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ITJ

ISSN 1812-5638

INFORMATION TECHNOLOGY JOURNAL

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Information Technology Journal 12 (21): 6096-6097, 2013
ISSN 1812-5638 / DOI: 10.3923/itj.2013.6096.6097

Study on Multi-strategy Analysis and Application of A-r Algorithm

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Abstract: Based on analyzing multi-agent system mode, comprehending a-r rules of data mining and taking high-school practice-teaching management system as the experiment modal,mining rules algorithm is put forward to solving analysis service function of space information and cooperation in application field. Meanwhile,this method also improves ameliorates service ability and efficiency of multi-agent system.

Key word: Association rules, multi-agent system data mining, practice-teaching system

INTRODUCTION

Generally speaking, human artificial intelligence is divided into two parts: DPS (distribute problem solution) and MAS (multi-agent system). The former is major in the task decomposition, the latter emphasizes in the research on compromise and collaboration between agents based on independence.

RERTINENT RESEARCH ON MULTI-AGENT STRATEGY AND ASSOCIATION RULES

Association rules mining algorism is a hot point in data mining field with the succeeding proposing of new and refined idea.

Association rules is an important knowledge mode in database: Aiming at discovering whether there exists some relationship between bargain items which leads the expanding spread in database with the development in database technology. The canonical Apriori algorism and FP-growth algorism which are proposed by Fayyad *et al.* (1996) and Han *et al.* (2002), respectively in 1994, are refined to concentrate on how to improve mining efficiency.

Apriori refined algorism: Obtain Frequenct-1 with binary perpendicular expression by scanning data once; Get itemsets in Frequenct-2 with binary perpendicular expression by conducting 'Bit-And' operation per two rows by dictionary order; count the supportive degree in results, if supportive degree is greater than assumed minimal value, the pointing item is the frequent itemsets. Therefore, that solving the problem just needs database-scanning one time which makes great progress in memory utility ratio and mining efficiency.

FP-growth refined algorism: After the first scanning, the frequent itemsets is compressed in a FP-tree with remaining association information. Then FP-tree is break down into many condition databases, each of which associates with frequent itemsets in unit length. In the end do mining in each condition database. AR-SET mining algorism with multi-association rules which is presented in Reference (Chao and Xu, 2009), utilizes "OR","AND" operation to solve frequent itemsets.

Analysis on multi-agent technology constituting frame mode: This research involves agent conception, attribute and formation description.

Agent pertinent conception: Functioning in dynamic ambience, agent is an intelligent, environment-sensible and high autonomous entity by programming, reasoning and policy-solving to respond and accomplish specific task and objective, according to self-possession, state, behavior ability, relative knowledge, knowledge rules and obtained outer information. Agent not only can be divided into software agent and artificial intelligence agent by operation environments but also be done into: Agent based on regulation, agent based on programmer, agent based on nerve net, agent based on machine-learning and agent based on fuzzy logic by control mechanism.

Analysis on constituting frame model: Hybrid architecture, including cogitating two subsystems: pattern and reactive pattern, fuses classical and nonclassical artificial intelligence system. The way mapping agent to function entity includes two categories: Function decomposing way and physics decomposing way. Because of the incertitude and nonintegratitude and computational complexity, constructing MAS system becomes quit difficult. The architecture mode of agent describes multi-agent system architecture mode which covers static and dynamic property, after function entity mapping. This kind of a rchitecture, comprising of stratification mode, federal mode and complete

autonomous mode, has a great influence on the interaction of agents and function property of system.

APPLICATION OF A-R BY MULTI-AGENT ALGORISM

The practice-teaching system is multi-agent system Consisting of effective junctures and intelligent nodes and can construct intelligent community by association rules. Agent can be a person, a machine, software or even a practice-teaching projection and so on. There exist some relationships between local frequent itemsets and global frequent itemsets in distributed database developed from data source in different places (Shi, 2011).

Algorism description: First map transaction database into Boolean matrix D in the sequence of item I1, I2, I3, I4, I5 etc.; Assume the minimal supportive degree with K1 = 4, K2 = 2; Mark R= (α1, α2,…,αi)T. The first step of the algorism is launch self-inner product in R to certify 1-itemsets; Try to get the row vector corresponding to R in frequent itemsets; then mark the vectors with fewer non-zero elements as well as the row in the same number; skim the marked vectors when searing in order to accelerate the convergence. The definition of frequent itemsets which can justify how to determine the row vector in frequent itemsets R, is deleting all the marked row in R by the above-mentioned method for boolean matrix R and striking out those row vectors whose elements totally included by other row vectors in remaining row vectors. The left row vector is our wanted results in frequent itemsets.

The second step is to calculate the count of non-zero vectors corresponding to ai , show out the possible row vectors by sentence and mark the row numbers of ai with fewer non-zero elements than ai. The third step is to compute K1 = <ai, aj> or K2 = <ai, aj> from row ai+1 with results D1, D2 corresponding to R1, R2, respectively. Assume D is global supportive degree with effective supportive degree being min K=Ki×|Di||D |, i =1,2,…,N, when generating the frequent itemsets of distributed database D which could be seen as a super affair database with the nodesets D1, D2,…, DN locating in each N segments of D. In this way, for the searching of frequent itemsets in distributed affair database, find out each local place i(i = 1,2,…,N) similar to the above-chapter.

Develop boolean matrix Ri (i=1,2,…,N) in row vectors corresponding to frequent itemsets; Then broadcast boolean matrix corresponding to frequent itemsets in every site to other places to yield a new global boolean matrix R; At last, find out row vector corresponding to frequent itemsets of distributed affair database D in R by global minimal supportive degree min K and obtain effective frequent itemsets of D.

EXISTING PROBLEM AND SOLVING SCHEME

There must exist various objective data association between actual database models and mapping boolean matrix for this case model is the practice-teaching junction. The values of K1 and K2 change dependent on complexity which will lead the great incensement of algorism proposed in this study. Facing this puzzle, federal mode is adopted after comparison. According to the association degree defined in formula2.2, the objective is divided association model, each of which is set a passage, namely mark Ri. Develop boolean matrix to conduct frequent itemsets search by algorism2.2.

CONCLUSION

With exceeding amount of valuable data in artificial intelligence field, data mining has become the hot point in artificial intelligence, mode discerning and other pertinent fields. The analysis and application of A-r technology and distribution system found the basis for our research in this study. With combining multi-agent algorism with association rules in practice-teaching management system, data mining algorism refined by multi-agent formation model through compromising and cooperating is the breakthrough point which has the guiding meaning for the application of multi-agent strategy under association rules.

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