

## **, A new quantitative method for simplifying complex fuzzy cognitive maps**

Fuzzy cognitive map (FCM) is a qualitative soft computing approach addresses uncertain human perceptions of diverse real-world problems. The map depicts the problem in the form of problem nodes and cause-effect relationships among them. Complex problems often produce complex maps that may be difficult to understand or predict, and therefore, maps need to be simplified. Previous studies used subjectively simplification/condensation processes by grouping similar variables into one variable in a qualitative manner. This paper proposes a quantitative method for simplifying FCM. It uses the spectral clustering quantitative technique to classify/group related variables into new clusters without human intervention. Initially, improvements were added to this clustering technique to properly handle FCM matrix data. Then, the proposed method was examined by an application dataset to validate its appropriateness in FCM simplification. The results showed that the method successfully classified the dataset into meaningful clusters.