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# Analysing the Performance of Women Gym-Goers Using Generalized Intuitionistic Fuzzy Soft Sets

**Research Article***

**J.Jon Arockiaraj[1] and S.Sharmila[1]**

1 Department of Mathematics, St. Joseph's College of Arts & Science, Manjakuppam, Cuddalore (Tamil Nadu), India.

**Abstract:** This paper introduces the concept of generalized intuitionistic fuzzy soft sets for solving multi attribute decision making problem. Generalized intuitionistic fuzzy soft set is the extension of intuitionistic fuzzy soft sets. In this paper, we are analysing the performance of women gym -goers and also finding the best gym-goer who is reducing her weight in a particular month by using generalized intuitionistic fuzzy soft set theory.

**Keywords:** Fuzzy soft sets, Generalized fuzzy soft sets, Generalized intuitionistic Fuzzy soft sets and multi criteria decision making problem.



## 1. Introduction

In a real world, we have to handle situations involving uncertainity, impression and vagueness. Moreover the great deal of data involved in economics, engineering, medical science and other fields are not always rich and includes all kinds of uncertainity. In recent years researchers have become interested to deal with the complexity of uncertain data. There are a wide range of theories such as probability theory, fuzzy set theory, vague set theory which are considered as mathematical approaches to modelling vagueness [1]. In 1999 D. Molodtsov set up the basic theory of soft sets which can deal with uncertain, fuzzy, unclear information [3]. This theory has proven useful in many different fields such as the Smoothness of functions, Game theory, Operations research, Riemann integration, Perron integration, Probability theory and Measurement theory. Intuitionistic fuzzy set was introduced by K.T.Atanassov [2], [5] as an extensions of the standard fuzzy sets. Later Maji et al. [6], [7] introduced the concept of intuitionistic fuzzy soft set.

**Definition 1.1.** *Let U be an initial set and E be a set of parameters. Let P(U) denotes the power set of U, and let $A \subset E$. A pair (F,A) is called a soft set [3] over U, where F is a mapping given by $F : A \to P(U)$.*

**Definition 1.2.** *Let $U = \{x_1, x_2, \dots, x_n\}$ be the universal set of elements and $E = \{e_1, e_2, e_3, \dots, e_m\}$ be the universal set of parameters. Let $F : E \to I^U$ and be a fuzzy subset of E, ie., $\mu : E \to I = [0, 1]$, where $I^U$ is the collection of all fuzzy subsets of U. A pair $(F, \mu)$ is called the fuzzy soft set, FSS over U. It is denoted by $F_\mu(e) = (F(e), \mu(e))$ [9].*

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**Example 1.3.** *Suppose a fuzzy soft set (F, E) describes the attractiveness of sarees with respect to the given parameters, which the teachers are going to wear.* $U = \{s_1, s_2, s_3, s_4, s_5\}$ *which is the set of all sarees under consideration. Let* $I^U$ *be the collection of all fuzzy subsets of U. Also let E ={*$e_1$*= colorful,* $e_2$*= bright,* $e_3$*=cheap,* $e_4$*= dull}. Let*

$F(e_1) = \{ s_1/0.5, s_2/0.9, s_3/0.0, s_4/0.0, s_5/0.0\}$,

$F(e_2) = \{s_1/1.0, s_2/0.8, s_3/0.0, s_4/0.0, s_5/0.0\}$,

$F(e_3) = \{s_1/0.0, s_2/0.0, s_3/0.0, s_4/0.6, s_5/0.0\}$,

$F(e_4) = \{s_1/0.0, s_2/1.0, s_3/0.0, s_4/0.0, s_5/0.3\}$

*Then the family* $\{ F(e_i), i = 1,2,3,4\}$ *of* $I^U$ *is a fuzzy soft set (F, E).*

**Definition 1.4.** *Let U be an initial universal set and let E be the set of parameters. Let P(U) denotes the set of all intuitionistic fuzzy sets of U. A pair (F,A) is called an intuitionistic fuzzy soft set (IFSS) over U if F is a mapping given by* $F : A \to P(U)$.

