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Thangaraja P

Vadivel A

John Sundar C

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Thangaraja P[1], Vadivel A[2,3,*] and John Sundar C[3]
[1]Department of Mathematics, Mahendra Engineering college, Namakkal - 637 503, India; thangarajap1991@gmail.com
[2]Department of Mathematics, Arignar Anna Government Arts College, Namakkal - 637 002, India; avmaths@gmail.com
[3]Department of Mathematics, Annamalai University, Annamalai Nagar - 608 002, India; johnphdau@hotmail.com
[*]Correspondence: (Vadivel A) avmaths@gmail.com; Tel.: (+91 9442353356)

Abstract. The process of determining which illness or disease is to blame for a person's symptoms and indicators is known as medical diagnosis. Most frequently, it is referred to as analysis with the clinical environment implied. The data needed for finding is normally gathered from a clinical trial and actual assessment of the individual looking for medical consideration. This paper's major objective is to identify a methodical strategy for decision-making problems that involves choosing the appropriate choices and qualities for a neutrosophic score function utilising neutrosophic topology. Additionally, we use a neutrosophic topological space based on attributes and alternatives combined with graphical representation to apply a neutrosophic scoring function to medical diagnosis problems.

Keywords: Neutrosophic set, Neutrosophic topology, Neutrosophic score function.

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1. Introduction

Zadeh [41] as part of logic and set hypothesis was the first to introduce the concept of a fuzzy set between intervals in mathematics. Chang's [10] general topology framework, that utilisesfuzzy topological space, was created with a fuzzy set. Adlassnig [6] used fuzzy set theory to formalise medical interactions and fuzzy logic to create a framework for automated analysis. This theory has been used in the areas of artificial intelligence, probability, science, control structures, and financial concerns [16, 20, 26].

In 1983, Atanassov [7] developed an intuitionistic fuzzy set with membership and non-membership values. Coker [14] created intuitionistic fuzzy topological spaces from intuitionistic fuzzy sets. De et al. [15] were the first to develop the applications of intuitionistic fuzzy sets in medical diagnosis. Several researchers [8,17,27] investigated intuitionistic fuzzy sets in medical diagnostics further.

Smarandache [23, 24] offered the notions of neutrosophy and neutrosophic set at the beginning of the 21^{th} century and has a wide range of consistent applications in computer science, information systems, applied mathematics, artificial intelligence, mechanics, medicine, dynamic, management science, and electrical & electronics, etc [1–4,36,37]. Salama and Alblowi, [21,22] in 2012, developed neutrosophic set and neutrosophic crisp set in a neutrosophic topological space. Recently, Vadivel and authors [29,30,33–35] presented various open sets and mappings in neutrosophic topological spaces. Smarandache [24] described the single valued Neutrosophic set on three portions (T-Truth, F-Falsehood, I-Indeterminacy) Neutrosophic sets, which Wang et al. [38] worked on. In decision making problems, Majumdar and Samanta [18] described various similarity measures of single valued neutrosophic sets. Several researchers have recently proposed numerous similarity measures and single-valued neutrosophic sets in medical diagnostics [5, 9, 11–13, 19, 28, 39, 40]. Vadivel and authors [31, 32] discussed an applications using neutrosophic score function in mobile networking and material selection problems.

2. Preliminaries

Definition 2.1. [21] Let T be a non-empty set. A neutrosophic set (briefly, N_seus) L is an object having the form $L = \{\langle t, \mu_L(t), \sigma_L(t),\ \nu_L(t)\rangle : t \in T\}$ where $\mu_L, \sigma_L, \nu_L \to [0, 1]$ denote the degree of membership, indeterminacy, non-membership functions respectively of each element $t \in T$ to the N_seus L and $0 \leq \mu_L(t) + \sigma_L(t) + \nu_L(t) \leq 3$ for each $t \in T$.

Definition 2.2. [21] Let T be a non-empty set & the N_seus's L & K in the form $L = \{\langle t, \mu_L(t), \sigma_L(t), \nu_L(t)\rangle : t \in T\}$, $K = \{\langle t, \mu_K(t), \sigma_K(t), \nu_K(t)\rangle : t \in T\}$, then

(i) $0_{N_s} = \langle t, 0, 0, 1\rangle$ and $1_{N_s} = \langle t, 1, 1, 0\rangle$,
(ii) $L \subseteq K$ iff $\mu_L(t) \leq \mu_K(t)$, $\sigma_L(t) \leq \sigma_K(t)$ & $\nu_L(t) \geq \nu_K(t) : t \in T$,
(iii) $L = K$ iff $L \subseteq K$ and $K \subseteq L$,
(iv) $1_{N_s} - L = \{\langle t, \nu_L(t), 1 - \sigma_L(t), \mu_L(t)\rangle : t \in T\} = L^c$,
(v) $L \cup K = \{\langle t, \max(\mu_L(t), \mu_K(t)), \max(\sigma_L(t), \sigma_K(t)), \min(\nu_L(t), \nu_K(t))\rangle : t \in T\}$,
(vi) $L \cap K = \{\langle t, \min(\mu_L(t), \mu_K(t)), \min(\sigma_L(t), \sigma_K(t)), \max(\nu_L(t), \nu_K(t))\rangle : t \in T\}$.

