise in mining medical data are also briefly listed. Section 2 describes conventional rule mining techniques and states the motivation behind using
swarm intelligence for rule mining and classification. Section 3 describes the various SI based algorithms that have been implemented in our study. Section 4 describes the details of the experiment. Section 5 presents the results of the practical experiment followed by conclusions and future scope in section 6.

Reference

- Margarita Sordo, Shawn N. Murphy, Harvard Medical School, Charlestown, MA. USA, A PSO/ACO Approach to Knowledge Discovery in a Pharmacovigilance Context.
- Carlos Ordonez, Comparing Association Rules and Decision Trees for Disease Prediction, ACM HIKM’06, November 11, 2006, Arlington, Virginia, USA.
- John F Roddick, Peter Fule, Warwick J. Graco, Exploratory Medical Knowledge Discovery Experiences and Issues, Health Insurance Commission Australia.
- Jean-Marc Trémeaux, Yan Liu, Mining for association rules in medical data, 2006.
- Han, J. and Pei, J. 2000, Mining frequent patterns by pattern-growth: methodology and implications, ACM SIGKDD Explorations Newsletter 2, 2, 14-20.
- Tien Dung Do, Siu Cheung Hui, Alvis Fong, Mining Frequent Itemsets with Category-Based Constraints, Lecture Notes in Computer Science, Volume 2843, 2003, pp. 76 – 86.
- Manning, A., Keane, J., Data Allocation Algorithm for Parallel Association Rule Discovery, Lecture Notes in Computer Science, Volume 2035, Page 413-420.
- Toksari MD (2006), Ant colony optimization for finding the global minimum, Applied Mathematics and Computation, pp 308-316.

Index Terms

Computer Science
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Key words

Swarm intelligence

Association rule mining
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Particle swarm optimization

rule quality