Journal of Information Systems Engineering and Management
2025, 10(18s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Applications Of Γ(Gamma)- Fuzzy Soft Set In Multi-Criteria Decision Making

T. Srinivasa Rao[1], S V Subramanyeswara Rao[2], M. Raja Pavan Kumar[3],[4]Mohiddin Shaw

[1]Departmen of Engineering Mathematics, K L E F (Deemed to be University), Vaddeswaram, Guntur District, A.P., INDIA-522502

[2],Departmen of Mathematics, Rama Chandra college of Engineering, Eluru, A.P., INDIA

[3]Research scholar Department of Mathematics, Acharya Nagarjuna University, Nambur, A.P

[4]Department of BS&H, Narasaraopeta Engineering College, A.P

E-mail:1tsr_2505@kluniversity.in, 2svbsrao@rcee.ac.in, 3mrajapavankumar@kluniversity.in, 4mohiddinshaw@gmail.com

ARTICLE INFO

Received: 21 Dec 2024

Revised: 31 Jan 2025

Accepted: 10 Feb 2025

ABSTRACT

Molodtsov 's soft settheory has been considered an efficient Mathematical tool is conduct alonguncertainties. In our regular life, we frequently facing some real problems which need right decision making to getthe best solution for these problems. Therefore, it is necessary to consider various parameters related to the bestsolution. In this paper, we applied Γ(Gamma)-Soft set theory in decision making problems.

Keywords: Γ(Gamma)- Soft set; Fuzzy soft set; Fuzzy Γ(Gamma)- soft set; Comparison-table.

INTRODUCTION

In current days to deal the problems with uncertainties plenty of theories have been evolved inclusive of principleof fuzzy units, theory of vague sets, concept of hard sets, idea of probability and so on. But these kinds of theorieshave their inherent difficulties because the inadequacy of the parameterization. To keep away from these problemsthe Russian researcher, Molodtsov [1] become first initiated the smooth concept, as a very common Mathematicaldevice to solve such issues with uncertainties. Soft set idea does not require the specialization of a parameter, as analternative, it accommodates approximate descriptions of an object as its place to begin.Decision making is the method of selecting the high-quality many of the options to be had. It involves identity ofdiverse alternatives and systematic evaluation of every alternative to pick out one that serves nice theaccomplishment of the preferred goal. B.H Ahmad and AtharKharal[4] studied the properties and a few operationson fuzzy smooth units like a fuzzy union, intersection and De Morgan's laws. P.K Maji and A.R. Roy [2] mentionedan utility of soft units in choice-making problem with the help of Rough Mathematics. A.R. Roy and P.K. Maji presented an application of Fuzzy soft set theory in decision making problems. ArindamChaudhuri et al [5]studied the decision-making troubles the use of fuzzy soft relations. Kalaichelvi and HarithaMalini [6] tried aversion on funding and savings problems. P.K. Das and R. Borgohain [7] carried out the Fuzzy tender set in a multi-observer and multi-criteria choice problems. Palash Dutta and BulendraLimboo [13] introduced the idea of bell-fashioned fuzzy gentle set carried out to clinical diagnosis. Said Broumi et al [10] they implemented the concept of the intuitionistic Neutrosophic soft set to ring idea.Pabitra Kumar Maji [12] studied weighted Neutrosophic gentle units that are a hybridization of Neutrosophic units with soft sets like weighted parameters. Abdelfattah A. El-Atiket al [16]presented a new method of reducing Fuzzy Soft set to solve the problems that appear in the methods of NPR, PNPR and $DBPR$.Renukadevi V. and Sangeetha G[14] they introduced and explained the coverage of a parameter of soft set a new decision making approach for the soft set over the universe using certainty of a parameter. Phaengtan K., Aimcharoen N., and Suebsan P [15] Krishna Gogoi et al [9] studied the utility of Fuzzy soft set concept indecision making. A.M. Ibrahim and Yusuf [8] were mentioned one of some kind algebraic systems thru soft set idea.Molodtsov (1999) [1] defines a Soft set as a parameterized own family of subsets of universe set in which eachelement is considered as a fixed of approximate factors of the Soft set. Onyeozil et al. [11] discussed numerousoperations on gentle matrices and their basic residences. In this studies paper, we studied an utility technique ofΓ(Gamma)-Soft sets in a hassle of decision-making hassle by way of taking an instance of choosing the bestTelevision with distinct parameters of various manufacturers.