Definition 2.3. [21] A neutrosophic topology (briefly, N_seuty) on a non-empty set T is a family Γ_{N_s} of neutrosophic subsets of T satisfying

(i) $0_{N_s}, 1_{N_s} \in \Gamma_{N_s}$.
(ii) $L_1 \cap L_2 \in \Gamma_{N_s}$ for any $L_1, L_2 \in \Gamma_{N_s}$.
(iii) $\bigcup L_x \in \Gamma_{N_s}, \forall\ L_x : x \in T \subseteq \Gamma_{N_s}$.

Then (T, Γ_{N_s}) is called a neutrosophic topological space (briefly, $N_s eutysp$) in T. The Γ_{N_s} elements are called neutrosophic open sets (briefly, $N_s euos$) in T. A $N_s eus$ C_{N_s} is called a neutrosophic closed sets (briefly, $N_s eucs$) iff its complement $C^c_{N_s}$ is $N_s euos$.

Definition 2.4. [25] The Neutrosophic Score Function (briefly, $N_s euScFu$) on $s : L \to [0, 1]$ is defined by

$$s(\mu_L, \sigma_L, \nu_L) = \frac{2 + \mu_L - \sigma_L - \nu_L}{3}$$

that represents the average of positiveness of the neutrosophic components μ_L, σ_L, ν_L.

3. Neutrosophic Score Function

In this section, we present a neutrosophic score function based on methodical approach for decision-making problem with neutrosophic information. The following essential steps are proposed the precise way to deal with select the proper attributes and alternative in the decision-making situation.

Step 1: Problem field selection:

Consider multi-attribute decision making problems with m attributes $At_1, At_2, \cdots, At_m$ and n alternatives $\Gamma_1, \Gamma_2, \cdots, \Gamma_n$ and p attributes $\xi_1, \xi_2, \cdots, \xi_p$, $(n \leq p)$.

	Γ_1	Γ_2	.	.	.	Γ_n
At_1	(b_{11})	(b_{12})	.	.	.	(b_{1n})
At_2	(b_{21})	(b_{22})	.	.	.	(b_{2n})
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
At_m	(b_{m1})	(b_{m2})	.	.	.	(b_{mn})

	At_1	At_2	.	.	.	At_m
ξ_1	(e_{11})	(e_{12})	.	.	.	(e_{1m})
ξ_2	(e_{21})	(e_{22})	.	.	.	(e_{2m})
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
ξ_p	(e_{p1})	(e_{p2})	.	.	.	(e_{pm})

Here all the attributes b_{ij} and e_{ki} are neutrosophic numbers, where $(i = 1, 2, \ldots, m, j = 1, 2, \ldots, n$ and $k = 1, 2, \ldots, p)$.

Step 2: Form neutrosophic topologies for Γ_j and ξ_k:

(i) $\Gamma^*_j = \Gamma \cup \Gamma^* \cup \Gamma^{**}$, where $\Gamma = \{1_{N_s}, 0_{N_s}, b_{1j}, b_{2j}, \cdots b_{mj}\}$, $\Gamma^* = \{b_{1j} \cup b_{2j}, b_{2j} \cup b_{3j}, \cdot, b_{m-1j} \cup b_{mj}\}$ and $\Gamma^{**} = \{b_{1j} \cap b_{2j}, b_{2j} \cap b_{3j}, \cdot, b_{m-1j} \cap b_{mj}\}$.

(ii) $\xi^*_k = \xi \cup \xi^* \cup \xi^{**}$, where $\xi = \{1_{N_s}, 0_{N_s}, e_{k1}, e_{k2}, \cdots e_{km}\}$, $\xi^* = \{e_{k1} \cup e_{k2}, e_{k2} \cup e_{k3}, \cdot, e_{km-1} \cup e_{km}\}$ and $\xi^{**} = \{e_{k1} \cap e_{k2}, e_{k2} \cap e_{k3}, \cdot, e_{km-1} \cap e_{km}\}$.

Step 3: Find neutrosophic score functions:

Neutrosophic score functions (shortly, $N_s euScFu$) of $\Gamma, \Gamma^*, \Gamma^{**}, \xi, \xi^*, \xi^{**}, \Gamma_j$ and ξ_k are defined as follows.

(i) $N_s euScFu(\Gamma) = \frac{1}{3(m+2)} \left[\sum_{i=1}^{m+2} [2 + \mu_i - \sigma_i - \nu_i]\right]$, $N_s euScFu(\Gamma^*) = \frac{1}{3q} \left[\sum_{i=1}^{q} [2 + \mu_i - \sigma_i - \nu_i]\right]$, where q is the number of element of Γ^* and

$N_seuScFu(\Gamma^{**}) = \frac{1}{3r}\left[\sum_{i=1}^{r}[2+\mu_i-\sigma_i-\nu_i]\right]$, where r is the number of element of Γ^{**}. For $j = 1, 2, \cdots, n$,

$$N_seuScFu(\Gamma_j) = \begin{cases} N_seuScFu(\Gamma) & \text{if } N_seuScFu(\Gamma^*) = 0; N_seuScFu(\Gamma^{**}) = 0 \\ \frac{1}{2}\left[N_seuScFu(\Gamma) + N_seuScFu(\Gamma^*)\right] & \text{if } N_seuScFu(\Gamma^{**}) = 0 \\ \frac{1}{3}\left[N_seuScFu(\Gamma) + N_seuScFu(\Gamma^*) + N_seuScFu(\Gamma^{**})\right] & \text{otherwise} \end{cases}$$

