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A data mining method to identify field type in global oil and gas field case study

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Based on the locations and types of past oil and gas field, new discoveries can be predicted from the tectonic setting of the world's oil and gas field. Geoscientists can characterize a field based on the dominant geological event that influenced the structure's ability to trap and contain oil and gas in recoverable quantities. But in fact multiple factors affected the type of the oil and gas fields. In this paper, a data mining approach was used to integrated factors of field type. The factors are evaluated by the quantified field data. These data included general field data, location, well statistics, cumulative production data, reserves data and reservoir properties data. The method includes four steps. Firstly, a set of attributes are identified to describe the field characteristics. Secondly, the application of principal component analysis and categorical principal components analysis reduced redundant data and noise by representing the main data variances with a few vector components in a transformed coordinate space. Finally, clustering was done based on a proximity matrix between samples. Euclidean distance definitions were tested in order to build a meaningful cluster tree. By applying this method to the world's oil and gas field data, we concluded that: (1) the world's fields can be clusfied in six types according to the quantified field data; (2) over 20% of the world's fields are clustered at top depth between 2000 and 2500 meters. (3)more attributes can be added to this clustering method, and the influence of the attributes can be evaluated.