

**RULE BASED DECISION SUPPORT IN TABLE DATA SETS WITH
UNCERTAINTY AND ITS EXECUTION ENVIRONMENT**

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ABSTRACT. A framework of decision support in table data sets with uncertainty is considered, and the prototype of its software tool is implemented in SQL. We follow the framework of the possible world semantics for table data sets with uncertainty, and two kinds of rules, i.e., the certain rules and the possible rules, are defined. This definition is simple and natural, but we are faced with the fact that the number of the possible worlds may exceed 10^{100} . Even in such huge number of possible worlds, the NIS-Apriori algorithm generates two kinds of rules, because this algorithm is independent from the number of the possible worlds due to the proved properties. The prototype system takes three phases for decision support, i.e.,

- (i) the rule generation phase for knowing the general tendency of data sets,
- (ii) the aggregation phase for decision support from the obtained rules,
- (iii) the aggregation phase for decision support from data sets.

It is possible to employ (ii), if user's condition matches the condition in the obtained rules. Otherwise, it is necessary to employ (iii). The prototype system is applied to the Car Evaluation data set (a table data set without uncertainty) and the Congressional Voting data set (a table data set with uncertainty) in UCI machine learning repository. Since this prototype is implemented in SQL procedure, it will easily be applicable to any table data set on PC with SQL.

Key words and phrases. decision support, association rules, NIS-Apriori algorithm, prototype in SQL, Uncertainty.