(ii) $N_seuScFu(\xi) = \frac{1}{3(m+2)}\left[\sum_{i=1}^{m+2}[2+\mu_i-\sigma_i-\nu_i]\right]$, $N_seuScFu(\xi^*) = \frac{1}{3s}\left[\sum_{i=1}^{s}[2+\mu_i-\sigma_i-\nu_i]\right]$, where s is the number of element of ξ^* and $N_seuScFu(\xi^{**}) = \frac{1}{3t}\left[\sum_{i=1}^{t}[2+\mu_i-\sigma_i-\nu_i]\right]$, where t is the number of element of ξ^{**}. For $k = 1, 2, \cdots, p$,

$$N_seuScFu(\xi_k) = \begin{cases} N_seuScFu(\xi) & \text{if } N_seuScFu(\xi^*) = 0; N_seuScFu(\xi^{**}) = 0 \\ \frac{1}{2}\left[N_seuScFu(\xi) + N_seuScFu(\xi^*)\right] & \text{if } N_seuScFu(\xi^{**}) = 0 \\ \frac{1}{3}\left[N_seuScFu(\xi) + N_seuScFu(\xi^*) + N_seuScFu(\xi^{**})\right] & \text{otherwise} \end{cases}$$

Step 4: Final Decision

Arrange neutrosophic score values for the alternatives $\Gamma_1 \leq \Gamma_2 \leq \cdots \leq \Gamma_n$ and the attributes $\xi_1 \leq \xi_2 \leq \cdots \leq \xi_p$. Choose the attribute ξ_p for the alternative Γ_1 and ξ_{p-1} for the alternative Γ_2 etc. If $n < p$, then ignore ξ_k, where $k = 1, 2, \cdots, n-p$.

4. Numerical Example

Medical diagnosis has increased volume of data accessible to doctors from new medical innovations and includes vulnerabilities. In medical diagnosis, very difficult task is the way toward classifying different set of symptoms under a single name of an illness. In this part, we exemplify a medical diagnosis problem for effectiveness and applicability of above proposed approach.

Step 1: Problem field selection:

Consider the following tables giving informations when consulted physicians about five patients, Patient 1 (shortly, Pat_1), Patient 2 (shortly, Pat_2), Patient 3 (shortly, Pat_3), Patient 4 (shortly, Pat_4) and Patient 5 (shortly, Pat_5) and symptoms are Weight gain (shortly, Wg), Tiredness (shortly, Td), Myalgia (shortly, Ml), Swelling of legs (shortly, Sl) and Mensus Problem (shortly, Mp). We need to find the patient and to find the disease such as Lymphedema, Insomnia, Hypothyroidism, Menarche, Arthritis of the patient. The data in Table 1 and Table

2 are explained by the membership, the indeterminacy and the non-membership functions of the patients and diseases respectively.

Symptoms \ Patients	Pat_1	Pat_2	Pat_3	Pat_4	Pat_5
Wg	(0.9,0.1,0)	(0.8,0,0.2)	(0,0.1,0.9)	(0.1,0,0.7)	(0.3,0.2,0.5)
Td	(0,0.3,0.7)	(0.1,0.2,0.7)	(0.8,0.1,0.2)	(0.1,0.1,0.8)	(0.6,0.5,0.3)
Ml	(0.3,0.1,0.6)	(0.8,0,0.3)	(0.3,0.1,0.6)	(0.2,0.1,0.6)	(0.3,0,0.4,0.4)
Sl	(0.9,0,0.1)	(0.4,0.2,0.5)	(0.2,0.2,0.7)	(0.4,0.2,0.5)	(0.4,0.6,0.3)
Mp	(0.2,0.1,0.7)	(0.3,0.2,0.5)	(0.4,0.3,0.2)	(0.9,0,0.1)	(0.7,0.4,0.5)

TABLE 1. Neutrosophic values for patients

Disease \ Symptoms	Wg	Td	Ml	Sl	Mp
Lymphedema	(0,0.2,0.8)	(0.2,0.2,0.1)	(0.7,0.2,0.1)	(0.9,0,0.1)	(0.2,0.6,0.4)
Insomnia	(0,0.1,0.9)	(0.9,0,0.1)	(0.2,0,0.8)	(0.2,0.4,0.1)	(0.2,0.1,0.7)
Hypothyroidism	(0.9,0.1,0.1)	(0.1,0.1,0.8)	(0,0.1,0.9)	(0.1,0.4,0.3)	(0.2,0.6,0.4)
Menarche	(0.6,0.3,0.1)	(0.1,0.1,0.8)	(0.2,0.4,0.1)	(0.2,0.5,0.3)	(0.9,0,0.2)
Arthritis	(0,0.1,0.8)	(0.1,0.4,0.6)	(0.9,0.1,0.1)	(0.1,0.3,0.5)	(0.3,0.1,0.6)

