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(Dedicated to Professor G. C. Sharma on His 85^{th} Birth Anniversary Celebrations)

SHORTEST PATH ON INTERVAL-VALUED INTUITIONISTIC TRAPEZOIDAL NEUTROSOPHIC FUZZY GRAPHS WITH APPLICATION

K. Kalaiarasi[1] and R. Divya[2]
[1,2]PG and Research Department of Mathematics, Cauvery College for Women (Autonomous), Affiliated to Bharathidasan University, Tiruchirappalli, Tamil Nadu, India-620018
Email: Kalaishruthi1201@gmail.com, rdivyamat@gmail.com

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Abstract

In this article, stretch esteemed Interval Valued Intuitionistic Trapezoidal Neutrosophic Fuzzy Graph (IVITrNFG) of SPP, which is drew on trapezoidal numbers and IVITrNFG. Hear a genuine application is given an illustrative model for IVITrNFG. Additionally Shortest way is determined for this model. This present Dijkstra's Algorithm briefest way was checked.

2010 Mathematics Subject Classification: 05C85
Keywords and Phrases: Interval-Valued Intuitionistic Fuzzy Number (IVIFN), Trapezoidal Fuzzy Number (TrFN), Shortest Path (SP), Interval-Valued Intuitionistic Trapezoidal Neutrosophic Fuzzy Graph(IVITrNFG).

1 Introduction

The creators Ahuja et al. [1] examined systematic execution of Dijkstra's calculation. Arsham [2] introduced another crucial arrangement calculation which permits affectability examination without utilizing any counterfeit, slack or surplus factors. Anusuya et al. [3] apply positioning capacity for briefest way issue. Broumi et al. [4] proposed for extend esteemed neutrosophic number. Broumi [5] presented neutrosophic charts with most limited way issues. Broumi [6] proposed calculation gives Shortest way issue on single esteemed neutrosophic charts. Broumi [7] proposed the Shortest way under Bipolar Neutrosophic setting. Broumi [8] gave the Shortest way issue under span esteemed neutrosophic setting. Chiranjibe Jana et al. [9] Presented Trapezoidal neutrosophic aggregation operators and its application in multiple attribute decision making process. De et al. [10] Computation of Shortest Path in a fuzzy organization. De et al. [11] study on ranking of trapezoidal intuitionistic fuzzy numbers. Enayattabar [12] introduced Dijkstra calculation for briefest way issue under Pythagorean fuzzy climate. Jana et al. [14] presented stretch esteemed trapezoidal neutrosophic set. Jayagowri et al. [15] discover Optimized Path in a Network utilizing trapezoidal intuitionistic fuzzy numbers. Kalaiarasi et al. [16] determine fuzzy optimal total cost and fuzzy optimal order quantity obtained by ranking function method and Kuhn-tucker method for the proposed inventory model. Kalaiarasi et al. [17] constructed inventory parameters that are fuzzy using trapezoidal fuzzy numbers. Kumar et al. [18] proposed to tackling briefest way issue with edge weight. Kumar et al. [19] introduced Algorithm for most limited way issue in an organization with span esteemed intuitionistic trapezoidal fuzzy number. Kumar et al. [20] presented the SPP from an underlying hub to an objective hub on neutrosophic chart . Majumdar et al. [21] introduced an intuitionistic fuzzy most brief way organization. Gani et al. [13] looking intuitionistic fuzzy most brief organization. Ojekudo et al. [22] tended to the most brief way utilizing Dijkstra's calculation. Said Broumi [23] processing the most brief way Neutrosophic Information. Smarandache et al. [24] summed up the fuzzy rationale and presented two neutrosophic ideas. Victor Christianto et al. [25] gave a neutrosophic approach to futurology. Wang et al. [26] contributed neutrosophic sets with their properties. Xu [27] introduced a strategies for amassing span esteemed intuitionistic fuzzy data, Yang et al. [28] introduced rectangular hindrance subject to various improvement capacities regarding the quantity of curves. Ye [29] proposed a Trapezoidal fuzzy Neural Computing and Applications. Ye [30] developed of the Multi models dynamic strategy utilizing shape liking measure, Ye [31] presented a Prioritized aggregation operators of trapezoidal intuitionistic fuzzy sets and their application.

