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Energy and Entropy Measures of Fuzzy Relations for Data Analysis

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Abstract

We present a new method for assessing the strength of fuzzy rules with respect to a dataset, based on the measures of the greatest energy and smallest entropy of a fuzzy relation. Considering a fuzzy automaton (relation), in which A is the input fuzzy set and B the output fuzzy set, the fuzzy relation R-1 with greatest energy provides information about the greatest strength of the input-output, and the fuzzy relation R-2 with the smallest entropy provides information about uncertainty of the input-output relationship. We consider a new index of the fuzziness of the input-output based on R-1 and R-2. In our method, this index is calculated for each pair of input and output fuzzy sets in a fuzzy rule. A threshold value is set in order to choose the most relevant fuzzy rules with respect to the data.

Keywords

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