TABLE 2. Neutrosophic values for diseases

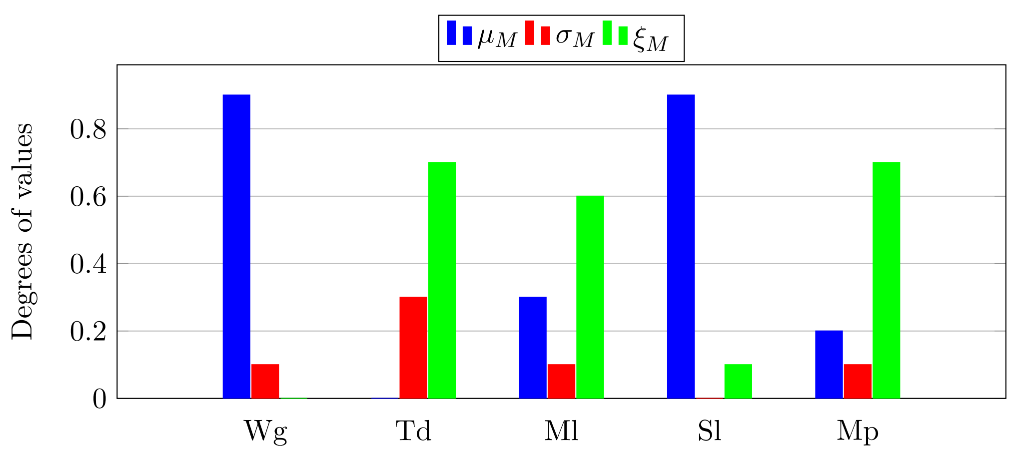

FIGURE 1. Neutrosophic values for Patient 1

Step 2: Form neutrosophic topologies for (Γ_j) **and** (ξ_k)**:**

(i) $\Gamma_1^* = \Gamma \cup \Gamma^* \cup \Gamma^{**}$, where

$\Gamma = \{(0,0,1),(1,1,0),(0.9,0.1,0),(0,0.3,0.7),(0.3,0.1,0.6),(0.9,0,0.1),(0.2,0.1,0.7)\}$,

$\Gamma^* = \{(0.9,0.3,0),(0.3,0.3,0.6),(0.9,0.3,0.1),(0.2,0.3,0.7),(0.9,0.1,0.1)\}$ and

$\Gamma^{**} = \{(0,0.1,0.7),(0,0,0.7),(0.3,0,0.6),(0.2,0,\ 0.7)\}$.