Here, in this paper disclosed the briefest way to India famous seven tourist places utilized the proposed calculation.

Section 2, introduces some basic concepts related to definitions. Section 3, introduces *IVITrNFG* proposed algorithm and find *SPP* using that proposed algorithm. Section 4, we apply real life application. The application has India famous seven tourist place and find its *SPP* using *IVITrNFG* proposed algorithm . Section 5, verifies shortest path on India famous seven tourist place with Dijkstras algorithm. Conclusion is given in Section 6.

2 Methodology

In this section we explain some important definitions.

Definition 2.1. *Let*

$$\bar{n}_1 = \Big\langle ([(t_a^L, t_b^L, t_c^L, t_d^L), (t_e^L, t_f^L, t_g^L, t_h^L)], [(t_a^U, t_b^U, t_c^U, t_d^U), (t_e^U, t_f^U, t_g^U, t_h^U)]),$$

$$([(i_a^L, i_b^L, i_c^L, i_d^L), (i_e^L, i_f^L, i_g^L, i_h^L)], [(i_a^U, i_b^U, i_c^U, i_d^U), (i_e^U, i_f^U, i_g^U, i_h^U)]),$$

$$([(f_a^L, f_b^L, f_c^L, f_d^L), (f_a^L, f_b^L, f_c^L, f_d^L)], [(f_e^U, f_f^U, f_g^U, f_h^U), (f_e^U, f_f^U, f_g^U, f_h^U)])\Big\rangle$$

and

$$\bar{n}_2 = \Big\langle ([(T_a^L, T_b^L, T_c^L, T_d^L), (T_e^L, T_f^L, T_g^L, T_h^L)], [(T_a^U, T_b^U, T_c^U, T_d^U), (T_e^U, T_f^U, T_g^U, T_h^U)]),$$

$$([(I_a^L, I_b^L, I_c^L, I_d^L), (I_e^L, I_f^L, I_g^L, I_h^L)], [(I_a^U, I_b^U, I_c^U, I_d^U), (I_e^U, I_f^U, I_g^U, I_h^U)]),$$

$$([(F_a^L, F_b^L, F_c^L, F_d^L), (F_e^L, F_f^L, F_g^L, F_h^L)], [(F_a^U, F_b^U, F_c^U, F_d^U), (F_e^U, F_f^U, F_g^U, F_h^U)])\Big\rangle$$

both Interval-Valued Trapezoidal Neutrosophic Numbers. Therefore following procedure holds:

$$\bar{n}_2 = \Big\langle ([(T_a^L, T_b^L, T_c^L, T_d^L), (T_e^L, T_f^L, T_g^L, T_h^L)], [(T_a^U, T_b^U, T_c^U, T_d^U), (T_e^U, T_f^U, T_g^U, T_h^U)]),$$

$$([(I_a^L, I_b^L, I_c^L, I_d^L), (I_e^L, I_f^L, I_g^L, I_h^L)], [(I_a^U, I_b^U, I_c^U, I_d^U), (I_e^U, I_f^U, I_g^U, I_h^U)]),$$

$$([(F_a^L, F_b^L, F_c^L, F_d^L), (F_e^L, F_f^L, F_g^L, F_h^L)], [(F_a^U, F_b^U, F_c^U, F_d^U), (F_e^U, F_f^U, F_g^U, F_h^U)])\Big\rangle$$

We propose definition of score and accuracy functions for an Interval-Valued Trapezoidal Neutrosophic Number.

