Chapter 6
An Approach of Selecting Best School Using Neutrosophic Hyper Soft Set

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ABSTRACT

Decision-making analysis is one of the best ways to choose the perfect alternative for any specified purpose. Fuzzy theory overcomes the vague and uncertain conditions. Neutrosophic set was an extension of fuzzy set theory. Application of neutrosophic hyper soft set is a major tool in solving the multi-criteria decision-making problem. In this chapter, a numerical example has been framed to select the best school in the certain locality using the proposed algorithm. The parameters have been given in the form of neutrosophic hyper soft set. Comparison was done with the existing method.

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1. INTRODUCTION

In many real life situations some of the collective data and information are vague and uncertain. Zadeh (Zadeh, 1965) introduced the idea of Fuzzy Set theory. It paves an important way to solve the difficulty in dealing with uncertainty. Fuzzy set contains the degree of membership conferring the elements belongs to the set entirely. The membership belong to the unit interval (Abbas, Murtaza, Smarandache, 2020). In fuzzy set theory the membership values are converted into crisp values by using different ranking functions. In many situations the decision maker may overcome the information about the belongings and non – belongings of the objects. In such cases fuzzy system needs an extension to overcome the situations. Atanassov (Atanassov, 1986) developed the idea of Intuitionistic Fuzzy set to deal with inaccurate information in membership and non- membership function. Since there is a possibility to exceed the value of unit interval, the notion of Pythagorean Fuzzy Set was developed. Later many authors introduced various operational laws and several aggregation operators.

Molodtsov defined the concept of Soft Set theory to deal with the parameterised family of the set of universe .Soft sets has been used to construct the connection between alternatives and attributes in Multi criteria Decision Making problems . Maji et al further prolonged the idea with basic operations and their properties. Many decision making ideas had been done with the combination of Fuzzy Set and Soft Set. Similarly Intuitionistic Fuzzy Soft Set were also developed to overcome decision making theory and many aggregation operators has been applied to solve the problems.

To deal with indertermine information apart from belonging and non-belonging of the information Florentin Smarandache defined the concept of Neutrosophic Fuzzy Set. Maji et al (Maji, Biwas, Roy, 2003) proposed many basic operations and properties to solve Neutrosophic Fuzzy Soft Sets. When the decision making problems contains the subattributes of the attributes Smarandache (Smarandache, 2018) proposed the idea of Hyper Soft Set from the idea of soft set. Generally Fuzzy Soft set has been framed in the matrix form. A decision matrix is a list of values in rows and columns that allows an analyst to systematically identify, analyse, and rate the performance of relationships between sets of values and information. There are many criteria involved in the decision making process such as Maxmin, Maximax, Laplace, Hurwich criteria etc.,

Generally fuzzy numbers measures the range of uncertainty, intuitionistic fuzzy numbers measures truth and falsity, while Neutrosophic fuzzy set measures the indeterminacy value of the observations. Here Neutrosophic Hyper Soft Sets has been applied to select the best school in a locality under various criteria.