Mathematical Problems in Engineering

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Special Issue on

# Data-driven Fuzzy Multiple Criteria Decision Making and its Potential Applications

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With the complexity of the socio-economic environment, today's decision-making is one of the most notable ventures, whose mission is to decide the best alternative under the numerous known or unknown criteria, such as "purchase of products", "choice of hotels", "identification of partners", "technology adoption", and so on. However, due to the limited knowledge base of decision makers and the dynamic changes of the objective environment, decision making becomes a very difficult and complex task. To address it completely, the multiple criteria decision making (MCDM) methods based on the fuzzy set theory and its extensions are developed under the different domains. These methods have tremendous advantages in terms of representation of uncertain information, aggregation of information, and description of decision makers' preference. However, many current studies have been limited to analysis of the fuzzy MCDM theories, and there are only very limited studies focusing on their applications. Moreover, most application cases are based on virtual simulation data, which limits the practical application of fuzzy MCDM methods.

At present, with the development of data mining technologies, decision-making methods combining data mining and fuzzy MCDM are beginning to gain attention. These methods mine structured or unstructured data such as text, audio, and pictures, express the data in the form of fuzzy sets, and analyze the decision-making problems under certain scenarios by using the information aggregation operators and decision criteria. These methods combine data mining with fuzzy sets to form a new research paradigm, namely the data-driven fuzzy MCDM paradigm. This paradigm combines the respective advantages of data mining and fuzzy sets and promotes the application of the fuzzy MCDM method in practice. Therefore, further exploration of the data-driven fuzzy MCDM method is conducive to widely extract data value and enrich the fuzzy set theory; it is particularly valuable in applying the method to guide the actual decision-making.

This Special Issue aims to collate original research papers and research articles that report on recent advancements in data-driven fuzzy MCDM methods, techniques, and practical achievements in the broad field.

Potential topics include but are not limited to the following:

- Data-driven fuzzy MCDM in:
  - supply chain and transportation management
  - environmental evaluation
  - consumer behavior analysis
  - risk measure
  - innovation management
  - medical health management
  - blockchain management
  - knowledge-based systems

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