2. PRELIMINARIES

2.1 Soft set :Let M be a preliminary Universal set and H be set of parameters. Suppose that P(M) denotes the power set of Mand A be a non- empty sub set of H. A pair (F, A) is referred to as a soft set over M, in which $F{:}A \rightarrow$P(M) ismapping.

2.2 Γ(Gamma)- Soft set:The triode set (F, A, Γ) is called a Γ- Soft set over the Universal set, M where (F, L, Γ) = { F(a, γ) : a ∈ L, γ ∈Γ} and F is a function considered as F : L X Γ → P(M X Γ) such that M be the Universal set, P(M X Γ) be the power set of M X Γ in which H and Γ(Gamma) be the sets of parameters attributes and L is the sub set of H.

2.3 Fuzzy soft set:Let M be the Universal set, H be the set of parameters and A ⊆ H. Also let IM denote the set of all fuzzy sub sets ofM. Then the pair (F, A) is called a fuzzy soft set over M, where F is a mapping from A to IM.

2.4 Γ(Gamma)–Soft sub set: Let (F, AX Γ) and (G, BXΓ) are two Γ(Gamma)–Softs over the same universe set if (F, AXΓ) is said to sub set of (G, BXΓ) if A X Γ ⊆ B X Γ and for every F (a, γ) ⊆ F (b, γ) ∀ (a, γ) ∈*A*X Γ and (b, γ) ∈ BX Γ that is (F, AXΓ) ⊆(G, BXΓ).

2.5 Let (F, AX Γ) and (G, BXΓ) are two Γ(Gamma)–Softs over the same universe set The "AND" operation between two Γ(Gamma)–Softs is denoted by (F, AXΓ) Λ (G, BXΓ), it is defined by (F, AXΓ) Λ (G, BXΓ) = (H, (AΛB)XΓ) = H((a Λ b), γ) = F (a, γ) ∩G (b, γ) ∀ ((aΛb), γ) ∈(AΛB)XΓ.

2.6 Let (F, AX Γ) and (G, BXΓ) are two Γ(Gamma)–Softs over the same universe set The "OR" operation between two Γ(Gamma)–Softs is denoted by (F, AXΓ) V (G, BXΓ), it is defined by (F, AXΓ) V (G, BXΓ) = (H, (AVB)XΓ) = H((aVb), γ) = F (a, γ) ∪ G (b, γ) ∀ ((aVb), γ) ∈ (AVB)XΓ.

2.7 Fuzzy Γ(Gamma)- soft set: Let MXΓ be the Universal set and P(MXΓ) be the power set of MXΓ. Let H and Γ(Gamma) be the sets of parameters attributes. Also let I(MXΓ) denote the set of all fuzzy sub sets of MXΓ. The set (F, AXΓ) is called a Fuzzy Γ(Gamma)-Soft set over the Universal set, MXΓ is (F, AXΓ) = { F(a, γ) : a ∈ L, γ ∈ Γ} where F is a mapping given by F : A X Γ → I(MXΓ) and A is the sub set of H.

Example 1: Let MXΓ = {(T1, γ_1), (T2, γ_1), (T3, γ_1), (T4, γ_1), (T5, γ_1), (T1, γ_2), (T2, γ_2), (T3, γ_2), (T4, γ_2), (T5, γ_2)} be the set of Televisions with different brands also LX Γ = {(a_1, γ_1), (a_2, γ_1), (a_3, γ_2), (a_4, γ_2), (a_5, γ_1)}and OX Γ = {(a_1, γ_1), (a_2, γ_1), (a_3, γ_2), (a_4, γ_2), (a_5, γ_1), (b_1, γ_2), (b_2, γ_1)} where (a_1, γ_1) denotes "Smart television with brand-1", (a_2, γ_1) denotes "Flat television with brand-1", (a_3, γ_2) denotes "Curved television with brand-2", (a_4, γ_2) denotes "Large Screen television with brand-2", (a_5, γ_1)denotes "Woofer television with brand-1", (b_1, γ_2) denotes "Costly television with brand-2", (b_2, γ_1) denotes "Cheap television with brand-1". Let (F, LX Γ) and (G, OXΓ) are two Γ(Gamma)–Softs over MXΓ.