(ii) $\Gamma_2^* = \Gamma \cup \Gamma^* \cup \Gamma^{**}$, where

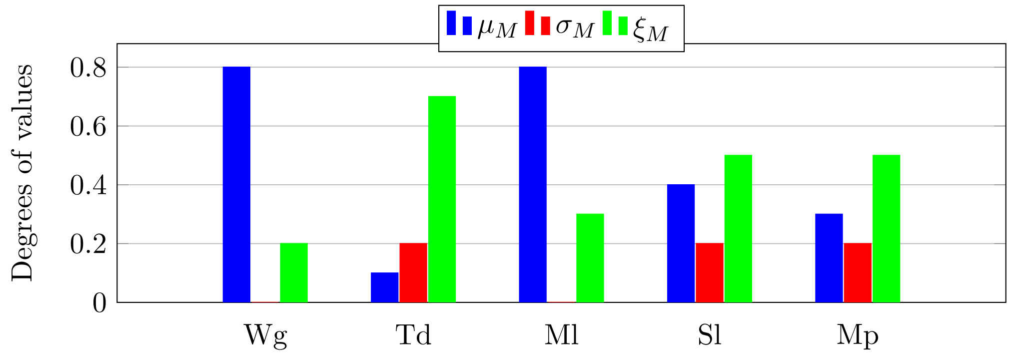

FIGURE 2. Neutrosophic values for Patient 2

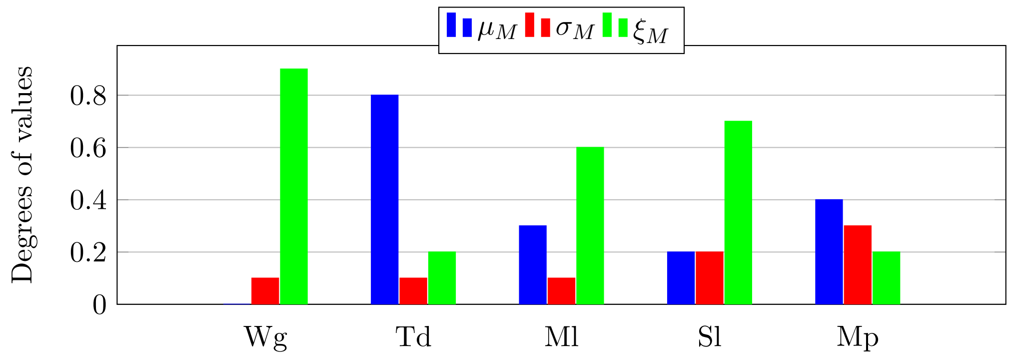

FIGURE 3. Neutrosophic values for Patient 3

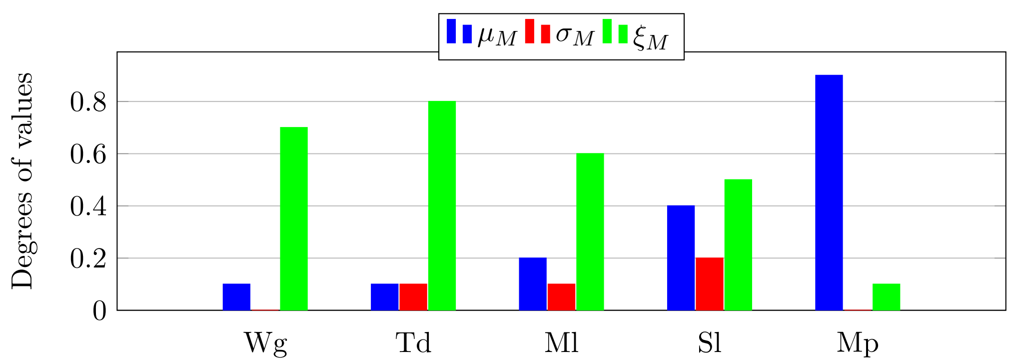

FIGURE 4. Neutrosophic values for Patient 4

$\Gamma = \{(0,0,1),(1,1,0),(0.8,0,0.2),(0.1,0.2,0.7),(0.8,0,0.2),(0.4,0.2,0.5),(0.3,0.2,0.5)\}$,

$\Gamma^* = \{(0.8,0.2,0.2),(0.8,0.2,0.3)\}$ and

$\Gamma^{**} = \{(0.1,0,0.7),(0.4,0,0.5),(0.3,0,0.5)\}$.

(iii) $\Gamma_3^* = \Gamma \cup \Gamma^* \cup \Gamma^{**}$, where

$\Gamma = \{(0,0,1),(1,1,0),(0,0.1,0.9),(0.8,0.1,0.2),(0.3,0.1,0.6),(0.2,0.2,0.7),(0.4,0.3,0.2)\}$,

$\Gamma^* = \{(0.8,0.2,0.2),(0.8,0.3,0.2),(0.3,0.2,0.6)\}$ and

$\Gamma^{**} = \{(0.2,0.1,0.7),(0.4,0.1,0.2)\}$.