Definition 2.2. *Let*

$$\bar{n}_1 = \Big\langle ([(t_a^L, t_b^L, t_c^L, t_d^L), (t_e^L, t_f^L, t_g^L, t_h^L)], [(t_a^U, t_b^U, t_c^U, t_d^U), (t_e^U, t_f^U, t_g^U, t_h^U)]),$$
$$([(i_a^L, i_b^L, i_c^L, i_d^L), (i_e^L, i_f^L, i_g^L, i_h^L)], [(i_a^U, i_b^U, i_c^U, i_d^U), (i_e^U, i_f^U, i_g^U, i_h^U)]),$$
$$([(f_a^L, f_b^L, f_c^L, f_d^L), (f_a^L, f_b^L, f_c^L, f_d^L)], [(f_e^U, f_f^U, f_g^U, f_h^U), (f_e^U, f_f^U, f_g^U, f_h^U)])\Big\rangle$$

and be an Interval-Valued, Intuitionistic Trapezoidal Neutrosophic Number, then their score functions are defined as

$$S(\bar{n}) = \frac{1}{3}\left[\begin{array}{r} 2 + \dfrac{[(t_a^U + t_b^U + t_c^U + t_d^U + t_e^L + t_f^L + t_g^L + t_h^L) - (t_a^L + t_b^L + t_c^L + t_d^L + t_e^U + t_f^U + t_g^U + t_h^U)]}{8} \\ -\dfrac{[(i_a^U + i_b^U + i_c^U + i_d^U + i_e^L + i_f^L + i_g^L + i_h^L) - (i_a^L + i_b^L + i_c^L + i_d^L + i_e^U + i_f^U + i_g^U + i_h^U)]}{8} \\ -\dfrac{[(f_a^U + f_b^U + f_c^U + f_d^U + f_e^L + f_f^L + f_g^L + f_h^L) - (f_a^L + f_b^L + f_c^L + f_d^L + f_e^U + f_f^U + f_g^U + f_h^U)]}{8} \end{array}\right], S(\bar{n}) \in [-1, 1]$$

where the higher value of $S(\bar{n})$, larger the Interval-Valued Intuitionistic Trapezoidal Number $\bar{n}$.

3 Interval-Valued Intuitionistic Trapezoidal Neutrosophic Fuzzy Graph

In this research, we using proposed algorithm for finding shortest path.

Step 3.1 Let

$$d_1 = \langle [(0,0,0,0),(0,0,0,0)],[(0,0,0,0),(0,0,0,0)],[(1,1,1,1),(1,1,1,1)],$$
$$[(1,1,1,1),(1,1,1,1)],[(1,1,1,1),(1,1,1,1)],[(1,1,1,1),(1,1,1,1)]\rangle$$

and the source node as

$$d_1 = \langle [(0,0,0,0),(0,0,0,0)],[(0,0,0,0),(0,0,0,0)],[(1,1,1,1),(1,1,1,1)],$$
$$[(1,1,1,1),(1,1,1,1)],[(1,1,1,1),(1,1,1,1)],[(1,1,1,1),(1,1,1,1)]\rangle$$

and the source node as

Step 3.2 Find $d_j = \text{minimum}\{d_i \oplus d_{ij}\};\ j = 2,3,\ldots,n$.

Step 3.3 If the minimum value of i, ie., $i = r$ then the lable node j as $[d_j, r]$. If minimum arise related to more than one values of i. Their position we choose minimum value of i.

Step 3.4 Let the destination node be $[d_n, l]$. Here source node is d_n. We conclude a score function and we finds minimum value of Interval-Valued Trapezoidal Neutrosophic Number.

Step 3.5 We calculate shortest path problem between source and destination node. Review the label of node 1. Let it be as $[d_n, A]$. Now review the label of node A and so on. Replicate the same procedure until node 1 is procured.

Step 3.6 The shortest path can be procured by combined all the nodes by the **Step 3.5**.

