A Soft Set Approach in Investment Decision

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Abstract: - **Decision –making is a process to select best out of different alternatives possibilities. Here every process of decisions produces a final choice that may or May not prompt action .it is the study of identifying the best choice according to decision maker .it is the central part of every activity in every process of decision. Now a day's soft set theory is taking major role in decision making process .decision making process consists of different activities such as 1) identification of alternatives 2) analysis of alternatives 3) choosing best alternatives 4) evaluation of result. So that the above activities are critical and sensitive in taking decision .therefore soft set is a new approach to help a investor to decide his funds and earn return on their investment.**

In this paper we have defined soft relation and application in investment decision based on the data collected from male employees working in private and government sectors in Bhubaneswar city, odisha

Key words: - **soft relation, soft operations, investment, rational and logical solutions**

I. INTRODUCTION

In present days various complicated problems arising in the field of engineering, medical science, banking, economics and management etc. That consists of imprecise and uncertainty data .basically that data problem is created by human and nature of subjects.

in recent years different theories like probability theory, vagueness theory and fuzzy theory etc have evolved to deal with such problems .however this theory fails in at times .the problem or limitations has been evaluated by Molodston 1999 and he initiated the concepts of soft theory or soft set .this theory making it convenient to the researcher and is applied in various field, the concept of soft set has rich potential for giving optimal solutions the of real life problems. Application of soft set theory in other disciplines is rapidly developed in decision making area.

In the year 2002 p.k maji gave first practical application of soft set in decision making problem. In 2011 DR. A .k Kalaicheelvi have used application of fuzzy operations in financial funds .and also Neog (2012) applied imprecise soft sets in the educational evaluation process.

In this work an attempt has been made to apply the soft relation in investment decision in different funds considering the data of male employees in Bhubaneswar, odisha. The intention of the work is to earn expected return of investment for which the investor has to select right investment plans.

II. BASIC DEFINITIONS

Definition 2.1

A pair (F, E) is called a soft set (over U) if and only if F is a mapping of E into the set of all subsets of the set U.

Example :-Let U ={ C_1, C_2, C_3 } be the set of four cars and E = {costly (e_1) ,silver colour (e_2), Morden technology (e_3) } be the set of parameters and A = {$e_1, , e_2$ } ⊆ E then(F,A) = { $F(e_1) = \{ C_1, C_2, C_3 \}$, $F(e_2) = \{ C_1, C_2 \}$} is the crisp soft set over U which describe the {highly attracted of car " which MR K is going to buy .

Definition 2.2

Let U be a universe .A fuzzy set X over U is a set defined by a function μ_x representing a mapping

$\mu_x : U \rightarrow [0 ,1]$ .here μ_x called membership function of X and the value $\mu_x (U)$ is called the grade of membership of u ∈ U .the value represents the degree of un belonging to the fuzzy set X. thus a fuzzy set X over U can be the represent as follows

$$X = \{ (U/ \mu_x(U):u \in U, \mu_x \in [0,1]$$

The set of all the fuzzy sets over U will be denoted by F (U)

Definition 2.3

Let U be a universal set E a set of parameters and A ⊆ E .let F(U) denotes the set of all fuzzy *subsets of U. then the pairs (F,A) is called fuzzy soft set over U. where F is mapping from A to F(U)*

Definition 2.4

Let (F,A) and (G,B) be two subsets over a common universal set . the relation R of (F,A) on (G,B) may be defined as a mapping R:A X B →P (U^2) such that for each $e_i \in$ A ,$e_j \in$ B and for $U_1 \in F(e_1)$,$U_k \in G(e_j)$ the relations R is characterized by the following membership functions.

$\mu_R (U_1, U_K) = \mu_{f(ei)} (U_1) X \mu_{g(ej)} (U_k)$ where $U_1 \in F(e_1)$, $U_k \in G(e_j)$

III. APPLICATION OF SOFT SETS

Now we apply the concepts of fuzzy soft sets to investment of funds in investment decision making problem, data collected from hundred male employee s of Bhubaneswar city, Odisha .