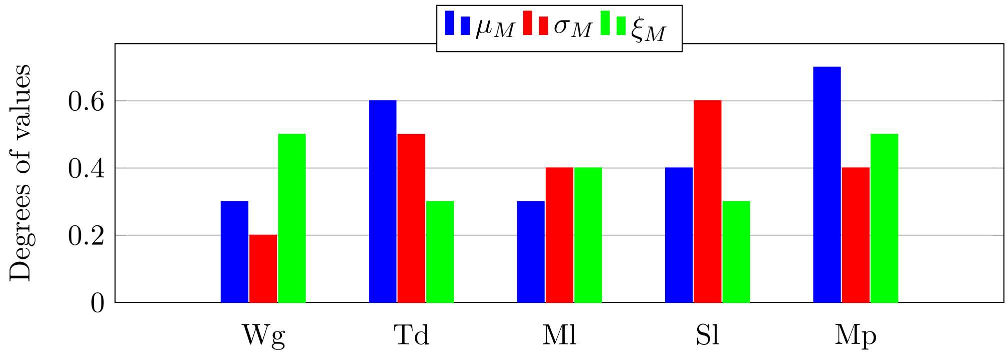

FIGURE 5. Neutrosophic values for Patient 5

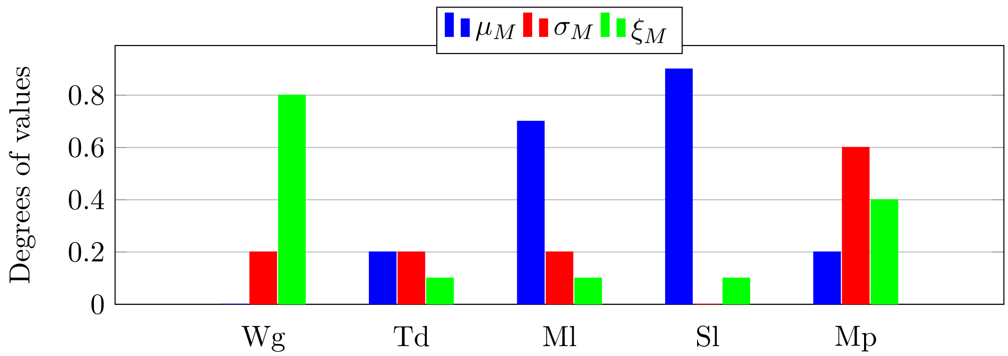

FIGURE 6. Neutrosophic values for Lymphedema

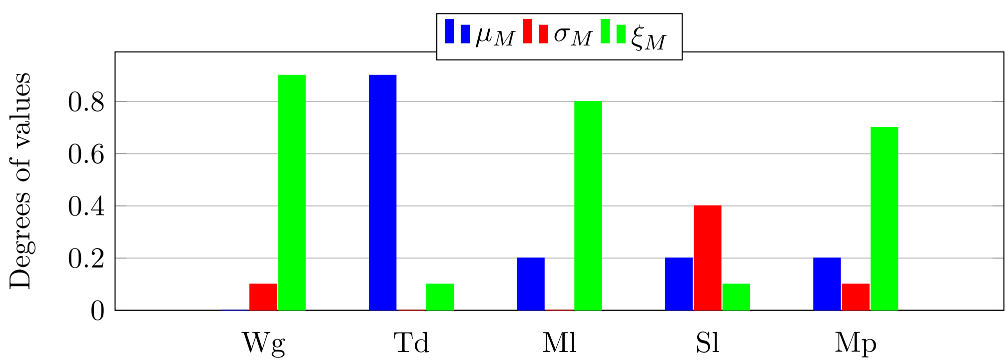

FIGURE 7. Neutrosophic values for Insomnia

(iv) $\Gamma_4^* = \Gamma \cup \Gamma^* \cup \Gamma^{**}$, where

$\Gamma = \{(0,0,1),(1,1,0),(0.1,0,0.7),(0.1,0.1,0.8),(0.2,0.1,0.6),(0.4,0.2,0.5),(0.9,0,0.1)\}$,

$\Gamma^* = \{(0.1,0.1,0.7),(0.9,0.1,0.1),(0.9,0.2,0.1)\}$ and

$\Gamma^{**} = \{(0.1,0,0.8),(0.2,0,0.6),(0.4,0,0.5)\}$.

(v) $\Gamma_5^* = \Gamma \cup \Gamma^* \cup \Gamma^{**}$, where

$\Gamma = \{(0,0,1),(1,1,0),(0.3,0.2,0.5),(0.6,0.5,0.3),(0.3,0.4,0.4),(0.4,0.6,0.3),(0.7,0.4,0.5)\}$,

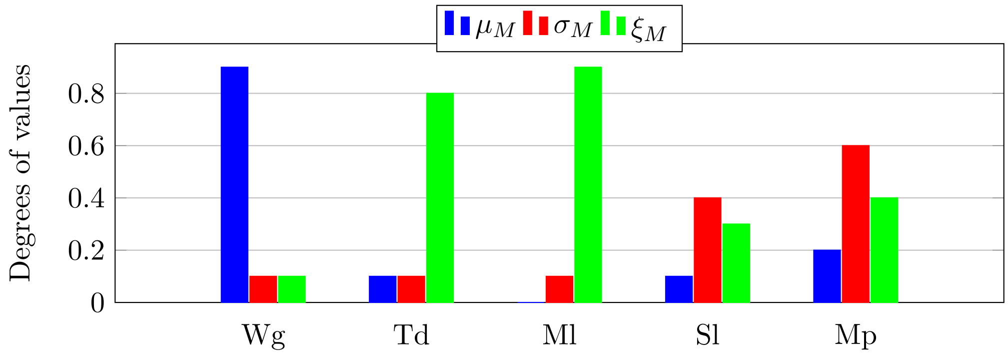

FIGURE 8. Neutrosophic values for Hypothyroidism

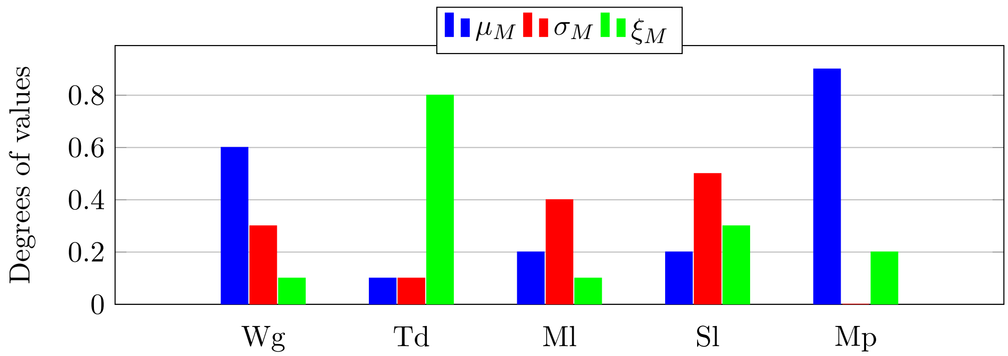

FIGURE 9. Neutrosophic values for Menarche

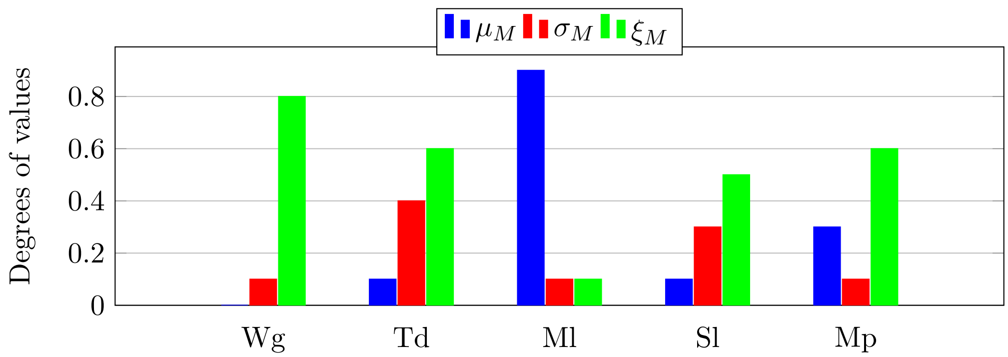

FIGURE 10. Neutrosophic values for Arthritis

$\Gamma^* = \{(0.6, 0.6, 0.3), (0.7, 0.5, 0.3), (0.7, 0.4, 0.4), (0.7, 0.6, 0.3)\}$ and

$\Gamma^{**} = \{(0.4, 0.5, 0.3), (0.6, 0.4, 0.5), (0.3, 0.4, 0.5), (0.4, 0.4, 0.5)\}$.