4 Data Analysis

To find shortest path on India famous seven tourist place using Interval-Valued Intuitionistic Trapezoidal Neutrosophic Fuzzy Graph.

***Figure* 4.1:** The Beaches of Goa

***Figure* 4.2:** Gate way of India

***Figure* 4.3:** Mecca Masjid

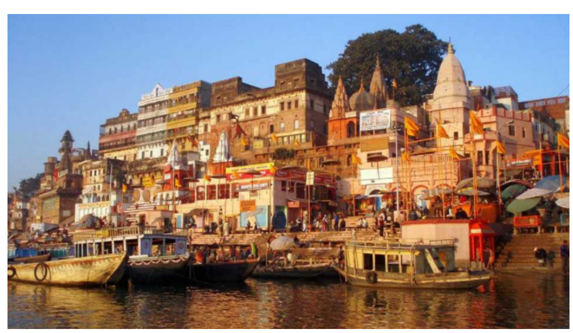


***Figure* 4.4:** Holy City of Varanasi

***Figure* 4.5:** Taj mahal

***Figure* 4.6:** The Golden City (Jaisalmer)

***Figure* 4.7:** Harmandir Sahib

Here we consider source node is The Beaches of Goa and destination node is Sri Harmandir Sahib. To find Shortest Path on The Beaches of Goa to Sri Harmandir Sahib. Here distance between one tourist place

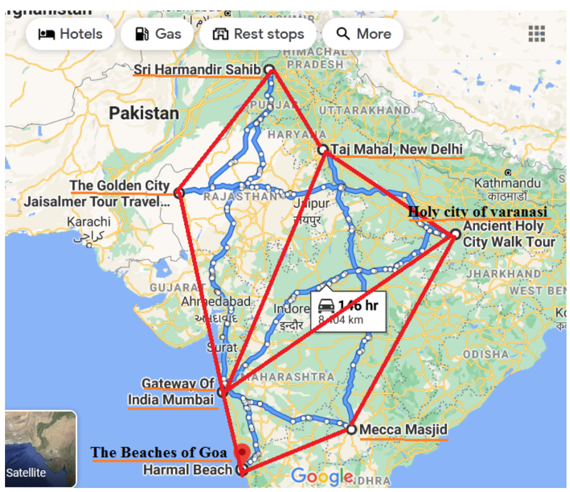


***Figure* 4.8:** A Graph Of India Famous Seven Tourist Place

to another tourist place is calculated in kilometers. The numerical value of the distance is converted to *IVITrNFG* with the help of through trapezoidal signed distance.

The given distance (kilometer) converted to neutrosophic number. We converted neutrosophic number as (a_1, a_2, a_3, a_4) are membership function & $(a_1^*, a_2^*, a_3^*, a_4^*)$ are non-membership function. These functions converted to fuzzy trapezoidal numbers using trapezoidal signed distance $\dfrac{a_1 + a_2 + a_3 + a_4}{4}$. Finally converted Interval-Valued Intuitionistic Trapezoidal Neutrosophic Fuzzy Number.

Here, Apply the *IVITrNFN* in our algorithm to find shortest path to India famous seven tourist place.

