Approximate Pseudo-lattice generation

Chaïma Ben Youssef, Samir Elloumi
Ecole Doctorale en Informatique, Faculté des Sciences de Tunis, Tunisie
ch_mail2005@yahoo.fr, samir.elloumi@fst.rnu.tn

Abstract

The *concepts lattice* is an ordered graph composed by *formal concepts* which regroup the elements sharing the same properties. But the generation and the browse of such a structure generate an elevated complexity because of its size. In order to ameliorate the concept lattice manipulation, we propose a new definition of the approximate concept permitting to reduce the nodes number in a lattice and then proposes a new algorithm of pseudo-lattice of approximate concepts generation.

Keywords : Learning, approximate concept, approximate pseudo-lattice.

In the literature, different definitions of approximate concepts [4, 2, 5] have been proposed in order to ameliorate the use of the Galois lattice. In our work, an approximate concept is a subset of objects containing approximately the same attributes according to a similarity threshold δ. This concept is represented by subset of attributes and a subset of objects weighted by their degree of adherence. The pseudo lattice of concepts used is an ordered list of levels [1]. Every level contains concepts having the same cardinality in their extensions. This cardinality is called *the rank* of the level. These levels are sorted in the descending according to their ranks. The head is therefore the level having the biggest rank. The relation of order $\preceq$ between the different concepts is expressed by the ties father/son between concepts belonging to different levels. The generation of the pseudo lattice consists in browsing the list of the attributes of the training sample (EA) in search of the approximate concepts.

We normalized the bases [3]: Iris, Zoo, Monks-1, Monks-2 and Monks-3 in order to validate the generation method of the pseudo approximate concept lattice. Then we varied the similarity threshold from 1 up to the number of objects. The table 1 permits of illustrate these results.

Base	threshold	Number of concepts
Iris	1	11
Iris	100	2
Iris	150	1
zoo	1	20
zoo	50	2
zoo	101	1
Monks-1	1	17
Monks-1	100	1
Monks-1	432	1
Monks-2	1	17
Monks-2	100	4
Monks-2	432	1
Monks-3	1	17
Monks-3	100	4
Monks-3	432	1

Table 1: Application of the method on existing bases

In this work, we presented a new definition of one approximate Concept and we presented an algorithm of approximate concept lattice generation which should be useful for the training methods thanks to the reduction of the lattice size.

References

[1] R. Godin, R. Missaoui, and H. Alaoui. Incremental concept formation algorithm based on galois (concept) lattices. pages 246–267, 1995.

[2] P. Hitzler and G. Q. Zhang. A cartesian closed category of approximable concept structures. 2004.

[3] Site http://kel.otago.ac.nz/hyspeech/corpusinfo.html.

[4] Q. Li and X. Chen. Formal Topology, Chu Space and Approximable Concept. 2005.

[5] E. Mephu Nguifo and A. Zagaoui. Classification supervisée à partir de treillis de concepts approximatifs. *Septièmes journées de la Société Francophone de classification, SFC'99, Nancy, France*, 1999.