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Choice of an Outdoor Game by mixed one Parametric IF Measures

Anita Singla[1*], Vinod Kumar[1] and Rupa Rani Sharma[2]
[1]Department of Mathematics, Guru Kashi University, Bathinda, Punjab.
[2]Department of Applied Sciences, G.L. Bajaj Institute of Technology and Management, Greater Noida, India.

Abstract

Sports are considered not only to give pleasure to players, but the game must have some positive values. Games are attractive because the game played usually consider the interesting user interface and affect the human emotion also. One of the most important benefits for playing games is that the development of the human brain can be done. The physical fitness of the player is another important benefit of playing games (outdoor). The game itself is a system in which players are involved regularly and the prevailing culture in it, also the player interacts with the system. The success or failure of any team lies in the abilities and skills of the players that enclose the team. The process of game selection and team formation in multi-player sports is a complex problem where the ultimate success is determined by how the group of players forms an effective team. In general, the selection of the game and formation of the team for outdoor games are mainly judgments made by the influencing factors. An analytical model has developed to select an outdoor game by keeping the influencing factors in mind. In the whole analysis process, we propose two phase frameworks. For selection of game and player who want to play the game (outdoor) according to the game strategies and his interest. A case study is used to demonstrate the performance of the proposed approach.

Keywords: Intuitionistic fuzzy sets, Max-min-max criteria, Renyi's measure, Arimoto measure, Outdoor games

Introduction

Outdoor games have become increasingly popular over the decades. At the same time, expectations of the people have been growing for the quality of games. The increasing challenges and complexity of outdoor games are making sport policies and rules more

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difficult for the players. Therefore, we develop a decision support scheme which can be used in various decision-making problems. These decisions are made under some situations and follow some conditions such as socioeconomic status, demographic characteristics etc. the accuracy of decision support scheme helps players to select one or more outdoor game after studying the various uncertain influencing factors. Intuitionistic fuzzy relation will also play an important role. A decision maker is frequently encountered with fuzzy constraints, fuzzy maximization with utility concept and fuzziness about the state of competitors. There are many decision-making situations where we can't process the contained information in a quantitative form but which may need to accessed in qualitative form. The decision maker studies the various alternative factors in order to achieve the desired goals. Decision makers often make their decisions under risk and under fuzzy and intuitionistic fuzzy information system. So, the best strategy is chosen by the investigator for getting the better output.

Games, sports and physical activities are found in early human history. These appear to be universal features of culture, both present and past. Games play an important role mainly in the developing countries and also play key role in community. Sports are essential for the physical and mental welfare of the society. It keeps people healthy and fit and also improves the immunity. People who are involved in games and sports tend to feel fresh, active and social. A sport is a game in which the players do some physical activities according to specific rules and compete against each other. At last, we can say that with the help of sports and games, it is possible to attain the spirit of discipline and brotherhood.

There are so many games which are played through the whole world. In the present era the selection of an outdoor game is not an easy task for a player after following the influencing factors. Li et. al. [2004] gave a agent based game design by using fuzzy logic. Siddik Karo [2018] studied the fuzzy logic as a decision support system for finding the best athletes. Hristi and Arnold [2013] applied fuzzy logic in sports and did a case study in the field of strength training. Amir Barhoi [2017] applied the fuzzy set theory for the selection of good players og Volleyball. Oderanti [2013] deriver fuzzy inference game approach in business and market competitions. Farzad et. al. [2019] designed a model to develop local and native games by using fuzzy analytical hierarchy process. Madzid et. al. [2013] derived a fuzzy inference system to select player in multi-player sports. Jishu and Shankar [2018] did the solution of matrix games with generalized trapezoidal fuzzy payoffs. Abdiansah et. al. [2014] did implementation on enemy speed control to raise player engagement with use of fuzzy logic. Princeet.al.[2015]applied some parametric entropies in intuitionistic fuzzy set theory for solving some decision-making problems.

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Applied Technique

The present research has developed in terms of presenting a model. Explanatory nature of research and analytical research has been used to find the solution of the study. The process of modeling has been derived from intuitionistic fuzzy set theory and has presented in the form of tables. The methodology of correct research has conducted through the qualitative method. Some approaches have also applied for making the calculation easy. At last, a model in intuitionistic fuzzy set theory has applied after examining the status of games and factors, appropriate for the selection of these games. The whole study has completed in the form of cross tables. The procedure has listed in the steps below:

1. An intuitionistic fuzzy relation has been shownbetween the players and factors that influence the selection of game with assigned degree of membership and non-membership function in the form of table.
2. Again, an intuitionistic fuzzy relation is considered between the affecting factors and various outdoor games in table form.
3. Then maximum of the minimum value and minimum of the maximum value approach is applied on both the tables similar to matrix multiplication.
4. Finally on e parametric entropy functions are applied as intuitionistic fuzzy measures for getting the results.