We have

F(a_1, γ_1) = { ((T1, γ_1),0.4), ((T2, γ_1),0.6),((T3, γ_1),0.3), ((T4, γ_1),0.8), ((T5, γ_1),0.9), ((T1, γ_2),0.1), ((T2, γ_2),0.2) }

F(a_2, γ_1) = { ((T1, γ_1),0.5), ((T2, γ_1),0.8),((T3, γ_1),0.1), ((T5, γ_1),1), ((T1, γ_2),0.2) }

F(a_3, γ_2) = { ((T4, γ_1),0.4), ((T5, γ_1),0.6), ((T5, γ_2),0.7), ((T4, γ_2),0.4) }

F(a_4, γ_2) = { ((T4, γ_1),0.4), ((T5, γ_1),0.6), ((T5, γ_1),1), ((T1, γ_2),0.2) }

F(a_5, γ_1) = { ((T1, γ_1),0.6), ((T2, γ_1),0.2),((T3, γ_1),0.7), ((T4, γ_1),1), ((T5, γ_1),0.2) }

G(a_1, γ_1) = { ((T1, γ_1),0.4), ((T2, γ_1),0.6),((T3, γ_1),0.3), ((T4, γ_1),0.8), ((T5, γ_1),0.9), ((T1, γ_2),0.1), ((T2, γ_2),0.2) }

G(a_2, γ_1) = { ((T1, γ_1),0.5), ((T2, γ_1),0.8),((T3, γ_1),0.1), ((T5, γ_1),1), ((T1, γ_2),0.2) }

G(a_3, γ_2) = { ((T4, γ_1),0.4), ((T5, γ_1),0.6), ((T5, γ_2),0.7), ((T4, γ_2),0.4) }

G(a_4, γ_2) = { ((T4, γ_1),0.4), ((T5, γ_1),0.6), ((T5, γ_1),1), ((T1, γ_2),0.2) }

G(a_5, γ_1) = { ((T1, γ_1),0.6), ((T2, γ_1),0.2),((T3, γ_1),0.7), ((T4, γ_1),1), ((T5, γ_1),0.2) }

G(b_1, γ_2) = { ((T4, γ_1),0.4), ((T2, γ_1),0.8),((T3, γ_1),0.1), ((T5, γ_1),1), ((T1, γ_2),0.2) }

G(b_2, γ_1) = { ((T2, γ_1),0.4), ((T5, γ_1),0.6), ((T5, γ_1),1), ((T3, γ_2),0.2) }

Clearly (F, AXΓ) ⊆ (G, BXΓ).

METHODOLOGY

3.1 Let (F, AX Γ) and (G, BXΓ) are two Γ(Gamma)–Fuzzy Soft sets over the same universe set The "AND" operation between two Γ(Gamma)–Fuzzy Softs is denoted by (F, AXΓ) Λ (G, BXΓ), it is defined by (F, AXΓ) Λ (G, BXΓ) = (H, (AΛB)XΓ) = H((a Λ b), γ) = F (a, γ) ∩ G (b, γ) ∀ ((aΛb), γ) ∈ (AΛB)XΓ

Tabulation of data from the Γ(Gamma)–Fuzzy Softs as per following procedure.

In comparison table the number of rows and columns are equal. Along the rows we should enter the elements of universe set and along column enter elements of parameters set. The entries in the table Cij, i = 1,2,3….. and j =

1,2,3.....are the number of parameters for which the membership value of elements in Universal set exceeds or equal to the membership

value of Universal set elements.

The row sum (s_i) of Universal set elements is denoted t_i and it is evaluated by $t_i = \sum_{j=1}^{n} Cij$ and $s_j = \sum_{i=1}^{n} Cij$

The score of Universal set elements $Y_i = s_j.-t_i$

The following Algorithm results the identification of an item based on different choice input data characterised by different parameters with different brands.