Edges	Interval-Valued, Intuitionistic Trapezoidal Fuzzy Neutrosophic Numbers
1-2	$\langle([(0.20, 0.29, 0.35, 0.56), (0.49, 0.59, 0.65, 0.87)]), ([(0.8, 0.71, 0.65, 0.44), (0.51, 0.41, 0.35, 0.13)]), ([(0.11, 0.13, 0.16, 0.2), (0.79, 0.83, 0.86, 0.92)]), ([(0.89, 0.87, 0.84, 0.8), (0.21, 0.17, 0.14, 0.08)]), ([(0.003, 0.005, 0.03, 0.08), (0.9615, 0.9699, 0.9705, 0.9801)]), ([(0.997, 0.995, 0.97, 0.92), (0.0385, 0.0301, 0.0295, 0.0199)])\rangle$
1-3	$\langle([(0.91, 0.92, 0.94, 0.99), (0.02, 0.04, 0.06, 0.12)]), ([(0.09, 0.08, 0.06, 0.01), (0.98, 0.96, 0.94, 0.88)]), ([(0.52, 0.55, 0.6, 0.69), (0.35, 0.4, 0.42, 0.47)])([(0.48, 0.45, 0.4, 0.31), (0.65, 0.6, 0.58, 0.53)]), ([(0.09, 0.12, 0.15, 0.24), (0.80, 0.83, 0.86, 0.91)]), ([(0.91, 0.88, 0.85, 0.76), (0.2, 0.17, 0.14, 0.09)])\rangle$
2-4	$\langle([(0.82, 0.86, 0.89, 0.91), (0.09, 0.11, 0.13, 0.19)]), ([(0.18, 0.14, 0.11, 0.09), (0.91, 0.89, 0.87, 0.81)]), ([(0.17, 0.2, 0.23, 0.32), (0.72, 0.76, 0.79, 0.81)])([(0.83, 0.8, 0.77, 0.68), (0.28, 0.24, 0.21, 0.19)]), ([(0.14, 0.16, 0.18, 0.24), (0.79, 0.81, 0.83, 0.85)]), ([(0.86, 0.84, 0.82, 0.76), (0.21, 0.19, 0.17, 0.15)])\rangle$
2-5	$\langle([(0.92, 0.94, 0.96, 0.98), (0.02, 0.04, 0.06, 0.08)]), ([(0.08, 0.06, 0.04, 0.02), (0.98, 0.96, 0.94, 0.92)]), ([(0.32, 0.39, 0.45, 0.64), (0.49, 0.52, 0.58, 0.61)])([(0.68, 0.61, 0.55, 0.36), (0.51, 0.48, 0.42, 0.39)]), ([(0.11, 0.059, 0.08, 0.16), (0.899, 0.919, 0.923, 0.951)]), ([(0.989, 0.941, 0.92, 0.84), (0.101, 0.081, 0.077, 0.049)])\rangle$
2-6	$\langle([(0.84, 0.86, 0.89, 0.97), (0.07, 0.09, 0.11, 0.17)]), ([(0.16, 0.14, 0.11, 0.03), (0.93, 0.91, 0.89, 0.83)]), ([(0.1, 0.2, 0.3, 0.6), (0.4, 0.7, 0.8, 0.9)])([(0.9, 0.8, 0.7, 0.4), (0.6, 0.3, 0.2, 0.1)]), ([(0.21, 0.25, 0.27, 0.35), (0.65, 0.71, 0.74, 0.82)]), ([(0.79, 0.75, 0.73, 0.65), (0.35, 0.29, 0.26, 0.18)])\rangle$
2-4	$\langle([(0.94, 0.95, 0.96, 0.99), (0.02, 0.03, 0.04, 0.07)]), ([(0.06, 0.05, 0.04, 0.01), (0.98, 0.97, 0.96, 0.93)]), ([(0.23, 0.27, 0.35, 0.51), (0.52, 0.57, 0.66, 0.89)])([(0.77, 0.73, 0.65, 0.49), (0.48, 0.43, 0.34, 0.11)]), ([(0.17, 0.21, 0.26, 0.32), (0.59, 0.68, 0.79, 0.98)]), ([(0.83, 0.79, 0.74, 0.68), (0.41, 0.32, 0.21, 0.02)])\rangle$
4-5	$\langle([(0.79, 0.85, 0.89, 0.91), (0.07, 0.09, 0.15, 0.25)]), ([(0.21, 0.15, 0.11, 0.09), (0.930.91, 0.85, 0.75)]), ([(0.25, 0.31, 0.37, 0.51), (0.47, 0.58, 0.64, 0.87)])([(0.75, 0.69, 0.63, 0.49), (0.53, 0.42, 0.36, 0.13)]), ([(0.09, 0.15, 0.26, 0.5), (0.59, 0.67, 0.75, 0.99)]), ([(0.91, 0.85, 0.74, 0.5), (0.41, 0.33, 0.25, 0.01)])\rangle$
5-7	$\langle([(0.79, 0.86, 0.89, 0.98), (0.06, 0.09, 0.12, 0.21)]), ([(0.21, 0.14, 0.11, 0.02), (0.94, 0.91, 0.88, 0.79)]), ([(0.4, 0.5, 0.6, 0.9), (0.2, 0.3, 0.4, 0.7)]), ([(0.6, 0.5, 0.4, 0.1), (0.8, 0.7, 0.6, 0.3)]), ([(0.065, 0.085, 0.127, 0.277), (0.79, 0.81, 0.86, 0.98)]), ([(0.935, 0.915, 0.873, 0.723), (0.21, 0.19, 0.14, 0.02)])\rangle$
6-7	$\langle([(0.85, 0.87, 0.89, 0.95), (0.07, 0.09, 0.11, 0.17)]), ([(0.15, 0.13, 0.11, 0.05), (0.93, 0.91, 0.89, 0.83)]), ([(0.29, 0.37, 0.41, 0.57), (0.37, 0.48, 0.59, 0.92)])([(0.71, 0.63, 0.59, 0.43), (0.63, 0.52, 0.41, 0.08)]), ([(0.09, 0.17, 0.23, 0.43), (0.59, 0.68, 0.87, 0.94)]), ([(0.91, 0.83, 0.77, 0.57), (0.41, 0.32, 0.13, 0.06)])\rangle$

