REVIEW OF LITERATURE

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Molodtsov (1999) initiated a novel concept of Soft Set Theory, which is completely a new approach for modeling vagueness and uncertainties. Soft Set Theory has a rich potential for application in solving practical problems in Economics, Social Sciences, Medical Sciences etc. Applications of Soft Set Theory in other disciplines and in real life problems are now catching momentum. Molodtsov (1999) successfully applied Soft Theory into several directions, such as Smoothness of Functions, Game theory, Operations Research, Riemann Integration, Perron Integration, Theory of Probability, Theory of Measurement and so on. Maji et al. (2002) gave first practical application of Soft Sets in decision making problems.

Maji et al. (2001) initiated the concept of Fuzzy Soft Sets with some properties regarding union, intersection and complement of a Fuzzy Soft Set, De Morgan's Law etc. These results were further revised and improved by Ahmad and Kharal (2009). They defined arbitrary fuzzy soft union and intersection and proved De Morgan's Law Inclusions and De Morgan's Law in Fuzzy Soft Set Theory.

Majumdar and Samanta (2010) generalized the concept of Fuzzy Soft Sets and introduced Generalized Fuzzy Soft Sets.

While generalizing the concept of Fuzzy soft sets, Majumder and Samanta (2010) considered the same set of parameters. But Manash Jyoti Borah et al. (2012) generalized the concept of Fuzzy soft sets by considering different sets of parameters and also defined Generalized Fuzzy soft relations.

Atanassov (1986) defined the concept of Intuitionistic Fuzzy Sets and Maji et al. (2001) introduced the concept of Intuitionistic Fuzzy Soft sets. Bivas Dinda, Tuhin Bera and Samanta (2010) introduced the concept of Generalized Intuitionistic Fuzzy Soft sets. Also they defined relations on Generalized Intuitionistic Fuzzy Soft sets.

All these different forms of Fuzzy Soft Matrices and Fuzzy Soft Relations have applications in real life problems.

The following are some of the articles published on applications of Fuzzy Soft Matrices and Fuzzy Soft Relations:

1) "Solution of the Decision Making Problems Using Fuzzy Soft Relations", Arindam Chaudhuri, Kajal De and Dipak Chatterjee., 2009 [2].
2) "An Application of Fuzzy Soft Sets in Decision Making Problems Using Fuzzy Soft Matrices", Tridiv Jyoti Neog and Dusmanta Kumar Sut., 2011 [33].
3) "Fuzzy Soft Matrices and their Applications", Yong Yang and Chenli Ji., 2011 [36].
4) "Generalized Intuitionistic Fuzzy Soft Sets and its Applications", Babitha, K.V. and Sunil Jacob John., 2011 [5].
5) "An Application of Fuzzy Soft Relation in Decision Making Problems", Dusmanta Kumar Sut., 2012 [15].
6) "Fuzzy Soft Matrix Theory and Its Application in Decision Making", Cagman, N. and Enginoglu, S., 2012 [10]
7) "Fuzzy Soft Set theory applied to medical diagnosis using fuzzy arithmetic operations", Yildiary Celik and Sultan Yamak., 2013 [35].
8) "Intuitionistic Fuzzy Soft Matrix Theory And Its Application In Decision making", Rajarajeswari, P. and Dhanalakshmi, P., 2013 [28]
9) "A new order relation on fuzzy soft sets and its application", Xuechong Guan, Yongming Li and Feng Feng, 2013 [34]

In this review of literature a brief survey of some of the articles published on Soft Sets, Fuzzy Soft Sets, Fuzzy Soft Matrices, Intuitionistic Fuzzy Soft Sets, Intuitionistic Fuzzy Soft Matrices, Generalized Intuitionistic Fuzzy Soft Sets, Fuzzy Soft Relations and some of their applications are given.

1) "Soft Set Theory – First Results"

Molodtsov, D. (1999) [25]

The soft set theory offers a general mathematical tool for dealing objects. The basic notions of the theory of soft sets are introduced, the first results of the theory are presented and some problems of the future are discussed.

2) **"Intuitionistic Fuzzy Soft Sets"**

Maji, P.K., Biswas, R. and Roy, A.R. (2001) [17]

The concept of intuitionistic fuzzy soft set (IFSS) which combines the advantage of soft set and intuitionistic fuzzy set (IFS) is proposed. Then some basic notions of IFSS are also presented in this paper. Based on the "Complement", "Intersection", "Union" operations on IFS theory, the "Complement", "Intersection", "Union", "AND" and "OR" operations of IFSS are defined. Some properties of the above operations are also discussed.

3) **"An Application of Soft Sets in a Decision Making Problem"**

Maji, P.K., Biswas, R. and Roy, A.R. (2002) [18]

In this paper, the theory of soft sets one applied to solve a decision making problem using rough mathematics.