The lowest value from all the values will be considered. If there is any similarity in values select both.

Intuitionistic Fuzzy Behaviour

Most of the social sciences problems are built on Boolean logical framework. But this concept is not applicable in many of the conceptualizations and observations about this phenomenon especially in those where exact values are not known. Fuzzy set theory and generalized fuzzy set theory is one way to address this problem because degree of membership function and non-membership function is used in these. Fuzzy sets and its generalization mainly work on qualitative aspects of decision-making problems in which focus is on uncertainties with choice of alternatives. As the complexity of a system increases, the importance of intuitionistic fuzzy theory as a modeling tool increases. IFS theory is mainly a problem-solving technique given by Atanassov [1994] as an extension of fuzzy theory given by Zadeh [1965]. IFS theory provides a platform that defines a natural way of dealing with problems in which criteria of membership and its reciprocal (non-membership) is used. Intuitionistic fuzzy logic defines approximate interpolation between input and output situations. Intuitionistic fuzzy logic methods have widely introduced for various purposes and its application fields are modeling, prediction, computer vision and so many decision-making situations.

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In the area of sport, the use of intuitionistic fuzzy technique is still a rather new but upcoming field of activity. IF set theory has attracted scholars from almost all fields from economists, computer sciences, psychologists, etc. In this paper we develop a mathematical model in intuitionistic fuzzy set theory for the selection of an outdoor game according to some major influencing factors. A huge number of applicationshave been done in social sciences, medical sciences and also in medical sciences. Szmidt and Kacprzyk [2003] constructed so many new entropy measures and did their application in intuitionistic fuzzy set theory. Husain et. al. [2012] applied some IF measures in various decision-making problems.Princeet.al. [2014] generalized Shannon's fuzzy measure as intuitionistic fuzzy measure and did its application in medical science. Deshmukh et. al. [2011] generalized some fuzzy entropy measures and their properties.

Mathematical Definition

Before studying the mathematical definition of an intuitionistic fuzzy set two more definitions must be studied.

(i) Characteristic function: Let A be any set then a function X_A is called characteristic function which can take only two values either 0 when X does not belong to A or 1 when X belong to A as:

$$X_A(x) = 1 \text{ if } x \text{ in } A$$
$$= 0 \text{ if } x \text{ not in } A$$

(ii) Fuzzy set: Let X is any universal set, then fuzzy subset A of X is defined as:

$$\mu_A(x) \rightarrow [0,1]$$

Which assign a real no. $\mu_A(x)$ in the interval [0,1] for each element $x \in X$ where each value of x in $\mu_A(x)$ shows the membership grade.

(iii) Intuitionistic fuzzy set: Let $X = \{x_1, x_2, x_3, \ldots\ldots, x_n\}$ be any universal set, then an IF set A is given as:

$A = [< x, \mu_A(x), v_A(x)> ; x \in X]$

Where $\mu_A(x) : X\rightarrow[0,1]$ and $v_A(x) : X\rightarrow[0,1]$ are membershipgrades and non-membership grades that satisfies the condition$0 \leq \mu_A(x) + v_A(x) \leq 1$ and the value of intuitionistic index function (π) is calculated by $\pi_A(x) = 1 - \mu_A(x) - v_A(x)$. This index function indicates more vagueness on x. If $\pi_A(x) = 0$ for all $x \in X$, then an intuitionistic fuzzy set tends to fuzzy set.In this article, we apply Renyi's measure and Arimoto's measure intuitionistic fuzzymeasure.

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Max-Min-Max approach to the existing work

The word "composition" plays an important role in IF relation equations. This approach has extended from various methods as max-min method, max-product method, max-average method etc. Each of the method has its own characteristics and limitations but max-min method is considered superior in some cases. There are many composition methods which can be used like max-min-max method, max-product method, max-average method etc. But max-min-max method is considered best in intuitionistic fuzzy logic applications.Sanchez [1977] gave a new fuzzy relation equation and did its application in medical diagnosis.