3.2 Algorithm

1. Input the Γ(Gamma)–Fuzzy Soft set data
2. Input the parameters data with different choices along with different brands
3. Evaluate the resultant Γ(Gamma)–Fuzzy Soft from the Γ(Gamma)–Fuzzy soft sets and take the data into tabular form
4. Construct the Comparison-table of the Γ(Gamma)–Fuzzy Soft and calculate s_j and $t_i \forall i$.
5. Calculate the score of Universal set elements
6. Decision can be done $Y_k = \min Y_i$

4. Γ(GAMMA)–FUZZY SOFT APPLICATION ON DECISION MAKING PROBLEM

Application:

Let MXΓ = { (u_1, γ_1), (u_2, γ_1), (u_3, γ_1), (u_4, γ_2), (u_5, γ_2) } be the set of cars with two brands, i.e., { u_1, u_2, u_3, u_4, u_5 } are the cars with two brands { γ_1, γ_2 } . These cars can be selected based on colour, feature and price. The parameters set H = { (blue, γ_1), (blue, γ_2), (green, γ_1), (green, γ_2), (red, γ_2), (red, γ_1), (pink, γ_2), (pink, γ_1), (Auto gear, γ_1), (Auto gear, γ_2), (Dual mode, γ_1), (Dual mode, γ_2), (Turbo engine, γ_2), (Turbo engine, γ_1), (costly, γ_1), (cheap, γ_1), (costly, γ_2), (cheap, γ_2) }.

We are assuming three Γ(Gamma)–Fuzzy Soft sets named (F, AXΓ), (G, BXΓ) and (H, CXΓ) in which the set (F, AXΓ) describes "cars with colour complexion in two brands", the set (G, BXΓ) describes "cars with feature complexion in two brands" the set (H, CXΓ) describes "cars with different price in two brands".

The problem is to identify to select the best one out of different opinions of the customers. Therefore different opinions can be computed by these Γ(Gamma)–Fuzzy Soft sets as follows. The Γ(Gamma)–Fuzzy Soft set, (F, AXΓ) is defined as (F, AXΓ) = { cars with blue colour = { $(u_1, \gamma_1)/0.5$, $(u_2, \gamma_1)/0.6$, $(u_3, \gamma_1)/0.3$, $(u_4, \gamma_1)/0.7$, $(u_5, \gamma_1)/0.1$, $(u_1, \gamma_2)/0.4$, $(u_2, \gamma_2)/0.4$, $(u_3, \gamma_2)/0.6$, $(u_4, \gamma_2)/0.1$, $(u_5, \gamma_2)/0.8$ }, cars with green colour = { $(u_1, \gamma_1)/0.2$, $(u_2, \gamma_1)/0.5$, $(u_3, \gamma_1)/0.8$, $(u_4, \gamma_1)/0.9$, $(u_5, \gamma_1)/0.3$, $(u_1, \gamma_2)/0.4$, $(u_2, \gamma_2)/0.2$, $(u_3, \gamma_2)/0.4$, $(u_4, \gamma_2)/0.7$, $(u_5, \gamma_2)/0.6$ }, cars with red colour = { $(u_1, \gamma_1)/0.6$, $(u_2, \gamma_1)/0.2$, $(u_3, \gamma_1)/0.8$, $(u_4, \gamma_1)/0.9$, $(u_5, \gamma_1)/0.3$, $(u_1, \gamma_2)/0.3$, $(u_2, \gamma_2)/0.7$, $(u_3, \gamma_2)/0.4$, $(u_4, \gamma_2)/0.6$, $(u_5, \gamma_2)/0.8$ }, cars with pink colour = { $(u_1, \gamma_1)/0.2$, $(u_2, \gamma_1)/0.5$, $(u_3, \gamma_1)/0.6$, $(u_4, \gamma_1)/0.4$, $(u_5, \gamma_1)/0.8$, $(u_1, \gamma_2)/0.4$, $(u_2, \gamma_2)/0.3$, $(u_3, \gamma_2)/0.8$, $(u_4, \gamma_2)/0.2$, $(u_5, \gamma_2)/0.1$ }, cars with auto gear = { $(u_1, \gamma_1)/0.6$, $(u_2, \gamma_1)/0.9$, $(u_3, \gamma_1)/0.2$, $(u_4, \gamma_1)/0.5$, $(u_5, \gamma_1)/0.3$, $(u_1, \gamma_2)/0.7$, $(u_2, \gamma_2)/0.9$, $(u_3, \gamma_2)/0.3$, $(u_4, \gamma_2)/0.4$, $(u_5, \gamma_2)/0.5$ }, cars with dual mode = { $(u_1, \gamma_1)/0.3$, $(u_2, \gamma_1)/0.1$, $(u_3, \gamma_1)/0.7$, $(u_4, \gamma_1)/0.2$, $(u_5, \gamma_1)/0.9$, $(u_1, \gamma_2)/0.2$, $(u_2, \gamma_2)/0.2$, $(u_3, \gamma_2)/0.3$, $(u_4, \gamma_2)/0.4$, $(u_5, \gamma_2)/0.5$ }, cars with turbo engine = { $(u_1, \gamma_1)/0.4$, $(u_2, \gamma_1)/0.6$, $(u_3, \gamma_1)/0.3$, $(u_4, \gamma_1)/0.5$, $(u_5, \gamma_1)/0.2$, $(u_1, \gamma_2)/0.7$, $(u_2, \gamma_2)/0.6$, $(u_3, \gamma_2)/0.4$, $(u_4, \gamma_2)/0.7$, $(u_5, \gamma_2)/0.9$ }, cars with cheap price = { $(u_1, \gamma_1)/0.5$, $(u_2, \gamma_1)/0.3$, $(u_3, \gamma_1)/0.1$, $(u_4, \gamma_1)/0.9$, $(u_5, \gamma_1)/0.8$, $(u_1, \gamma_2)/0.6$, $(u_2, \gamma_2)/0.1$, $(u_3, \gamma_2)/0.4$, $(u_4, \gamma_2)/0.2$, $(u_5, \gamma_2)/0.4$ }, cars with costly price = { $(u_1, \gamma_1)/0.4$, $(u_2, \gamma_1)/0.6$, $(u_3, \gamma_1)/0.3$, $(u_4, \gamma_1)/0.5$, $(u_5, \gamma_1)/0.2$, $(u_1, \gamma_2)/0.2$, $(u_2, \gamma_2)/0.9$, $(u_3, \gamma_2)/0.4$, $(u_4, \gamma_2)/0.2$, $(u_5, \gamma_2)/0.4$ }

