# Article information:

Time series prediction based on high-order intuitionistic fuzzy cognitive maps with variational mode decomposition | SpringerLink  
<https://link.springer.com/article/10.1007/s00500-021-06455-0>

# Article summary:

1. The proposed VMD-HIFCM model combines variational mode decomposition (VMD) and high-order intuitionistic fuzzy cognitive maps (HIFCM) to predict time series data.

2. VMD is used to extract meaningful feature sequences from the original time series, which are then used as nodes in the HIFCM model for temporal modeling.

3. The addition of intuitionistic fuzzy sets improves the model's ability to handle uncertainty and fuzziness in real-world data, resulting in better prediction performance for non-stationary time series.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article presents a novel approach for time series prediction based on high-order intuitionistic fuzzy cognitive maps with variational mode decomposition. The authors provide a comprehensive review of the related technologies, including fuzzy cognitive maps, intuitionistic fuzzy sets, and high-order fuzzy cognitive maps. They also discuss the limitations of existing time series forecasting models and highlight the advantages of using FCMs for interpretability and uncertainty modeling.

The proposed VMD-HIFCM model combines VMD for feature extraction and HIFCM for temporal dependence modeling. The authors claim that their model has better prediction performance than traditional FCMs and other existing models in non-stationary data series. However, the article lacks detailed evidence to support this claim. The experiments conducted to verify the performance of the proposed method are not comprehensive enough to draw strong conclusions.

One potential bias in the article is its focus on the advantages of FCMs while downplaying their limitations. FCMs have been criticized for their lack of formal mathematical foundations and their sensitivity to expert knowledge. The authors do not address these criticisms or provide evidence to show how their model overcomes these limitations.

Another potential bias is the promotional tone of the article towards their proposed method. While they acknowledge some existing methods, they emphasize the novelty and superiority of their approach without providing sufficient evidence to support these claims.

Overall, while the article provides a useful overview of FCMs and intuitionistic fuzzy sets, it lacks detailed evidence to support its claims about the superiority of VMD-HIFCM over existing methods. Further research is needed to validate its effectiveness in real-world applications and compare it with other state-of-the-art models.

# Topics for further research:

* Criticisms of fuzzy cognitive maps
* Formal mathematical foundations of fuzzy cognitive maps
* Sensitivity analysis in fuzzy cognitive maps
* Variational mode decomposition for time series analysis
* Comparison of time series forecasting models
* Real-world applications of high-order intuitionistic fuzzy cognitive maps

# Report location:

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