Spatio-Temporal Data Mining with Association Rules for Lake Van

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Abstract : People, throughout the history, have made estimates and inferences about the future by using their past experiences. Developing information technologies and the improvements in the database management systems make it possible to extract useful information from knowledge in hand for the strategic decisions. Therefore, different methods have been developed. Data mining by association rules learning is one of such methods. Apriori algorithm, one of the well-known association rules learning algorithms, is not commonly used in spatio-temporal data sets. However, it is possible to embed time and space features into the data sets and make Apriori algorithm a suitable data mining technique for learning spatio-temporal association rules. Lake Van, the largest lake of Turkey, is a closed basin. This feature causes the volume of the lake to increase or decrease as a result of change in water amount it holds. In this study, evaporation, humidity, lake altitude, amount of rainfall and temperature parameters recorded in Lake Van region throughout the years are used by the Apriori algorithm and a spatio-temporal data mining application is developed to identify overflows and newly-formed soil regions (underflows) occurring in the coastal parts of Lake Van. Identifying possible reasons of overflows and underflows may be used to alert the experts to take precautions and make the necessary investments.

Keywords : apriori algorithm, association rules, data mining, spatio-temporal data