After performing "AND, OR" and the operations on the two Γ(Gamma)–Fuzzy Soft sets named (F, AXΓ), (G, BXΓ) over the same universal set a new Γ(Gamma)–Fuzzy Soft set will obtained.

Table-4.1

U	a_1 = Blue	a_2 = Green	a_3 = Red	a_4 = Pink
(u_1, γ_1)	0.5	0.2	0.6	0.2
(u_2, γ_1)	0.6	0.5	0.2	0.5
(u_3, γ_1)	0.3	0.8	0.8	0.6
(u_4, γ_1)	0.7	0.9	0.9	0.4
(u_5, γ_1)	0.1	0.3	0.3	0.8
(u_1, γ_2)	0.4	0.4	0.3	0.4
(u_2, γ_2)	0.4	0.2	0.7	0.3
(u_3, γ_2)	0.6	0.4	0.4	0.8

(u_4, γ_2)	0.1	0.7	0.6	0.2
(u_5, γ_2)	0.8	0.6	0.8	0.1

Table-4.2

U	b_1= Auto gear	b_2= Dual mode	b_3=Turbo engine
(u_1, γ_1)	0.6	0.3	0.4
(u_2, γ_1)	0.9	0.1	0.6
(u_3, γ_1)	0.2	0.7	0.3
(u_4, γ_1)	0.5	0.2	0.5
(u_5, γ_1)	0.3	0.9	0.2
(u_1, γ_2)	0.7	0.2	0.7
(u_2, γ_2)	0.9	0.2	0.6
(u_3, γ_2)	0.3	0.2	0.4
(u_4, γ_2)	0.4	0.4	0.7
(u_5, γ_2)	0.5	0.5	0.9

Table-4.3

U	c_1= Cheap	c_2= Costly
(u_1, γ_1)	0.5	0.4
(u_2, γ_1)	0.3	0.6
(u_3, γ_1)	0.1	0.3
(u_4, γ_1)	0.9	0.5
(u_5, γ_1)	0.8	0.2
(u_1, γ_2)	0.6	0.2
(u_2, γ_2)	0.1	0.9
(u_3, γ_2)	0.4	0.4
(u_4, γ_2)	0.2	0.2
(u_5, γ_2)	0.4	0.4

By performing AND operation between Γ(Gamma)–Fuzzy Soft sets (F, AXΓ), (G, BXΓ) we get the set of parameters, (F, AXΓ) Λ (G, BXΓ) = { p_{ij} / p_{ij} = ai Λ bj } for i = 1,2,3...10 and j = 1,2,3...10. The resultant Γ(Gamma)–Fuzzy Soft set is denoted by (K, DXΓ) and is given in the following table.