**Example 1.5.** *Suppose that there are three students in the universe given by* $U = \{s_1, s_2, s_3\}$ *and* $E = \{e_1, e_2, e_3\}$ *where* $e_1$*-excellent ,* $e_2$*-good,* $e_3$*-average.*

$F(e_1) = \{( s_1, 0.5,0.2),( s_2, 0.9, 0.1), (s_3, 0.4,0.3)\}$

$F(e_2) = \{( s_1, 0.3, 0.2), (s_2, 0.9, 0.7), (s_3, 0.5, 0.2)\}$

$F(e_3) = \{(s_1, 0.4, 0.9), (s_2, 0.3, 0.7), (s_3, 0.5, 0.5)\}$

*Thus IF soft set is a parameterized family of all Intuitionistic fuzzy set of U.*

**Definition 1.6.** *Let (F, A) and (G, B) be two fuzzy soft sets [6] over (U, E). We say that (F, A) is intuitionistic fuzzy soft subset of (G, B) if*

1. $A \subset B$
2. *F(e) is an intuitionistic fuzzy subset of G(e)*

**Definition 1.7.** *Let (F, A) be a IFSS. The complement [6] of (F, A) is defined by* $(F, A)^c = (F^c, A)$ *where* $F^c : A \to P(U)$.

**Definition 1.8.** *The operators* $\wedge$ *and* $\vee$ *on* $(L_*, \leq_*)$ *are defined as follows:* $(x_1,x_2) \wedge (y_1, y_2) = (\min(x_1,y_1), \max((x_2,y_2))$ $(x_1,x_2) \vee (y_1, y_2) = (\max(x_1,y_1), \min((x_2,y_2)),\ \ for\ (x_1,x_2), (y_1, y_2) \in L_*$

**Definition 1.9.** *Let* $U = \{x_1, x_2, \ldots, x_n\}$ *be universal set and E be the set of parameters. The pair (U, E) is a soft universe. Let* $F : E \to P(U)$ *and* $\langle\mu, \delta\rangle$ *be intuitionistic fuzzy subset of E, i.e,* $\mu, \delta : E \to [0, 1]$*, where P(U) denotes the set of all IF sub sets of U. Let* $F_{\mu\delta}$ *be the mapping* $F_{\mu\delta} : E \to P(U) \times I^2$ *defined as follows :* $F_{\mu\delta}(e) = (F(e), \mu(e), \delta(e))$ *where* $F(e) \in P(U)$ *Then* $F_{\mu\delta}$ *is called fgeneralizedintuitionistic fuzzy soft set (GIFSS) over the soft set (U, E).*

Obviously, every intuitionistic fuzzy set has the form $(F(e), \mu(e), \delta(e)$ where $\mu(e) = 1, \forall e \in E$ and $\delta(e) = 0, \forall e \in E$. In short, for each parameter e, $F_{\mu\delta}(e)$ gives not only the extent to which each element in U belongs or not belongs to F(e) but also indicates how much such belonging possible or not.

**Example 1.10.** *Let U be the set of medicines under consideration given by* $U = \{m_1, m_2, m_3\}$ *and* $E = \{e_1, e_2, e_3\}$ *where* $e_1$*-fever,* $e_2$*-headache,* $e_3$*- cold. Let* $(\mu, \delta)$ *be intuitionistic fuzzy subset of E is defined as follows*

$\mu(e_1) = 0.2, \mu(e_2) = 0.4, \mu(e_3) = 0.9$ *and* $\delta(e_1) = 0.7, \delta(e_2) = (0.6), \delta(e_3) = 0.4$

$F_{\mu\delta}(e_1) = \{((m_1,0.5, 0.2), (m_2,0.9, 0.1), (m_3,0.4, 0.3)), (0.2, 0.7)\}$

$F_{\mu\delta}(e_2) = \{((m_1,0.3, 0.2), (m_2,0.9, 0.7), (m_3,0.5, 0.2)), (0.4, 0.6)\}$