(i) $\xi_1^* = \xi \cup \xi^* \cup \xi^{**}$, where

$\xi = \{(0, 0, 1), (1, 1, 0), (0, 0.2, 0.8), (0.2, 0.2, 0.1), (0.7, 0.2, 0.1), (0.9, 0, 0.1), (0.2, 0.6, 0.4)\}$,

$\xi^* = \{(0.9, 0.2, 0.1), (0.2, 0.6, 0.1), (0.7, 0.6, 0.1), (0.9, 0.6, 0.1)\}$ and

$\xi^{**} = \{(0, 0, 0.8), (0.2, 0.2, 0.1), (0.2, 0, 0.1), (0.2, 0.2, 0.4), (0.7, 0, 0.1), (0.2, 0, 0.4)\}$.

(ii) $\xi_2^* = \xi \cup \xi^* \cup \xi^{**}$, where

$\xi = \{(0, 0, 1), (1, 1, 0), (0, 0.1, 0.9), (0.9, 0, 0.1), (0.2, 0, 0.8), (0.2, 0.4, 0.1), (0.2, 0.1, 0.7)\}$,

$\xi^* = \{(0.9, 0.1, 0.1), (0.2, 0.1, 0.8), (0.9, 0.4, 0.1)\}$ and

$\xi^{**} = \{(0, 0, 0.9), (0.2, 0, 0.1), (0.2, 0, 0.7)\}$.

(iii) $\xi_3^* = \xi \cup \xi^* \cup \xi^{**}$, where

$\xi = \{(0, 0, 1), (1, 1, 0), (0.9, 0.1, 0.1), (0.1, 0.1, 0.8), (0, 0.1, 0.9), (0.1, 0.4, 0.3), (0.2, 0.6, 0.4)\}$,

$\xi^* = \{(0.9, 0.4, 0.1), (0.9, 0.6, 0.1), (0.2, 0.6, 0.3)\}$ and

$\xi^{**} = \{(0.1, 0.1, 0.3), (0.2, 0.1, 0.4), (0, 0.1, 0.9), (0.1, 0.4, 0.4)\}$.

(iv) $\xi_4^* = \xi \cup \xi^* \cup \xi^{**}$, where

$\xi = \{(0, 0, 1), (1, 1, 0), (0.6, 0.3, 0.1), (0.1, 0.1, 0.8), (0.2, 0.4, 0.1), (0.2, 0.5, 0.3), (0.9, 0, 0.2)\}$,

$\xi^* = \{(0.6, 0.4, 0.1), (0.6, 0.5, 0.1), (0.9, 0.3, 0.1), (0.9, 0.1, 0.2), (0.2, 0.5, 0.1), (0.9, 0.4, 0.1), (0.9, 0.5, 0.2)\}$ and

$\xi^{**} = \{(0.2, 0.3, 0.1), (0.2, 0.3, 0.3), (0.6, 0, 0.2), (0.1, 0, 0.8), (0.2, 0.4, 0.3), (0.2, 0.4, 0.2)\}$.

(v) $\xi_5^* = \xi \cup \xi^* \cup \xi^{**}$, where

$\xi = \{(0, 0, 1), (1, 1, 0), (0, 0.1, 0.8), (0.1, 0.4, 0.6), (0.9, 0.1, 0.1), (0.1, 0.3, 0.5), (0.3, 0.1, 0.6)\}$,

$\xi^* = \{(0.9, 0.4, 0.1), (0.1, 0.4, 0.5), (0.3, 0.4, 0.6), (0.9, 0.3, 0.1), (0.3, 0.3, 0.5)\}$ and

$\xi^{**} = \{(0.1, 0.1, 0.6), (0.1, 0.3, 0.6), (0.1, 0.1, 0.5)\}$.

Step 3: Find neutrosophic score functions:

(i) $N_s euScFu(\Gamma) = 0.6$, $N_s euScFu(\Gamma^*) = 0.6933$ and $N_s euScFu(\Gamma^{**}) = 0.475$.

$N_s euScFu(\Gamma_1) = 0.5894$.

(ii) $N_s euScFu(\Gamma) = 0.6$, $N_s euScFu(\Gamma^*) = 0.7833$ and $N_s euScFu(\Gamma^{**}) = 0.5666$.

$N_s euScFu(\Gamma_2) = 0.6499$.

(iii) $N_s euScFu(\Gamma) = 0.5381$, $N_s euScFu(\Gamma^*) = 0.6888$ and $N_s euScFu(\Gamma^{**}) = 0.5833$.