Table-4.4

U	P_{11}	P_{12}	P_{13}	P_{22}	P_{23}	P_{32}	P_{41}	P_{42}
(u_1, γ_1)	0.5	0.3	0.4	0.2	0.2	0.3	0.2	0.2
(u_2, γ_1)	0.6	0.1	0.6	0.1	0.5	0.1	0.5	0.1
(u_3, γ_1)	0.5	0.3	0.2	0.7	0.3	0.7	0.2	0.6
(u_4, γ_1)	0.6	0.2	0.5	0.2	0.5	0.2	0.4	0.2
(u_5, γ_1)	0.1	0.1	0.1	0.3	0.2	0.3	0.3	0.8
(u_1, γ_2)	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2
(u_2, γ_2)	0.4	0.2	0.4	0.2	0.2	0.2	0.3	0.2
(u_3, γ_2)	0.3	0.2	0.4	0.2	0.4	0.2	0.3	0.2
(u_4, γ_2)	0.1	0.1	0.1	0.4	0.7	0.4	0.2	0.2
(u_5, γ_2)	0.5	0.5	0.8	0.5	0.6	0.5	0.1	0.1

By using the Algorithm the solution of our problem is given as follows.

Consider the Γ(Gamma)–Fuzzy Soft sets defined above (F, AXΓ), (G, BXΓ) and (H, CXΓ). Suppose that M = { P_{11} Λ c_1, P_{12} Λ c_1, P_{13} Λ c_1, P_{22} Λ c_2, P_{23} Λ c_2, P_{32} Λ c_2, P_{12} Λ c_2, P_{12} Λ c_1 } be the set of choice parameters of the customers. On the basis of this parameter set we can take decision from the availability set U. The tabular representation of resultant Γ(Gamma)–Fuzzy Soft set (S, NXΓ) is given as follows

Table-4.5

U	P_{11} Λ c_1	P_{12} Λ c_1	P_{13} Λ c_1	P_{22} Λ c_2	P_{23} Λ c_2	P_{32} Λ c_2	P_{41} Λ c_2	P_{42} Λ c_1
(u_1, γ_1)	0.5	0.3	0.4	0.3	0.2	0.3	0.2	0.2
(u_2, γ_1)	0.3	0.1	0.3	0.1	0.5	0.1	0.5	0.1
(u_3, γ_1)	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.1

(u_4, γ_1)	0.6	0.2	0.5	0.2	0.5	0.2	0.4	0.2
(u_5, γ_1)	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.8
(u_1, γ_2)	0.4	0.2	0.4	0.2	0.2	0.2	0.2	0.2
(u_2, γ_2)	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.1
(u_3, γ_2)	0.3	0.2	0.4	0.2	0.4	0.2	0.3	0.2
(u_4, γ_2)	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
(u_5, γ_2)	0.4	0.4	0.4	0.1	0.4	0.4	0.1	0.1

Table-4.6

The comparison table of the above Γ(Gamma)-Soft set

U	(u_1, γ_1)	(u_2, γ_1)	(u_3, γ_1)	(u_4, γ_1)	(u_5, γ_1)	(u_1, γ_2)	(u_2, γ_2)	(u_3, γ_2)	(u_4, γ_2)	(u_5, γ_2)
(u_1, γ_1)	8	7	7	7	7	7	7	7	7	7
(u_2, γ_1)	6	8	5	7	3	5	7	5	7	2
(u_3, γ_1)	0	4	8	0	3	0	3	0	3	3
(u_4, γ_1)	7	7	7	8	6	7	7	7	7	7
(u_5, γ_1)	0	4	4	0	8	0	4	3	3	3
(u_1, γ_2)	6	5	7	4	6	8	7	7	7	7
(u_2, γ_2)	0	4	4	0	3	0	8	0	3	3
(u_3, γ_2)	6	6	5	7	3	5	7	8	7	2
(u_4, γ_2)	0	4	4	0	3	0	4	0	8	3
(u_5, γ_2)	6	5	7	4	6	7	7	7	7	8