Let Q is an intuitionistic fuzzy set of set X andR be an intuitionistic fuzzyrelation from X to Y,then this criteria of intuitionistic fuzzy set X with intuitionistic fuzzy relation R(X to Y) is given as B = R o Q with membership grade and non-membership grade as:

$$\mu_B(y) = \max_{x \epsilon X} \{\min [\mu_A(x), \mu_R(x,y)]\} \quad \text{and}$$

$$v_B(y) = \min_{x \epsilon X} \{\max [v_A(x), v_R(x,y)]\}$$

now some propertiessatisfied by the above composition are:
(i) Associativity, (ii) Reflexivity, (iii) Transitivity, (iv) Symmetry.
Further, let P = $\{p_1, p_2,......,p_a\}$; F = $\{f_1, f_2,......,f_b\}$ and G = $\{g_1, g_2,......,c_c\}$ be the countable set of players, factors (that influence the interest of players) and types of outdoor games respectively.
Then, the two fuzzy relationsQ and R are given as:

$$Q = \{<(p, f), u_Q(p, f), v_Q(p, f) > | (p, f) \in P \times F\}$$

$$R = \{<(f, g), u_R(f, g), v_R(f, g) > | (f, g) \in F \times G\},$$

Where $u_Q(p, f)$ represents the degree in which the player p is affected by factor f. And the value $v_Q(p,f)$ define the degree in which the factor f does not affect the interest of player p. Similarly $u_R(f, g)$ indicate the relation between the selected game g and the factor f. Also, the value $v_R(f, g)$ indicate the degree in which the influencing factorfdoes not tends towards the type of outdoor game g.
The composition T of IF relations R and Q(T = R o Q) shows the position of player p_i in terms of influencing factors P to G are defined by membership grade and non-membership grade asgiven below:

$$\mu_T(p_i, g) = \max_{f \epsilon F} \{\min [\mu_Q(p_i, f), \mu_R(f, g)]\} \quad \text{and}$$

$$\mu_T(p_i, g) = \min_{f \epsilon F} \{\max [v_Q(p_i, f), \mu_R(f, g)]\} \quad \text{for all } p_i \epsilon \text{ Pandg} \epsilon \text{ G}$$

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By applying the above technique, we can see the liking of players by using the information taken from the case study. These particulars play a meaningful rolewhen various options are available while selecting outdoor games.

We know thatthe Renyi's entropy function is given as:

$$R_\alpha(P) = \frac{1}{1-\alpha}\log\sum_{i=1}^{n} p_i^\alpha \ ; \ \alpha \neq 1, \alpha > 0.$$

In this research paper we generalize the Renyi's entropy as intuitionistic fuzzy measure in the form

$$R_\alpha(P) = \frac{1}{1-\alpha}\log\left[\sum_{i=1}^{n}\left\{\left(\mu_i\right)^\alpha + (v_i)^\alpha + (\pi_i)^\alpha\right\}\right] \ , \ \alpha > 0, \alpha \neq 1$$

Again, we know Arimoto entropy function is given as:

$$A_\alpha(P) = \frac{1 - \left[\sum_{i=1}^{n}(p_i)^{1/\alpha}\right]^\alpha}{1 - 2^{\alpha-1}} \qquad , \alpha \neq 1, \alpha > 0$$

Again we generalize the above entropy function as intuitionistic fuzzy measure to get the solution in the form

$$A_\alpha(P) = \frac{1 - \left[\sum_{i=1}^{n}\left\{(\mu_i)^{1/\alpha} + (v_i)^{1/\alpha} + (\pi_i)^{1/\alpha}\right\}\right]^\alpha}{1 - 2^{\alpha-1}} \qquad , \alpha \neq 1, \alpha > 0$$

Where $\mu_i$indicates the membership grade, $v_i$indicates non-membership grade and the function $\pi_i$shows the intuitionistic index function. In addition, α is the parameter whose values may change or we can say α imitates the interest of players or some natural causes whose values may vary. At last, from Q and R a new measure of intuitionistic fuzzy relation T for which the concern level of player p for some outdoor game g so that the following conditions are verified:

(i) $R_\alpha(P)$ islowest while applying Renyi's measure.

(ii) $A_\alpha(P)$ is again lowest while applying Arimoto measure.

(iii) The equality T = R o Q is sustained.

The obtained new measure of T will translate the maximum degree of association and minimum degree ofnonassociation ofvarious players excitement interestas well aslow degreeof hesitant index. If we found equal values in T, then select the value in which intuitionistic index is least.