Iteration 4.1 Assume the initial value

$$d_1 = \langle[(0,0,0,0),(0,0,0,0)],[(0,0,0,0),(0,0,0,0)],[(1,1,1,1),(1,1,1,1)],\\ [(1,1,1,1),(1,1,1,1)],[(1,1,1,1),(1,1,1,1)],[(1,1,1,1),(1,1,1,1)]\rangle$$

Here we assume d_1 is the beaches of Goa.

Iteration 4.2 In this iteration was calculated through proposed algorithm from the tourist place The Beaches of Goa to Gate Way of India. The labeled node is Gate Way of India and minimum provided corresponding node is The Beaches of Goa.

Minimum Node	Labeled Node	Path Node
The Beaches of Goa	Gate Way of India	$\langle([(0.20,0.29,0.35,0.56),(0.49,0.59,0.65,0.87)]),([(0.8,0.71,0.65,0.44),(0.51,0.41,0.35,0.13)]),([(0.11,0.13,0.16,0.2),(0.79,0.83,0.86,0.92)]),([(0.89,0.87,0.84,0.8),(0.21,0.17,0.14,0.08)]),([(0.003,0.005,0.03,0.08),(0.9615,0.9699,0.9705,0.9801)]),([(0.997,0.995,0.97,0.92),(0.0385,0.0301,0.0295,0.0199)])\rangle$

Iteration 4.3 The node Mecca Masjid was forerunner node of The Beaches of Goa. Here the labeled node is Mecca Masjid and the minimum provided corresponding node is The Beaches of Goa.

Minimum Node	Labeled Node	Path Node
The Beaches of Goa	Mecca Masjid	$\langle([(0.91,0.92,0.94,0.99),(0.02,0.04,0.06,0.12)]),([(0.09,0.08,0.06,0.01),(0.98,0.96,0.94,0.88)]),([(0.52,0.55,0.6,0.69),(0.35,0.4,0.42,0.47)])([(0.48,0.45,0.4,0.31),(0.65,0.6,0.58,0.53)]),([(0.09,0.12,0.15,0.24),(0.80,0.83,0.86,0.91)]),([(0.91,0.88,0.85,0.76),(0.2,0.17,0.14,0.09)])\rangle$

Iteration 4.4 The node Holy City of Varanasi has two forerunner node , they are Mecca Masjid and Gate Way of India. *IVITrNSP* is calculated to Holy City of Varanasi from Mecca Masjid and Gate Way of India. Here, the labeled node is Holy City of Varanasi and the minimum provided corresponding node is Gate Way of India.