Table-4.7

The following table which shows the row sum, column sum and the score of each (u_i, γ_i)

U	Row sum (t_i)	Column sum (s_i)	$Y_i = s_j - t_i$
(u_1, γ_1)	71	127	56
(u_2, γ_1)	55	96	41
(u_3, γ_1)	24	44	20
(u_4, γ_1)	70	126	56
(u_5, γ_1)	29	54	25
(u_1, γ_2)	64	117	53
(u_2, γ_2)	25	46	21
(u_3, γ_2)	56	100	44
(u_4, γ_2)	26	48	22
(u_5, γ_2)	64	117	53

From the above table it is clear that the minimum value is at (u_3, γ_1).There fore the decision can take at (u_3, γ_1).

CONCLUSION.

In this paper we present an application of Γ(Gamma)–Fuzzy Soft set to identify the best selection out of available objects with brand. By using the algorithm we can construct the comparison table from the resultant Γ(Gamma)–Fuzzy Soft set and final decision concluded based on the minimum score computed from the comparison table.

REFERENCES

[1] D. Molodtsov, 'Soft Set Theory First Results', Computers Math. Applic. 37, p.p 19-31, 1999.

[2] P.K. Maji and A.R. Roy, 'An Application of Soft sets in a decision making problem', Computers and Mathematics with Applications, 44, 2002.

[3] A.R. Roy and P.K. Maji, 'A fuzzy soft set theoretic approach to decision making problems', Journal of Computational and Applied Mathematics, 203, 2007.

[4] B. Ahmad and AtharKharal, 'On Fuzzy Soft sets', Advances in Fuzzy systems, 2009.

[5] ArindamChaudhuri, Kajal De, Dipak Chatterjee 'Solution of decision making problems using Fuzzy Soft relations', International Journal of Information Technology, 15(1), 2009.

[6] A. Kalaichelvi and P. HarithaMalini, 'Application of Fuzzy Soft sets to Investment decision making problem, International journal of Mathematical Sciences and Applications, 1 (3), 2011.

[7] P.K. das and R. Borgohain, 'An Application of Fuzzy Soft set in Multi criteria decision making problem', International Journal of Computer Applications, 38(12), 2012.

[8] A.M Ibrahim, A.O. Yusuf. 'Development of Soft set theory', American International journal of contemporary research', 2 (9), p.p 205-210, 2012 .

[9] Krishna Gogoi, AlockKr.Dutta and Chandra Chutia, 'Application of Fuzzy soft set theory in day to day problems', International journal of computer Applications', 8(7), p.p 27-31, 2014.

[10] Said Broumi, FlorentinSmarandache and Pabitra Kumar Maji. 'IntutionisticNeutrosphic Soft set over rings', Mathematics and Statistics, 2 (3), p.p. 120-126, 2014.

[11] Onyeozili, I. A., Gwary T. M., 'A Study Of The Fundamentals Of Soft Set Theory', international journal of scientific & technology research, 3, p.p 132-143, 2014.

[12] Pabitra Kumar Maji, 'Weighted Neutrosophic Soft sets approacg in a Multicriteria decision making problems', Journal of New theory, 5, 2015.

[13] Palash Dutta and BulendraLimboo, ' Bell-Shaped Fuzzy Soft sets and their Application in Medical Diagnosis, Fuzzy Information and Engineering, 9, 2017.

[14] Renukadevi V. and Sangeetha G., A new decision making approach for winning strategy based on muti soft set logic, *Journal of Fuzzy Extension and Applications*. **1(**2), 2020

[15] Phaengtan K., Aimcharoen N., and Suebsan P., Partial averages of fuzzy soft sets in decision making problems, *Journal of Interdisciplinary Mathematics*. (2021) **24**, no. 4, 1035–1052

[16] Abdelfattah A. El-Atik, Radwan Abu-Gdairi, Arafa A. Nasef , SaeidJafari and Mohammed Badr "Fuzzy Soft Sets and Decision Making in Ideal Nutrition" Symmetry, 15(8), 2023