$F_{\mu\delta}(e_3) = \{((m_1 0.4, 0.9), (m_2, 0.3, 0.7), (m_3, 0.5, 0.5)), (0.9, 0.4)\}$

*Then* $F_{\mu\delta}$ *is a GIFSS over (U,E). It can be represented as in tabular form also:*

| | $m_1$ | $m_2$ | $m_3$ |
|---|---|---|---|
| $e_1$ | (0.5,0.2) | (0.9,0.1) | (0.4,0.3) |
| $e_2$ | (0.3,0.2) | (0.9,0.7) | (0.5,0.2) |
| $e_3$ | (0.4,0.9) | (0.3,0.7) | (0.5,0.5) |
| $(\mu,\delta)$ | (0.2,0.7) | (0.4,0.6) | (0.9,0.4) |

**Definition 1.11.** *Let $F_{\mu\delta}$ and $G_{\alpha\beta}$ be two GIFSS over (U, E). If*

1. *$(\mu,\delta)$ is IF subset of $(\alpha,\beta)$*
2. *F(e) is also IF subset of G(e) $\forall\ e \in E$ then $G_{\alpha\beta}$ is a intuitionistic fuzzy soft subset of $F_{\mu\delta}$.*

**Definition 1.12.** *Let us define fuzzy t-norm t and fuzzy t-conorm s as $t(a,b) = ab$ and $s(a,b) = a+b-ab$ respectively. The fuzzy complement of n defined by $n(a) = 1-a$.*

**Definition 1.13.** *The IF t-norm, IF t-conorm and complement is given by $T(x,y) = (x_1y_1,\ x_2+y_2-x_2y_2)$, $S(x,y) = (x_1+y_1-x_1y_1,\ x_2y_2)$ and $N(x) = (x_2,\ 1-x_1)$.*

**Definition 1.14.** *Let $F_{\mu\delta}$ be a GIFSS over (U,E). The complement of $F_{\mu\delta}$ is defined by $(F_{\mu\delta})^c = H_{\vartheta\rho}$ where $(\vartheta(e), \rho(e)) = N(\mu(e), \delta(e))$ and $G(e) = N(F(e))\ \ \forall\ e \in E$.*

**Definition 1.15.** *Let $F_{\mu\delta}$ and $G_{\alpha\beta}$ be two GIFSS over (U,E). The union of these two GIFSS forms a new GFSS $F_{\mu\delta}\widetilde{\cup}G_{\alpha\beta} = H_{\gamma\varphi}$ and is defined by $H_{\gamma\varphi} : E \to P(U) \times I^2\ \forall\ e \in E$, $H_{\gamma\varphi}(e) = (H(e), \gamma(e), \varphi(e))$ where $H(e) = S(F(e), G(e))$, $\gamma(e) = S(\mu(e), \alpha(e))$, $\varphi(e) = S(\delta(e), \beta(e))$ and S is intuitionistic fuzzy t-conorm.*

**Definition 1.16.** *Let $F_{\mu\delta}$ and $G_{\alpha\beta}$ be two GFSS over (U, E). The intersection of these two GFSS forms a new GFSS $F_{\mu\delta}\widetilde{\cap}G_{\alpha\beta} = H_{\gamma\varphi}$ and is defined by $H_{\gamma\varphi} : E \to P(U) \times I^2\ \forall\ e \in E$, $H_{\gamma\varphi}(e) = (H(e), \gamma(e), \varphi(e)$, where $H(e) = T(F(e), G(e))$, $\gamma(e) = T(\mu(e), \alpha(e))$, $\varphi(e) = T(\delta(e), \beta(e))$ and T is intuitionistic fuzzy t-norm.*

**Example 1.17.** *Let us consider two GIFSS $F_{\mu\delta}$ and $G_{\alpha\beta}$ over (U,E).*

$F_{\mu\delta}(e_1) = \{((m_1,\ 0.7, 0.2), (\ m_2,\ 0.4, 0.3),\ (m_3, 0.3, 0.5)), (0.1, 0.8)\}$