4) **"From Soft Sets to Information Systems"**

Daowu Pei and Duoqian Miao (2005) [14]

This paper discusses the relationship between soft sets and information systems. It is showed that soft sets are a class of special information systems. After soft sets are extended to several classes of general cases, the more general results also show that partition – type soft sets and information systems have the same formal structures and that fuzzy soft sets and fuzzy information systems are equivalent.

5) **"A Fuzzy Soft Set Theoretic Approach to Decision Making Problems"**

Roy, A.R. and Maji, P.K. (2007) [29]

The problem of decision making in an imprecise environment has found paramount importance in recent years. A novel method of object recognition from an imprecise multi observer data has been presented here. The method involves construction of a comparison table from a fuzzy soft set in a parametric sense for decision making.

6) **"Distance and Similarity Measures for Soft Sets"**

Athar Kharal (2010) [4]

In this paper, new similarity measures for soft sets using set theoretic operations are proposed. An application of the proposed

measures of similarity in the area of automated financial analysis is also presented.

7) **"Generalized Intuitionistic Fuzzy Soft Sets and its application in decision making"**

Bivas Dinda., Tuhin Bera and Samanta, T.K. (2010) [8]

In this paper, generalized intuitionistic fuzzy soft sets and relations on generalized intuitionistic fuzzy soft sets are defined and a few of their properties are studied. An application of generalized intuitionistic fuzzy soft sets in decision making with respect to degree of preference is investigated.

8) **"On Similarity Measures of Fuzzy Soft Sets"**

Pinaki Majumdar and Samanta, S.K. (2011) [27]

In this paper, several similarity measures of fuzzy soft sets are introduced. The measures are examined based on the geometric model, the set theoretic approach and the matching function. A comparative study of these measures is done.

9) **"Fuzzy Soft Set Theory and its Applications"**

Cagman, N, Enginoglu, S and Citak, F (2011) [11]

In this paper, a fuzzy soft set theory is defined and its related properties are studied Fuzzy Soft aggregation operator that allows constructing more efficient decision making method is defined. An example is given to show that the method can be successfully applied to many problems that contain uncertainties.

10) **"Fuzzy Soft Matrices and their Applications"**

Yong Yang and Chenli Ji, (2011) [36]

In this paper, we define fuzzy soft matrices and study their basic properties. We then define products of fuzzy soft matrices that satisfy commutative law and present a decision making method. This method can solve decision making problems which consider many observers' views. We finally offer some examples to show that the presented method is more reasonable and reliable in solving practical problems.

developed to solve intuitionistic fuzzy soft set based real life decision making problems which may contain more than one decision maker and an effort to apply it to a more relevant subject of today's world as in Predicting Terrorist Attack.

16) **"Matrices in soft set theory and their applications in decision making problems"**

Tanushree Mitra Basu, Nirmal Kumar Mahapatra and Shyamal Kumar Mondal (2012) [30]

The purpose of this paper is to define different types of matrices in soft set theory. We have introduced here some new operations on these matrices and discussed here all these definitions and operations by appropriate examples. Moreover a new efficient solution procedure has been developed to solve soft set based real life decision making problems which may contain more than one decision maker.

17) **"Different Types of Matrices in Fuzzy Soft Set Theory and Their Application in Decision Making Problems"**

Tanushree Mitra Basu, Nirmal Kumar Mahapatra and Shyamal Kumar Mondal (2012) [31]

The purpose of this paper is to define different types of matrices in fuzzy soft set theory. We have introduced here some new operations on these matrices and discussed here all these definitions and operations by appropriate examples. Moreover a new efficient solution procedure has been developed to solve fuzzy soft set based real life decision making problems which may contain more than one decision maker.

18) **"Similarity Measures of Intuitionistic Fuzzy Soft Sets and their Decision Making"**

Naim Cagman, Irfan Deli (2013) [26]

In this article, some types of distance between two Intuitionistic Fuzzy Soft Sets and proposed similarity measures of two Intuitionistic Fuzzy Soft Sets are defined. A decision method which is applied to a

medical diagnosis problem that is based on similarity measures of Intutionistic Fuzzy Soft Sets is constructed.

19) **"A new order relation on fuzzy soft sets and its application"**

Xuechong Guan., Yongming Li and Feng Feng., (2013) [34]

In this paper, a new order relation on fuzzy soft sets, called soft information order, is introduced and its application to decision-making is investigated. It is shown that the collection of all fuzzy soft sets equipped with this new order, forms a complete Heyting algebra. The representation theorem of fuzzy soft sets with respect to the soft information order is also obtained. We initiate the concepts of soft set satisfaction problems and their solutions. An algorithm is presented to solve such decision-making problems.