According to respondent following parameters is influence investment decision.

Factors of influence investment

P_1:- safety of funds: it relates certainty on capital and gives assurance of protection to the funds

P_2: –High return: it refers to easy conversion of investment into cash with high value of investment

P_3:- Maximum profit in minimum period: it refers to investor to collect maximum value with minimum   time period

P_4:– stable return: it refers to the consistent return from investment.

P_5: – tax concession: deduction under income tax

Investment area

Investor are invest area like I_1) Bank deposit i_2) gold i_3) real Estate i_4) postal deposit i_5) insurance

To apply fuzzy soft sets to this investment decision problem, considering the various investment area as universal set U= { i_1 ,i_2, i_3, i_4, i_5 } and factors influence investment decision as parameter given = { P_1 ,P_2, P_3, P_4, P_5 }

Based on the data the fuzzy soft sets (F_I ,P_I) ,I = 1 to 5 were framed by the membership value $\mu_{fi(pi)}$ (i_j) as the ratio between the number of respondent

$(F_1, P_1) = F_I$ (safety of funds) =

$$\{ \ i_1/ 1 \ , i_2{}^/ \ 0.9, i_3 /1 \ , i_4 /0.2 \ , i_5 \ /.08 \ \}$$

(F_2, p_2) = F_2 (high return) =

$$\{ \ i_1/ 0.5 \ , i_2 \ / 0.5 \ i_3 \ / 0.5 \ i_4 \ / 0.7 \ i_5 \ /0.3 \}$$

(F_3, p_3) = F_3 (maxi-minimum time) =

$$\{ \ i_1/ 0.5, \ i_2 \ / 0.5 \ i_3 \ / 0.5 \ i_4 \ / 0.7 \ i_5 \ /0.6 \}$$

$(F_4 \ , P_4)$)= F_4 (stable return) =

$$\{ \ i_1/ 1 \ , i_2 \ / 0.5 \ i_3 \ / 0.4 \ i_4 \ / 0.7 \ i_5 \ /0.6 \}$$

($F_5 \ , P_5$) = F_5(tax concession) =

$$\{ \ i_1/ 0.5 \ , i_2 \ / 0.6 \ i_3 \ / 0.5 \ i_4 \ / 0.7 \ i_5 \ /0.8 \}$$

Case -1 preference of investment of investors K

Safety of funds (p_1) and high return (p_2)

The problem can be solved by soft relation on investment

(R,C) = R(safety of funds ,high return) = { i_1/ 0.5 ,i_2, / 0.45 i_3, / 0.5 i_4 ,/ 0.14 i_5 /0.24 }

Therefore the investment area which best satisfies the requirement of investor   K is investment area which is the largest membership value the above relation. Here i_2 has the largest membership value (0.45)   .hence gold investment best suit the requirement of investor K

Case -2 preference of investment of investors L

Maxi-minimum time (p_3) , stable return(P_4) tax concession(P_5)

(R,C) = R (Maxi-minimum time (p_3) , stable return(P_4) tax concession(P_5)) = {{ i_1/ 0.25 ,i_2, / 0.150 i_3, / 0.100 i_4 ,/ 0.245 i_5 /0.288 }

Here I_5 has the largest membership value (0.288) hence insurance best suit for investor

IV. CONCLUSION

Soft set theory is one of the recent topics gaining significance in finding rational and logical solutions in various fields of real life problems. This theory helps a investor to decide the right plan as well as to attain optimal solutions for his investment and getting expected return on investment (ROI) with the stipulated period. Soft set gives and enlightens laymen to directly apply the methodology of decision making so as to gain concrete and profitable results. It has been instrumental and will become a key tool for the generation X users to narrow down to the best possible monetary pursuit. Hence, accessible know how of soft set theory makes an individual financially prudent.

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