$F_{\mu\delta}(e_2) = \{((m_1,\ 0.1, 0.8),\ (m_2,\ 0.2,\ 0.7),\ (m_3,\ 0.9, 0.1)), (0.6, 0.3)\}$

$F_{\mu\delta}(e_3) = \{((m_1 0.8, 0.1),\ (m_2,\ 0.5, 0.5),\ (m_3,\ 0.2, 0.7)),\ (0.8, 0.2)\}$ *and*

$G_{\alpha\beta}(e_1) = \{((m_1,\ 0.2, 0.7), (\ m_2,\ 0.3, 0.6),\ (m_3, 0.1, 0.8)), (0.1, 0.8)\}$

$G_{\alpha\beta}(e_2) = \{((m_1,\ 0.0, 0.8),\ (m_2,\ 0.1,\ 0.9),\ (m_3,\ 0.72, 0.13)), (0.3, 0.65)\}$

$G_{\alpha\beta}(e_3) = \{((m_1 0.71, 0.3),\ (m_2,\ 0.33, 0.65),\ (m_3,\ 0.1, 0.5)),\ (0.5, 0.5)\}$

Table 1: The union of two GIFSS is

| | $m_1$ | $m_2$ | $m_3$ |
|---|---|---|---|
| $e_1$ | (0.76,0.14) | (0.58,0.18) | (0.07,0.4) |
| $e_2$ | (0.1,0.64) | (0.28,0.63) | (0.97,0.01) |
| $e_3$ | (0.94,0.03) | (0.67,0.33) | (0.28,0.35) |
| $(\gamma,\ \varphi)$ | (0.19, 0.64) | (0.42, 0.2) | 0.9, 0.1) |

Table 2: The intersection of two GIFSS is

| | $m_1$ | $m_2$ | $m_3$ |
|---|---|---|---|
| $e_1$ | (0.14,0.76) | (0.12,0.72.) | (0.57,0.37) |
| $e_2$ | (0.0,0.96) | (0.02,0.97) | (0.65,0.22) |
| $e_3$ | (0.57,0.37) | (0.17,0.83) | (0.02,0.85) |
| $(\gamma,\varphi)$ | (0.01,0.96) | (0.18,0.76) | (0.4,0.6) |

## 2. Multi Criteria Decision Making Problem in GIFSS

Let $A = \{A_1, A_2, A_3, \ldots, A_m\}$ and $E = \{e_1, e_2, e_3, \ldots, e_n\}$. Assume that the characteristics of $A_i$ are by GIFSS as follows: $\{(e_1, F(e_1),\ \mu(e_1),\ \delta(e_1)), \ldots, (e_n, F(e_n),\ \mu(e_n),\ \delta(e_n))\}$ where $F(e_j) = (\alpha_{ij}, \beta_{ij})$, $i = 1, 2, \ldots, m$ and $\alpha_{ij}$ denotes the degree to which $A_i$ satisfies the criteria $e_j$ and $\beta_{ij}$ denotes the degree to which $A_i$ does not satisfies the criteria $e_j$. Also $\mu(e_j)$ denotes the possibility of the belongingness $F(e_j)$ and $\delta(e_j)$ deenotes the degree in which the belongingness $F(e_j)$ is not possible. Here note that $(\alpha_{ij}, \beta_{ij})$ and $(\mu(e_j, \delta(e_j)) \in L^*$.

Assume that there is a decision maker who wants to choose an alternative which satisfy the criteria

$$e_j, e_k, \ldots, e_p \;\; or \;\; e_s. \tag{1}$$

**Definition 2.1.** *The evaluation value for the alternatives $A_i$ satisfying the decision maker's requirement (1) as follows:*

$$E_v(A_i) = S(T_{j,k,l,\ldots,p}(\alpha_{iq}.\beta_{iq}), (\alpha_{sq}, \beta_{sq})) \tag{2}$$

*Taking $S$ as Intuitionistic fuzzy t-norm and $T$ as Intuitionistic Fuzzy t-conorm on $L^*$. The evaluation value can also be expressed as $E_v(A_i) = (\alpha_{Ai}, \beta_{Ai})$. Similarly the evaluation value for the set $(\mu, \delta)$ is expressed as $(\mu_{cd}, \delta_{cd})$.*