Case Study

Assume the names of five players are Shiva, Mohit, Sinha, Abhay and Vivek. Again, we know that there are so many influencing factors by which the players feel more satisfaction after selecting an outdoor game. In the present article we consider six main factors (parental and family support, peer interaction, positive environment, venue

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accessibility, personal dedication, coaching) for showing the relations. At last, we select six games (Kabbadi, Basketball, Football, Hockey, Volleyball, Cricket) from lots of outdoor games. Now we do the study in the form of tables given below:

Take P = $\{P_1, P_2, P_3, P_4, P_5\}$ be the number of players (normally having same age and same socio-economic status) and F = $\{F_1, F_2, F_3, F_4, F_5, F_6\}$ be a set ofinfluencing factors.

Now,consider the intuitionistic fuzzy relation Q(P→F) is given by:

Table – 1.1

Q	F_1		F_2		F_3		F_4		F_5		F_6	
Customers	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q
P_1	0.8	0.1	0.7	0.3	0.6	0.1	0.0	0.4	0.5	0.5	0.2	0.6
P_2	0.0	0.5	0.5	0.5	0.3	0.2	0.5	0.1	0.4	0.6	0.8	0.2
P_3	0.7	0.2	0.1	0.6	0.0	0.9	0.2	0.5	0.8	0.1	0.6	0.3
P_4	0.4	0.4	0.5	0.5	0.8	0.2	0.9	0.0	0.7	0.1	0.3	0.3
P_5	0.6	0.3	0.4	0.3	0.9	0.1	0.3	0.2	0.1	0.5	0.0	0.8

Then, take F = $[F_1,F_2, F_3, F_4, F_5, F_6]$ be themajor factors which has been taken. The player can choose one factor or more than one factor.

Then the intuitionistic fuzzy relation R(F→G) is given as

Table - 1.2

R	G_1		G_2		G_3		G_4		G_5		G_6	
Factors	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q
F_1	0.3	0.0	0.5	0.1	0.4	0.4	0.1	0.7	0.1	0.1	0.3	0.5
F_2	0.2	0.5	0.3	0.4	0.6	0.1	0.8	0.0	0.4	0.0	0.2	0.4
F_3	0.1	0.8	0.4	0.4	0.2	0.7	0.8	0.2	0.3	0.7	0.7	0.0
F_4	0.4	0.3	0.2	0.5	0.2	0.6	0.8	0.1	0.1	0.7	0.0	0.6
F_5	0.1	0.9	0.1	0.8	0.0	0.3	0.3	0.6	0.2	0.4	0.2	0.3
F_6	0.4	0.6	0.3	0.3	0.9	0.0	0.2	0.5	0.0	0.5	0.6	0.2

In the 3rd step we use the maximum-minimum and minimum-maximum technique on the above tables. In case of μ_Q we consider maximum of the minimum value and for $v_{Q,}$modeltake minimum of the maximum value.

Then T = R o Q is as follows:

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Table - 1.3

T	E_1		E_2		E_3		E_4		E_5		E_6	
Customers	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q	μ_Q	v_Q
C_1	0.3	0.1	0.5	0.1	0.6	0.3	0.7	0.2	0.4	0.1	0.6	0.1
C_2	0.4	0.3	0.3	0.3	0.8	0.2	0.5	0.1	0.4	0.5	0.6	0.2
C_3	0.4	0.2	0.5	0.2	0.6	0.3	0.3	0.5	0.2	0.2	0.6	0.3
C_4	0.4	0.3	0.4	0.3	0.5	0.3	0.8	0.1	0.4	0.4	0.7	0.2
C_5	0.3	0.3	0.5	0.3	0.4	0.3	0.8	0.2	0.4	0.3	0.7	0.1

Now we apply Renyi's entropy as intuitionistic fuzzy measure on the values of above table and get solutions in the form of following tables (1.4) in the following manner.

