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CONTENTS

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A Genetic Algorithm Approach for Multi-Objective Transportation Problem with Hexagonal Fuzzy Number

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ABSTRACT

Several fuzzy approaches have been used for finding the compromise results in the context of "multi-objective transportation problem (MOTP)" with fuzzy parameters. In this work, we have examined a MOTP with "hexagonal fuzzy numbers (HFNs)" as its parameters, i.e., demand, supply and penalties of the problem are mold in HFNs with a new approach developed with the help of a genetic algorithm. Robust ranking is used for the defuzzified value of the hexagonal fuzzy parameters. We have found the BFS (basic feasible solution) of the problem by adopting the zero-point technique. Then the genetic algorithm is used for obtaining the compromising superlative solution by the set of feasible solutions obtained by the zero-point technique of the problem. An algorithm has been developed for the procedure. To figure out the adaptability of the proposed technique, a numerical example has been used.

1. Introduction

Transportation problems (TPs) is a kind of the optimization techniques, plays a crucial role in supply chain management to minimize total cost and for making the best service. Because of high competition in the market, it became too difficult to find the best system or way for distributing the product to the costumers at minimum cost or maximum profit by satisfying the demand of the costumers. Transportation problems TPs gave the best way to meet this challenge. The TPs are special kind of the linear programming problem. Because of its special structure, it is not comfortable to find the solution of this

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MEDIATIVE FUZZY LOGIC OF SUGENO-TSK MODEL FOR THE DIAGNOSIS OF DIABETES

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Abstract. Fuzzy Logic (FL) is very beneficial in medical field. But due to the consideration of membership function only; it cannot give an appropriate result in prese nt era of contradiction. So, we need to consider favourable as well as unfavourable cases together as the Intuitionistic Fuzzy Logic (IFL) does. But what happens if we have imperfect information that cannot be dealt with the IFL. When there-exist a contradiction in the expert knowledge, then we have to propose a Mediative Fuzzy Logic (MFL) based Sugeno's inference system for the diagnosis of diabetes. In the present research paper, we have proposed a new approach to the diagnosis of diabetes, we have collected certain information from Pima Indians Diabetes Database (PIDD) as input variables and we used MFL based inference system for the diagnosis of diabetes.

1. Introduction

Diabetes mellitus or simply diabetes is a major health issue that causes high level blood sugar. Its prevalence has been rapidly increasing in low- and middle-income countries; diabetes causes kidney failure, stroke, blindness, heart attacks and many more. When a doctor fails to correct diagnosis of diabetic patient then it may harmful to the patient.Diabetes mellitus or simply diabetes is a major health issue that causes high level blood sugar. Its prevalence has been rapidly increasing in low- and middle-income countries; diabetes causes kidney failure, stroke, blindness, heart attacks and many more. When a doctor fails to correct diagnosis of diabetic patient then it may harmful to the patient.Firstly, fuzzy set were introduced by professor L.A. Zadeh [1] in 1965 by using membership functions only. For a given universal set X and $A \subseteq X$, describe a set by using membership function $\mu_A(x) : X \to [0, 1]$, which takes value from closed interval of unit length. The possibility of an object 'x' belongs to the fuzzy set A varying between [0, 1] we may say that FL was used to handle partial truth value, which is not completely true or completely false. On the behalf of this theory, Zadeh described that fuzzy set theory is nothing but an extension of classical set theory. Fuzzy set have many real life and practical applications, it has been used to many areas from controlling system to Artificial Intelligence (AI). Later on, both concepts, classical logic as well as FL extended to IFL. IFL deals with two functions, membership and non-membership function and their values lies between closed unit interval [0, 1]and sum of these two values also lies in the same unit interval. IFL is generalization of FL; IFL helps to represent impartial knowledge and used to present many real-world problems in more appropriate manner. In 1986, K. Atanassov [2, 3] provide concept of IFL and used