Minimum Node	Labeled Node	Path Node
Gate Way of India	Holy City of Varanasi	$\langle([(0.856,0.901,0.928,0.96),(0.535,0.635,0.695,0.895)]),([(0.836,0.751,0.688,0.490),(0.956,0.935,0915,0.835)]),([(0.0187,0.026,0.0368,0.064),(0.5688,0.6308,0.6794,0.7452)]),([(0.7387,0.696,0.6468,0.544),(0.0588,0.0408,0.0294,0.0152)]),([(0.00042,0.0008,0.0054,0.0192),(0.7596,0.7856,0.8055,0.833)]),([(0.8574,0.8358,0.7954,0.6992),(0.008,0.0057,0.005,0.0029)])\rangle$

Iteration 4.5 The node Taj Mahal has two forerunner node, they are Gate Way of India and Holy City of Varanasi. *IVITrNSP* is calculated to Taj Mahal from Gate Way of India and Holy City of Varanasi. Here,

the labeled node is Taj Mahal and the minimum provided corresponding node is Gate Way of India.

Minimum Node	Labeled Node	Path Node
Gate Way of India	Taj Mahal	$\langle([(0.94, 0.96, 0.97, 0.99), (0.5, 0.6, 0.67, 0.88)]), ([(0.816, 0.73, 0.66, 0.45), (0.99, 0.98, 0.96, 0.93)]), ([(0.035, 0.051, 0.072, 0.128), (0.387, 0.432, 0.4988, 0.5612)]), ([(0.6052, 0.531, 0.462, 0.288), (0.107, 0.0816, 0.0588, 0.0312)]), ([(0.000033, 0.00029, 0.0024, 0.0128), (0.8644, 0.8913, 0.8958, 0.932)])([(0.986, 0.936, 0.892, 0.773), (0.00389, 0.0024, 0.0023, 0.00097)])\rangle$

Iteration 4.6 The node The Golden City was forerunner node of Gate Way of India. Here the labeled node is The Golden City and the minimum provided corresponding node is Gate Way of India.

Minimum Node	Labeled Node	Path Node
Gate Way of India	The Golden City	$\langle([(0.872, 0.9, 0.9285, 0.9868), (0.5257, 0.6269, 0.6885, 0.8921)]), ([(0.832, 0.75, 0.6885, 0.4568), (0.9657, 0.947, 0.928, 0.852)]), ([(0.011, 0.026, 0.048, 0.12), (0.316, 0.581, 0.688, 0.828)]), ([(0.801, 0.696, 0.588, 0.32), (0.126, 0.051, 0.028, 0.008)]), ([(0.00063, 0.00125, 0.0081, 0.028), (0.6249, 0.6886, 0.718, 0.8036)]), ([(0.787, 0.746, 0.708, 0.598), (0.0135, 0.0087, 0.0077, 0.0036)])\rangle$

Iteration 4.7 The node Sri Harmandir Sahib has two forerunner node , they are Taj Mahal and The Golden City. *IVITrNSP* is calculated to Sri Harmandir Sahib from Taj Mahal and The Golden City. The labeled node is Sri Harmandir Sahib and the minimum provided corresponding node is Taj Mahal.