$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.466	0.468	0.466	**0.462**	0.468	0.466
P_2	0.476	0.476	**0.291**	0.468	0.468	0.470
P_3	0.474	0.473	**0.466**	0.473	0.470	**0.466**
P_4	0.476	0.476	0.473	**0.454**	0.474	0.462
P_5	0.476	0.473	0.476	**0.291**	0.476	0.462

Table – 1.4.1 for $\alpha = 0.1$

$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.456	0.459	0.456	**0.448**	0.459	0.456
P_2	0.476	0.476	**0.281**	0.459	0.459	0.463
P_3	0.472	0.470	**0.456**	0.470	0.463	**0.456**
P_4	0.476	0.476	0.470	**0.431**	0.472	0.448
P_5	0.476	0.470	0.476	**0.281**	0.476	0.448

Table – 1.4.2 for $\alpha = 0.2$

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$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.446	0.451	0.446	**0.434**	0.451	0.446
P_2	0.475	0.475	**0.272**	0.451	0.451	0.457
P_3	0.470	0.484	**0.446**	0.484	0.457	**0.446**
P_4	0.475	0.475	0.484	**0.410**	0.470	0.434
P_5	0.475	0.484	0.475	**0.272**	0.475	0.434

Table – 1.4.3 for α = 0.3

$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.437	0.444	0.437	**0.421**	0.444	0.437
P_2	0.474	0.474	**0.263**	0.444	0.444	0.451
P_3	0.468	0.464	**0.437**	0.464	0.451	**0.437**
P_4	0.474	0.474	0.464	**0.388**	0.468	0.421
P_5	0.474	0.464	0.474	**0.263**	0.474	0.421

Table – 1.4.4 for α = 0.4

$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.424	0.437	0.424	**0.374**	0.437	0.424
P_2	0.474	0.474	**0.254**	0.437	0.437	0.444
P_3	0.466	0.461	**0.424**	0.461	0.444	**0.424**
P_4	0.474	0.474	0.461	**0.367**	0.466	0.374
P_5	0.474	0.461	0.474	**0.254**	0.474	0.374

Table – 1.4.5 for α = 0.5

$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.419	0.430	0.419	**0.394**	0.430	0.419
P_2	0.473	0.473	**0.245**	0.430	0.430	0.437
P_3	0.464	0.457	**0.419**	0.457	0.437	**0.419**
P_4	0.473	0.473	0.457	**0.346**	0.464	0.394
P_5	0.473	0.457	0.473	**0.245**	0.473	0.394

Table – 1.4.6 for α = 0.6

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$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.410	0.423	0.410	**0.382**	0.423	0.410
P_2	0.472	0.472	**0.238**	0.423	0.423	0.431
P_3	0.462	0.454	**0.410**	0.454	0.431	**0.410**
P_4	0.472	0.472	0.454	**0.326**	0.462	0.382
P_5	0.472	0.454	0.472	**0.238**	0.472	0.382

Table – 1.4.7 for α = 0.7

$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.401	0.417	0.401	**0.366**	0.417	0.401
P_2	0.470	0.470	**0.228**	0.417	0.417	0.421
P_3	0.458	0.449	**0.401**	0.449	0.421	**0.401**
P_4	0.470	0.470	0.449	**0.307**	0.458	0.366
P_5	0.470	0.449	0.470	**0.228**	0.470	0.366

Table – 1.4.8 for α = 0.8

$R_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.390	0.406	0.390	**0.350**	0.406	0.390
P_2	0.468	0.468	**0.220**	0.406	0.406	0.409
P_3	0.453	0.441	**0.390**	0.441	0.409	**0.390**
P_4	0.468	0.468	0.441	**0.285**	0.453	0.350
P_5	0.468	0.441	0.468	**0.220**	0.468	0.350

Table – 1.4.9 for α = 0.9

From the above tables we find the solution. The table shows that the game Hockey is most popular because three players P_1, P_4, and P_5 are interested to play this game. The player Mohit wants to play Football while the player P_3can play either Football or Cricket.

At last we apply Arimoto intuitionistic fuzzy measure in table 3 then find the result. This result will also compare with the results of above tables. The obtained tables (1.5) after applying the measure are given below.

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$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.862	1.067	0.862	**0.647**	1.067	0.862
P_2	1.289	1.289	**0.431**	1.067	1.067	0.862
P_3	1.231	1.077	**0.862**	1.077	0.868	**0.862**
P_4	1.289	1.289	1.077	**0.431**	1.231	0.647
P_5	1.289	1.077	1.289	**0.431**	1.289	0.647

Table – 1.5.1 for $\alpha = 0.1$

$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.936	1.110	0.936	**0.706**	1.110	0.936
P_2	1.253	1.253	**0.471**	1.110	1.110	0.943
P_3	1.274	1.161	**0.936**	1.161	0.943	**0.936**
P_4	1.253	1.253	1.161	**0.471**	1.274	0.706
P_5	1.253	1.161	1.253	**0.471**	1.253	0.706

