

## Peer Review

# Review of: "Picture Fuzzy, Hesitant Fuzzy, and Spherical Fuzzy SuperHyperGraph"

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This work proposes different ways to generalize hypergraphs. It starts from the concept of a hypergraph, which is already a generalization of graphs, and introduces the notion of a superhypergraph, which is a concept that generalizes hypergraphs by starting from iterations of parts of the set of vertices. The notion of fuzziness is introduced on superhypergraphs, notably through concepts such as picture Fuzzy HyperGraph; Hesitant Fuzzy HyperGraph; Spherical Fuzzy HyperGraph;....The second part focuses on the results obtained from the different structures introduced in section 1.

This article is well-written; the concepts introduced are innovative and generalize the various works carried out until now on graphs and hypergraphs. The various mathematical results obtained are relevant (I haven't checked the proofs in detail, but it sounds perfectly correct to me); they make sense in the theory developed in this work.

Furthermore, the various concepts discussed in the article are illustrated by examples that are meaningful and quite intuitive. This illustrates the relevance of the structures developed in this article.

The author should consider applications of his work in artificial intelligence or decision theory. Indeed, artificial neural networks can be seen as directed graphs, and they can also be seen as directed hypergraphs (hypernetworks). Perhaps the concepts introduced in this work can have important applications in AI.

Furthermore, I think that notions of measure theory could be introduced into this work, which would allow linking the set of structures defined in this paper to classical theories.

In conclusion, this work is of high quality; it introduces concepts that seem relevant to me and that should have applications in various scientific fields, particularly in (theoretical) computer science. Furthermore, the article is very well illustrated with judicious examples that shed light on the various

concepts covered throughout the document. The mathematical results are interesting and illustrate the scope of the definitions.

Therefore, I am completely in favor of the publication of this work, which is in line with hypergraphs.

## **Declarations**

**Potential competing interests:** No potential competing interests to declare.