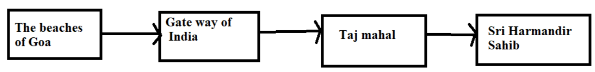
Minimum Node	Labeled Node	Path Node
Taj Mahal	Sri Harmandir Sahib	$\langle([(0.9874, 0.9944, 0.9967, 0.9998), (0.53, 0.636, 0.7096, 0.9052)]), ([(0.8546, 0.7678, 0.6974, 0.461), (0.9994, 0.9982, 0.9952, 0.9853)]), ([(0.014, 0.0255, 0.0432, 0.1152), (0.0774, 0.1296, 0.1995, 0.3928)]), ([(0.36312, 0.2655, 0.1848, 0.0288), (0.0856, 0.05712, 0.03528, 0.00936)]), ([(0.000002145, 0.000024, 0.0003, 0.0035), (0.6828, 0.72195, 0.77, 0.9134)]), ([(0.9219, 0.856, 0.779, 0.559), (0.0008, 0.00045, 0.000322, 0.0000194)])\rangle$

Since Sri Harmandir Sahib is the destination node.

We calculate *SP* to destination node to source node. Since

Labeled Node	**Minimum Node**
Sri Harmandir Sahib	Taj Mahal
Taj Mahal	Gate Way of India
Gate Way of India	The Beaches of Goa

Therefore the seven wonders Interval-Valued Nether Trapezoidal Neutrosophic Fuzzy Graph Shortest Path is



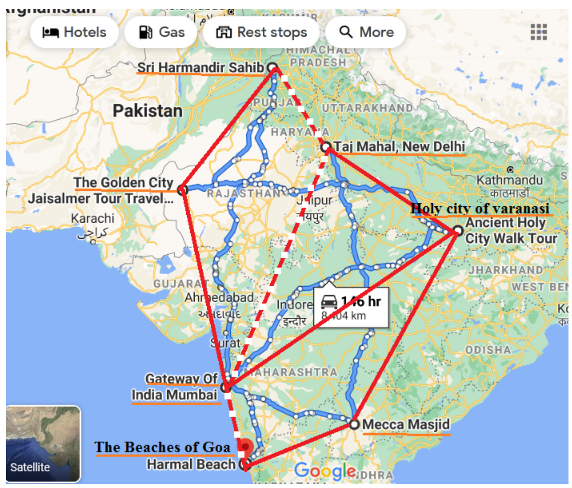


***Figure* 4.9:** *SP* from The Beaches of Goa to Sri Harmandir Sahib

5 Shortest Path On Dijkstra's Algorithm

In the above real life application, we clarify another method of *SPP* using Dijkstras algorithm. In this *SPP*, we use direct method of Dijkstras algorithm and we assume edge weight is India famous seven tourist place km.

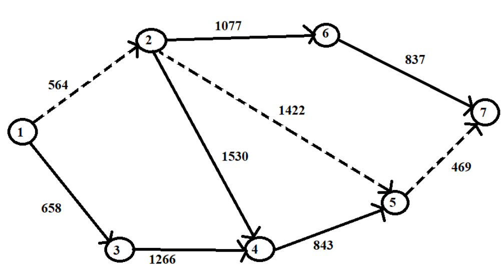


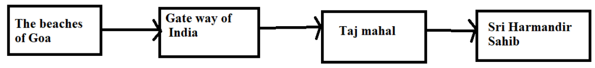
***Figure* 5.1:** *SP* for Dijkstra's Algorithm

Here, we verify India famous seven tourist place shortest path through Dijkstras Algorithm. We have the paths are

$$1 \to 2 \to 5 \to 7$$

Here these two paths Interval-Valued Intuitionistic Trapezoidal Neutrosophic Fuzzy Graphs and Dijkstra's Algorithm are same. The shortest path is

$$1 \to 2 \to 5 \to 7$$



6 Conclusion

In this article, discovering *SP* on India famous seven tourist place using Interval-Valued Intuitionistic Trapezoidal Neutrosophic Fuzzy Graph. A genuine application is given to act as an *IVITrNFG*. Finally checked most brief way *SP* on India famous seven tourist place with Dijkstra's algorithm.

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