$N_s euScFu(\Gamma_3) = 0.6034$.

(iv) $N_s euScFu(\Gamma) = 0.5524$, $N_s euScFu(\Gamma^*) = 0.7333$ and $N_s euScFu(\Gamma^{**}) = 0.5333$.

$N_s euScFu(\Gamma_4) = 0.6063$.

(v) $N_s euScFu(\Gamma) = 0.5533$, $N_s euScFu(\Gamma^*) = 0.6083$ and $N_s euScFu(\Gamma^{**}) = 0.5166$.

$N_s euScFu(\Gamma_5) = 0.5527$.

(i) $N_s euScFu(\xi) = 0.5857$, $N_s euScFu(\xi^*) = 0.6917$ and $N_s euScFu(\xi^{**}) = 0.5857$.

$N_s euScFu(\xi_1) = 0.6332$.

(ii) $N_s euScFu(\xi) = 0.5381$, $N_s euScFu(\xi^*) = 0.7111$ and $N_s euScFu(\xi^{**}) = 0.5222$.

$N_s euScFu(\xi_2) = 0.5905$.

(iii) $N_s euScFu(\xi) = 0.5$, $N_s euScFu(\xi^*) = 0.6555$ and $N_s euScFu(\xi^{**}) = 0.475$.

$N_s euScFu(\xi_3) = 0.5435$.

(iv) $N_s euScFu(\xi) = 0.5809$, $N_s euScFu(\xi^*) = 0.7666$ and $N_s euScFu(\xi^{**}) = 0.5888$.

$N_s euScFu(\xi_4) = 0.6454$.

(v) $N_s euScFu(\xi) = 0.5143$, $N_s euScFu(\xi^*) = 0.5933$ and $N_s euScFu(\xi^{**}) = 0.4555$.

$N_s euScFu(\xi_5) = 0.5210$.

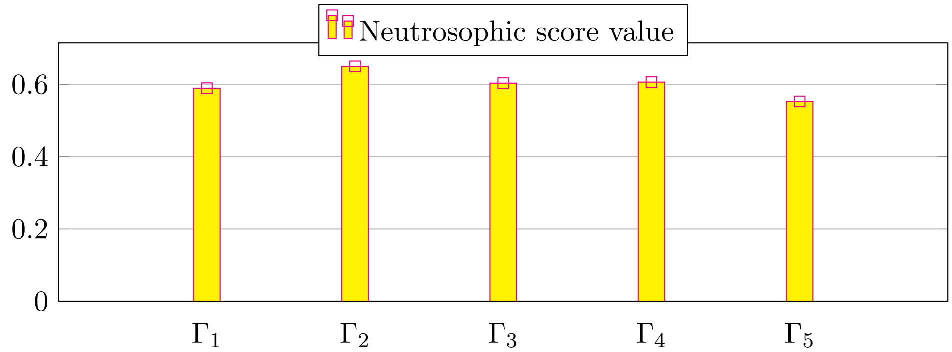

FIGURE 11. Neutrosophic score values for Patients

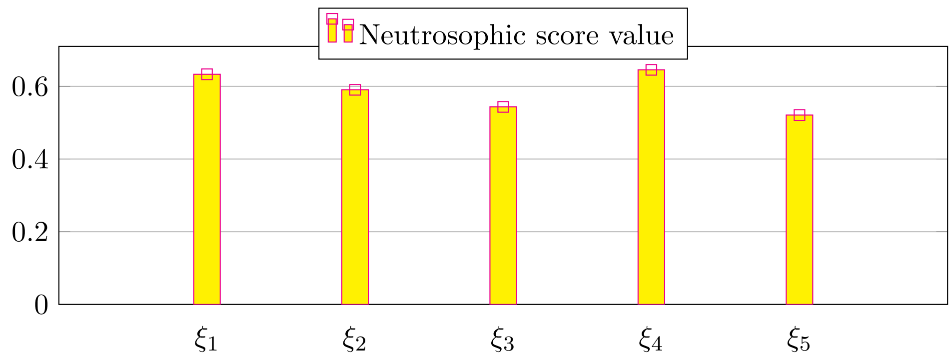

FIGURE 12. Neutrosophic score values for Diseases

Step 4: Final Decision:

Arrange neutrosophic score values for the alternatives Γ_1, Γ_2, Γ_3, Γ_4, Γ_5 and the attributes ξ_1, ξ_2, ξ_3, ξ_4, ξ_5 in ascending order. We get the following sequences $\Gamma_5 \leq \Gamma_1 \leq \Gamma_3 \leq \Gamma_4 \leq \Gamma_2$ and $\xi_5 \leq \xi_3 \leq \xi_2 \leq \xi_1 \leq \xi_4$. Thus the Pat_5 suffers from Menarche, the Pat_1 suffers from Lymphedema, the Pat_3 suffers from Insomnia, the Pat_4 suffers from Hypothyroidism and the Pat_2 suffers from Arthritis.

5. Conclusions

In this numerical example, we found out that the patients suffering from a diseases in the form of neutrosophic set by using neutrosophic score functions. This will help to find out the correct attributes and alternative in any field environment problems.

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