**Definition 2.2.** *The degree of suitably to which the alternativee satisfy the decision maker's requirement can be measured by the following score function $J_n \quad (n = 1, 2, 3, \ldots)$ or $J_\infty$.*

$$J_n E_v(A_i) = \alpha_{Ai} + \mu_{cd}\pi_{E_v(A_i)} + \mu_{cd}(1 - \mu_{cd} - \delta_{cd})\pi_{E_v(A_i)} + \cdots + \mu_{cd}(1 - \mu_{cd} - \delta_{cd})^{n-1}\pi_{E_v(A_i)} \tag{3}$$

$$J_\infty E_v(A_i) = \alpha_{Ai} + \frac{\mu_{cd}}{\mu_{cd} + \delta_{cd}}\pi_{E_v(A_i)} \tag{4}$$

*Where $\pi_{E_v(A_i)} = (1 - \alpha_{Mi} - \beta_{Mi})$ and $(\mu_{cd} + \delta_{cd} \neq 0$.*

**Algorithm:**

**Steps**

- Write the GIFSS $F_{\mu\delta}$ by using the data which we were collected.
- Rewrite the GIFSS $F_{\mu\delta}$ in tabular form.
- Calculate the evaluation value for each alternative $A_i$ and also for $(\mu, \delta)$ by using (2)
- Find the degree of suitability $J_n \; (n = 1, 2, 3, \ldots, \infty)$ to which the alternative $A_i$ for $i = 1, 2, 3 \ldots, m$ satisfy the decision maker's requirement by using (3) and (4)
- For any $i_0 \in \{1, 2, 3 \ldots, m\}$, if $J_n E_v(A_{i0})$ is the maximum value among all the values $J_n E_v(A_i)$ $(1, 2, 3, \ldots, m)$ then the alternative $A_{i0}$ is the best.
- Stop the procedure.

**Remark 2.3.** *If necessary, we can find $J_\infty E_v(A_i)$ to choose the best alternative. For any $J_n$ $(1, 2, 3, \ldots, \infty)$, we get the same alternative.*

## 3. Analysing the Performance of a Women Gym-goers Using Generalized Intuitionistic Fuzzy Soft Set

The importance of physical fitness cannot be emphasized enough. In today's society that is moving towards a more sedentary lifestyle's, there is a greater need than ever to increase the daily activity level to maintain both cardiovascular fitness and body weight. Generalized intuitionistic fuzzy soft set has been used to analyse the performance of five gym-goers and also finding the best performer among the five. Considering that the trainer of a particular gym X observing five women gym-goers for 6 months. His observation is made on the gym – goers based on some criteria. Assume some of the machines such as treadmill, recumbent cycle, elliptical trainer, jumping rope and flooring as criteria. Suppose $F_\mu$ is the generalized fuzzy soft set representing the performance of five women gym-goers at a particular gym X as

$X = \{g_1, g_2, g_3, g_4, g_5\}$ and

$E = \{e_1, e_2, e_3, e_4, e_5\}$ are the set of parameters indicating the machines in which the goers workout.

Let us consider $A = \{e_1, e_2, e_3, e_4, e_5\} \subset E$ be the parameter to analyse the gym-goers. Where

$e_1$-treadmill

$e_2$-recumbent cycle

$e_3$-elliptical trainer

$e_4$-jumping rope

$e_5$-flooring.

