ABSTRACT

Investigations in Information theory work as a pillar to define the information theoretic measures for measuring information and play a significant role in communication sciences.

The theory of fuzzy sets and intuitionistic fuzzy sets provides an effective tool for handling the complex situations of real time systems and exploring many research topics. A number of efforts have been carried out by various researchers in order to efficiently deal with uncertainty and emerges an inundation path of research disciplines. The theory of intuitionistic fuzzy sets is enriched with new explorations and provides various research directions.

The objective of this work is to discuss mathematical information theoretic measures based on some axiomatic foundations for crisp sets and its generalizations given by fuzzy sets and intuitionistic fuzzy sets. A new weighted information generating function for discrete probability distributions is defined and studied from axiomatic and application point of view. Some new entropy measures and divergence measures are developed and their interesting properties are studied apart from the basic axioms with proof. The limitations of some existing measures introduced in the literature are discussed and their shortcomings are discussed through a few numerical examples. The performance of these proposed measures are effectively enhanced by applying them in fields of medical diagnosis, drought risk assessment and decision making problems. Some new parametric analogous of entropy and divergence measures are also introduced and the role of parameter in discussed in detail in order to obtain the best possible solution for the above mentioned applications.