Table – 1.5.2 for $\alpha = 0.2$

$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	0.944	1.140	0.944	**0.774**	1.140	0.944
P_2	1.368	1.368	**0.516**	1.140	1.140	1.020
P_3	1.303	1.220	**0.944**	1.220	1.020	**0.944**
P_4	1.368	1.368	1.220	**0.522**	1.303	0.774
P_5	1.368	1.220	1.368	**0.516**	1.368	0.774

Table – 1.5.3 for $\alpha = 0.3$

$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	1.052	1.173	1.052	**0.844**	1.173	1.052
P_2	1.395	1.395	**0.560**	1.173	1.173	1.093
P_3	1.337	1.272	**1.052**	1.272	1.093	**1.052**
P_4	1.395	1.395	1.272	**0.577**	1.337	0.844
P_5	1.395	1.272	1.395	**0.560**	1.395	0.844

Table – 1.5.4 for $\alpha = 0.4$

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$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	1.098	1.201	1.098	**0.907**	1.201	1.098
P_2	1.423	1.423	**0.600**	1.201	1.201	1.150
P_3	1.365	1.310	**1.098**	1.310	1.150	**1.098**
P_4	1.423	1.423	1.310	**0.641**	1.365	0.907
P_5	1.423	1.310	1.423	**0.600**	1.423	0.907

Table – 1.5.5 for α = 0.5

$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	1.148	1.234	1.148	**0.967**	1.234	1.148
P_2	1.452	1.452	**0.635**	1.234	1.234	1.205
P_3	1.395	1.349	**1.148**	1.349	1.205	**1.148**
P_4	1.452	1.452	1.349	**0.707**	1.395	0.967
P_5	1.452	1.349	1.452	**0.635**	1.452	0.967

Table – 1.5.6 for α = 0.6

$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	1.186	1.271	1.186	**1.026**	1.271	1.186
P_2	1.478	1.478	**0.664**	1.271	1.271	1.255
P_3	1.430	1.388	**1.186**	1.388	1.255	**1.186**
P_4	1.478	1.478	1.388	**0.765**	1.430	1.026
P_5	1.478	1.388	1.478	**0.664**	1.478	1.026

Table – 1.5.7 for α = 0.7

$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	1.223	1.300	1.223	**1.076**	1.300	1.223
P_2	1.507	1.507	**0.692**	1.300	1.300	1.292
P_3	1.461	1.423	**1.223**	1.423	1.300	**1.223**
P_4	1.507	1.507	1.423	**0.830**	1.461	1.076
P_5	1.507	1.423	1.507	**0.692**	1.507	1.076

Table – 1.5.8 for α = 0.8

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$A_\alpha(P)$	G_1	G_2	G_3	G_4	G_5	G_6
P_1	1.283	1.358	1.283	**1.134**	1.358	1.283
P_2	1.567	1.567	**0.746**	1.358	1.358	1.358
P_3	1.507	1.477	**1.283**	1.477	1.358	**1.283**
P_4	1.567	1.567	1.477	**0.895**	1.507	1.034
P_5	1.567	1.477	1.567	**0.746**	1.567	1.034

Table – 1.5.9 for $\alpha = 0.9$

From the above tables the system again obtains the solution. All the tables give similar results as obtained after applying Renyi's intuitionistic fuzzy measure. The model provides the players namely Shiva, Abhay and Vivek like to play Hockey. Football will be played by player P_2 (Mohit) and the player Sinha is interested in two games (Football, Cricket).

Conclusion and Future Research Directions

In this paper, a mathematical technique has been proposed to select game according to the interest of the player based on intuitionistic fuzzy set theory. This approach gives the better results when there is large number of qualitative and quantitative attributes in the process of player selection. The interest and performance of players directly affects their ranking and also plays important role in any game which can achieve the team to win. Every player has their own desires and interests which are influenced by a lot of factors. These factors also affect the selection of game (outdoor) when there some options available. On the basis of above results,model find that both theentropies givesimilar results for different values of α.Some more intuitionistic fuzzy measures can be developed and their application can be done in various disciplines. Some areas of application are medical science, engineering etc. These types of studies are also appropriate for mathematical modeling and project teams in business and industry. The above application will also help the coaches to think systematically about multi-criteria decision-making problems and improves the quality of their decisions. This paper will also help us to tell easily which game is most popular among the players. At last, we hope that the study presented here can inspire others to pursue further research in this area and related fields.

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