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DISTANCE-BASED SIMILARITY MEASURE FOR SINGLE-VALUED NEUTROSOPHIC SETS AND ITS APPLICATION IN MEDICAL DIAGNOSIS

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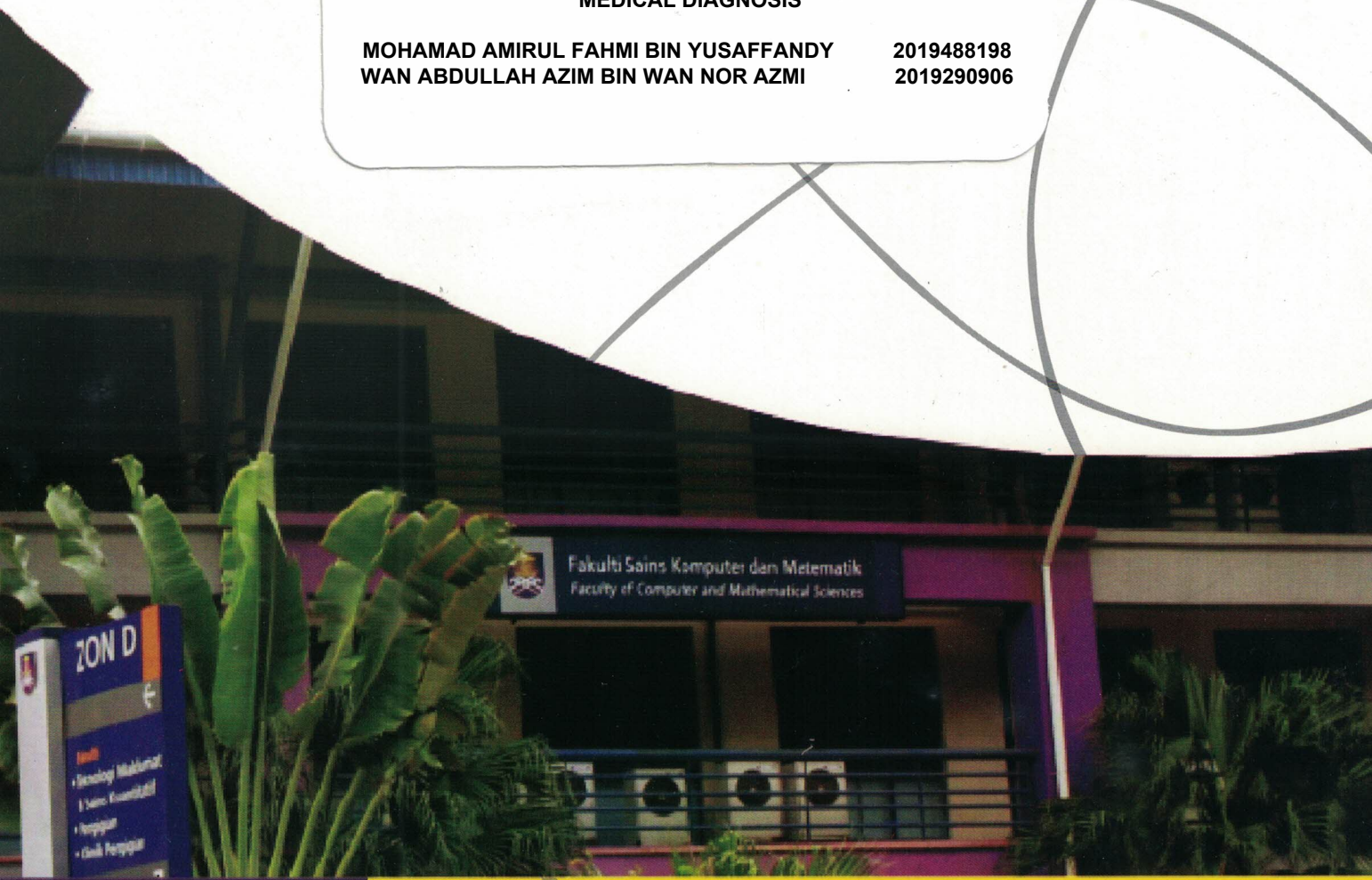

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ABSTRACT

Neutrosophic set is the extension of the fuzzy set which cannot represent uncertainty data. Neutrosophic set can relate it as being able to characterize the attributes in membership-values of truth, falsity and indeterminacy. Many real life problems involves uncertainty and inconsistent information. One of them is the medical diagnosis which contains a lot of attributes that is inconsistent, uncertain and imprecise. As this information is very vital to the doctor to make a decision-making such as early diagnosis, hence, this study aims to formulate distance based measure of neutrosophic set in order to solve decision making problem related with medical diagnosis. In this project, distance-based similarity measure has been formulate from the existing measures which are Euclidean distance and cosine similarity measures. The distance based similarity measure is applied into two data. The first data are consist of four patients with five symptoms and five diseases while the second data are consist of one woman with eight symptoms and six diagnoses. Each patients then diagnose with the disease based on the similarity measures. The highest value of similarity measure show that the patient is suffering with that recognized disease.

1 INTRODUCTION

1.1 Research Backgroud

A neutrosophic set proposed by Smarandache (1998) is an efficient mathematical model that can deal with information that have ambiguous, uncertainty and inconsistent data as fuzzy set theory evolved to other fuzzy based models. Single Value Neutrosophic Set (SVNS) is an extension from the neutrosophic set. It also can be defines as the generalization of the intuitionistic fuzzy set (IFS), fuzzy set and classic set (Aydoğdu, 2015). For the SVNS model, many information about the model measure have been introduced and discussed over the years. For example, distance measures, inclusion measures, entropy measures, similarity measures, and correlation coefficients. To apply the neutrosophic set to practical technical and scientific applications, Peng et al. (2016) proposed the SVNS and developed the simplified neutrosophic set. In model theory, the notion of SVNS is invaluable. As a result, it can be used in real scientific and technical applications. The similarity measure also can be described as crucial method that can determine the degree of similarity among two objects.

In multiple criteria decision making, to determine the differences between the options, similarity measure of neutrosophic set can be used (Liu, Liu, & Liu, 2018). According to Chatterjee et al. (2019), similarity measures are very important since they have been used in many applications with various fields of decision making such as pattern recognition, image thresholding, and multicriteria decision making. The numerous similarity measures can be classified into two categories which are crisp and neutrosophic similarity measures for existing SVNSs. The crisp similarity measures can be said as real valued functions and for neutrosophic similarity measures, it can be considered as the level of similarity, taking into account the similarity among the three membership values one by one. Because of that, the neutrosophic similarity acts towards a single valued neutrosophic number as a measure of the similarity. S. Ye et al. (2015) also states that the similarity measures not only essential in decision making problem or