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# Fakulti Sains Komputer Dan Matematik

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DECISION MAKING IN MEDICAL DIAGNOSIS BY USING  
SINGLE-VALUED NEUTROSOPHIC SETS

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## ABSTRACT

Medical diagnosis contains uncertain, incomplete, inconsistent information and these information described the relationship between symptoms and diseases. Medical experts take a long time to gain accurate final diagnosis results since they need to deal with uncertain, incomplete and inconsistent information. Intuitionistic Fuzzy set contains questionable results that may lead to false diagnosis of patients' symptom. Thus, this research is conducted to compute Single Valued Neutrosophic sets (SVNs) for patient's symptoms and diagnosis of disease, compare the results of distance and similarity measures in the medical diagnosis environment and choose the best diagnosis result for patient suffering disease based on distance and similarity measures. Two formulas of distance measure used are normalized Hamming and Euclidean distance. Eight different formula of similarity measure are also used in this research. Final result after applying all methods, we found that  $P_1$  suffering from malaria,  $P_2$  suffering from stomach problem,  $P_3$  suffering from typhoid and  $P_4$  suffering from viral fever.

# 1 INTRODUCTION

## 1.1 Research Background

Medical diagnosis is the process of investigating a person's symptoms based on diseases. A lot of information can be obtained by medical experts from modern medical technology, because medical diagnosis contains uncertain, incomplete, inconsistent information and this information are essential for medical diagnosis. The described relationship between symptoms and disease are usually based on this uncertain and inconsistent information that leads us to make a medical diagnosis decisions. Most diagnostic problems include identifying patterns used by medical professionals to make decisions. It has successful practical applications in various fields such as telemedicine, space medicine, and emergency services where human diagnosis is difficult to obtain (Ali et al., 2018).

According to (Datla et al., 2017), the most relevant information for identifying diagnoses is found in the history of current illness and past medical history. Since, medical data about patient symptoms and disease is changeable and uncertain. As a result, there is no fixed treatment plan that includes the use of drugs or precise treatment modalities. In addition, due to the differences between physical examination, medical history and laboratory examination, the ambiguity, in-decision and uncertainty involved in the medical experts system are also different. Based on (Nguyen et al., 2019), medical diagnosis needs to process a large amount of information, most of which is predictable and the unconscious data is processed quickly, resulting in low inter- and intra- person consistency. Therefore, it is necessary to solve the indeterminacy, inconsistency and contradiction. Medical diagnosis based on artificial intelligence has attracted the intention of the computer science and computer-applicable mathematical research communities.

For the previous research, a medical diagnosis's process has been proposed in 2001 based on the possibility of an individual who has a health's particular state in a specific time frame (Kononenko, 2001). The benefit of this kind of medical diagnosis is to reduce health issues