Let $\mu : A \to I = [0,1]$ be a fuzzy subset of A defined by $\mu(e_1) = 0.3$, $\mu(e_2) = 0.7$, $\mu(e_3) = 0.5$, $\mu(e_4) = 0.9$, $\mu(e_5) = 0.8$ and $\vartheta(e_1) = 0.6$, $\vartheta(e_2) = 0.2$, $\vartheta(e_3) = 0.2$, $\vartheta(e_4) = 0.0$, $\vartheta(e_5) = 0.1$. Now consider the generalized fuzzy soft set $F_\mu$ as below

$F_{\mu\delta}(e_1) = \{(g_1, 0.2, 0.7), (g_2, 0.3, 0.5), (g_3, 0.0, 0.8), (g_4, 0.6, 0.0), (g_5, 0.7, 0.1), (0.3, 0.6)\}$

$F_{\mu\delta}(e_2) = \{(g_1, 0.4, 0.4), (g_2, 0.5, 0.3), (g_3, 0.7, 0.0), (g_4, 1.0, 0.0), (g_5, 0.1, 0.7), (0.7, 0.2)\}$

$F_{\mu\delta}(e_3) = \{(g_1, 0.3, 0.6), (g_2, 0.9, 0.0), (g_3, 1.0, 0.0), (g_4, 0.1, 0.5), (g_5, 0.7, 0.1), (0.5, 0.2)\}$

$F_{\mu\delta}(e_4) = \{(g_1, 1.0, 0.0), (g_2, 0.8, 0.1), (g_3, 0.3, 0.5), (g_4, 0.5, 0.2), (g_5, 0.1, 0.8), (0.9, 0.0)\}$

$F_{\mu\delta}(e_5) = \{(g_1, 0.1, 0.7), (g_2, 0.5, 0.4), (g_3, 0.3, 0.6), (g_4, 0.6, 0.2), (g_5, 0.8, 0.1), (0.8, 0.1)\}$

Writing the data in tabular form,

| | $e_1$ | $e_2$ | $e_3$ | $e_4$ | $e_5$ |
|---|---|---|---|---|---|
| $g_1$ | (0.2,0.7) | (0.4,0.4) | (0.3,0.6) | (1,0) | (0.1,0.7) |
| $g_2$ | (0.3,0.5) | (0.5,0.3) | (0.9,0.0) | (0.8,0.1) | (0.5,0.4) |
| $g_3$ | (0.0,0.8) | (0.7,0.0) | (1,0.0) | (0.3,0.5) | (0.3,0.6) |
| $g_4$ | (0.6,0.0) | (1,0.0) | (01,0.5) | (0.5,0.2) | (0.6,0.2) |
| $g_5$ | (0.7,0.1) | (0.1,0.7) | (0.7,0.1) | (0.1,0.8) | (0.8,0.1) |
| $(\mu, \delta)$ | (0.3,0.6) | (0.7,0.2) | (0.5,0.2) | (0.9,0.0) | (0.8,0.1) |

From the table and by using (1) we are finding the evaluation value for each $A_i$ and for $(\mu, \delta)$. Taking IF t-norm S as $\vee$ and IF t-conorm T as $\wedge$. We get

$E_v(A_1) = (0.2, 0.7)$

$E_v(A_2) = (0.5, 0.4)$

$E_v(A_3) = (0.3, 0.6)$

$E_v(A_4) = (0.6, 0.2)$

$E_v(A_5) = (0.8, 0.1)$

$E_v(\mu, \delta) = (0.8, 0.1)$. Here $(\mu_{cd}, \delta_{cd}) = (0.8, 0.1)$. Substitute the values $\mu_{cd}$, $\delta_{cd}$, $\alpha_{Ai}$ and $\beta_{Ai}$ in (3) and (4).

$J_1 E_v(A_1) = 0.2 + (0.8) = 0.28$

$J_1 E_v(A_2) = 0.5 + (0.8) = 0.58$

$J_1 E_v(A_3) = 0.3 + (0.8) = 0.38$

$J_1 E_v(A_4) = 0.6 + (0.8) = 0.76$

$J_1E_v(A_5) = 0.8 + (0.8) = 0.88.$

$$\max(J_1E_v(A_1),\ J_1E_v(A_2),\ J_1E_v(A_3),\ J_1E_v(A_4),\ J_1E_v(A_5)) = (0.28, 0.58, 0.38, 0.76, 0.88) = 0.88.$$

$J_2E_v(A_1) = 0.2 + (0.8)(0.1) + (0.8)(0.1) = 0.288$

$J_2E_v(A_2) = 0.5 + (0.8)(0.1) + (0.8)(0.1) = 0.588$

$J_2E_v(A_3) = 0.3 + (0.8)(0.1) + (0.8)(0.1) = 0.388$

$J_2E_v(A_4) = 0.6 + (0.8)(0.2) + (0.8)(0.1) = 0.776$

$J_2E_v(A_5) = 0.8 + (0.8)(0.1) + (0.8)(0.1) = 0.888$

$$\max(J_2E_v(A_1),\ J_2E_v(A_2),\ J_2E_v(A_3),\ J_2E_v(A_4),\ J_2E_v(A_5)) = (0.288, 0.588, 0.388, 0.776, 0.888) = 0.888.$$

Similarly,

$J_3E_v(A_1) = 0.2888$

$J_3E_v(A_2) = 0.5888$

$J_3E_v(A_3) = 0.3888$

$J_3E_v(A_4) = 0.7776$

$J_3E_v(A_5) = 0.8888$ and

$J_\infty E_v(A_1) = 0.2 + \frac{0.8}{0.9} = 0.2\overline{8}$

$J_\infty E_v(A_2) = 0.5 + \frac{0.8}{0.9} = 0.5\overline{8}$

$J_\infty E_v(A_3) = 0.3 + \frac{0.8}{0.9} = 0.3\overline{8}$

$J_\infty E_v(A_4) = 0.6 + \frac{0.8}{0.9} = 0.\overline{7}6$

$J_\infty E_v(A_5) = 0.8 + \frac{0.8}{0.9} = 0.8\overline{8}$

$$\max(J_\infty E_v(A_1),\ J_\infty E_v(A_2).\ J_\infty E_v(A_3),\ J_\infty E_v(A_4),\ J_\infty E_v(A_5)) = (0.2\overline{8}, 0.5\overline{8}, 0.3\overline{8}, 0.\overline{7}6, 0.\overline{8}) = 0.\overline{8}$$

Writing all the $J_n$'s for every players $(g_1, g_2, g_3, g_4, g_5)$ in tabular form.

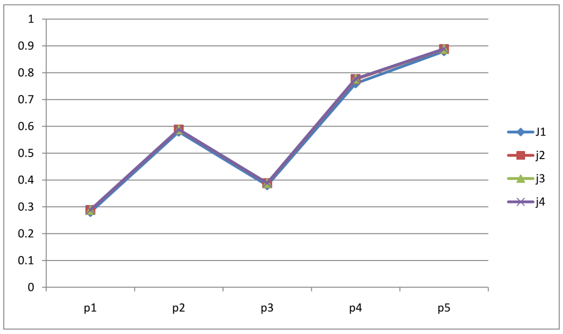
| | $J_1$ | $J_2$ | $J_3$ | $J_\infty$ |
|---|---|---|---|---|
| $g_1$ | 0.28 | 0.288 | 0.2888 | $0.2\overline{8}$ |
| $g_2$ | 0.58 | 0.588 | 0.5888 | $0.5\overline{8}$ |
| $g_3$ | 0.38 | 0.388 | 0.3888 | $0.3\overline{8}$ |
| $g_4$ | 0.76 | 0.776 | 0.7776 | $0.\overline{7}6$ |
| $g_5$ | **0.88** | **0.888** | **0.8888** | $\mathbf{0.\overline{8}}$ |

From the table, we note that $0.\overline{8} > 0.\overline{7}6 > 0.5\overline{8} > 0.3\overline{8} > 0.2\overline{8}$ corresponding to the gym- goers $g_5 > g_4 > g_2 > g_3 > g_1$. It shows that $g_5$ has the highest value. We conclude that $g_5$ has worked out well at the gym and lost her weight soon when compared with others.

## 4. Conclusion

In this paper, we have applied generalized intuitionistic fuzzy soft set with the parameters treadmill, recumbent cycle. elliptical trainer, jumping rope and flooring to analyse the performance of women gym-goers and also finding the best women gym-goer among five women gym-goers. Based on the parameters, we have got $g_5$ as the best performer. We hope that this method will be useful in decision making problem.

**Graphical representation :**

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