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An Implementation of TOPSIS Approach to Improve the Performance of K-Means Algorithm in Data Embezzlement System

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Abstract— ***A cluster of data from the database using the k-means clustering algorithm with reduced time consumption and increased efficiency. From the cluster we can select the alternative that is the closest to the ideal solution and farthest from negative ideal alternative. We have used the TOPSIS methodology to find the negative ideal solution.***
Keywords – K-means clustering, TOPSIS, Ideal solution, negative ideal solution.

I. INTRODUCTION

The paper is designed to focus on the concept of TOPSIS methodology along with K-means clustering for the hospital information system[2]. The cluster of cardiac patients' data will be retrieved using the K-means clustering technique [1]. In-order to obtain the quantitative beneficial attribute, the clustered data will be processed using TOPSIS methodology. Thus the outcome of the TOPSIS methodology will provide the best ideal solution. The following section of the paper will describe the model, implementation and effectiveness of the proposed system.

II. IMPLEMENTATION

The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) is a multi-criteria decision analysis method, based on the concept that the chosen alternative should have the shortest geometric distance from the positive ideal solution and the longest geometric distance from the negative ideal solution. In this method two artificial alternatives are hypothesized:
Ideal alternative: the one which has the best level for all attributes considered.
Negative ideal alternative: the one which has the worst attribute values.
TOPSIS assumes that we have m alternatives (options) and n attributes/criteria and we have the score of each option with respect to each criterion. Let xij score of option i with respect to criterion j. We have a matrix X = (xij) m×n matrix. Let J be the set of benefit attributes or criteria (more is better). Let J' be the set of negative attributes or criteria (less is better).

Table1. Sample patient database

Initial Stage				
	chest pain 0.4	undue fatigue 0.3	dyspnea 0.2	palpitations 0.1
patient1	9	9	7	8
patient2	8	7	9	7
patient3	7	6	8	9
patient4	6	7	6	6
patient5	5	8	5	7

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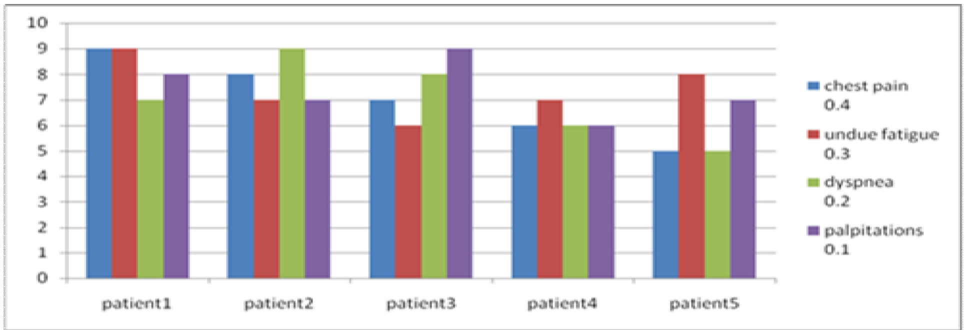

Fig1. The patient (x-axis) versus disease (y-axis) for the given collection of data.

With this clustered data (Table1) our target is to find the negative ideal solution .i.e, finding the less lifespan patient from the database in-order to canvass them to deposit insurance amount in the concerned bank.

A. Step 1: Construct Normalized Decision Matrix

This step transforms various attribute dimensions into non-dimensional attributes, which allows comparisons across criteria.
Normalize scores or data as follows:

$$r_{ij} = x_{ij}/ (\Sigma x^2_{ij}) \quad \text{for } i = 1, \ldots, m;\ j = 1, \ldots, n$$

Table2. The Normalized decision matrix

	chest pain 0.4	undue fatigue 0.3	dyspnea 0.2	palpitations 0.1
patient1	0.56	0.54	0.44	0.48
patient2	0.5	0.42	0.56	0.42
patient3	0.44	0.36	0.5	0.54
patient4	0.38	0.42	0.38	0.36
patient5	0.31	0.48	0.31	0.42

B. Step 2: Construct the Weighted Normalized Decision Matrix

Assume we have a set of weights for each criteria wj for j = 1,…n. Multiply each column of the Table2) normalized decision matrix by its associated weight.
An element of the new matrix is,

$$vij = wj\ rij$$

C. Step 3: Determine The Ideal And Negative Ideal Solutions

Ideal solution.

$$A^* = \{ v1^* , \ldots, vn^*\}, \text{ where}$$

$$vj^* = \{ \max (vij) \text{ if } j \in J ;\ \min (vij) \text{ if } j \in J' \}$$

Negative ideal solution.

$$A' = \{ v1' , \ldots, vn' \}, \text{ where}$$

$$v' = \{ \min (vij) \text{ if } j \in J ;\ \max (vij) \text{ if } j \in J' \}$$

In our proposed system we are gone find the less lifespan patient .i.e, negative ideal solution (Table3).

Volume 3 Issue X, November 2015
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Table3. Negative ideal solution

Step 3 (a): find negative ideal solution A'				
A' = {0.224, 0.108, 0.062, 0.036}				
	chest pain 0.4	undue fatigue 0.3	dyspnea 0.2	palpitations 0.1
patient1	0.224	0.162	0.088	0.048
patient2	0.2	0.126	0.112	0.042
patient3	0.176	0.108	0.1	0.054
patient4	0.152	0.126	0.076	0.036
patient5	0.124	0.144	0.062	0.042

D. Step 4: Calculate the Separation Measures For Each Alternative

The separation from the ideal alternative is:

$$S_i^* = [\,\Sigma (v_j^* - v_{ij})^2\,]^{1/2} \quad i = 1, \ldots, m$$

Similarly, the separation from the negative ideal alternative is:

$$S'_i = [\,\Sigma (v_j' - v_{ij})^2\,]^{1/2} \quad i = 1, \ldots, m$$

*E. Step 5: Calculate The Relative Closeness To The Ideal Solution Ci**

Table5.Relative ideal solution

Step 5: Calculate the relative closeness to the ideal solution		
$C_i^* = S^*_i / (S_i^* + S'_i)$		
	S*i / (Si* +S'i)	Ci*
patient1	0.7887 / (0.7887 + 0.7997)	0.4965
patient2	0.7366 / (0.7366 + .7543)	0.4941
patient3	0.7251 / (0.7251 + .7547)	0.49
patient4	0.5455 / (0.5455 + 0.5725)	0.4879
patient5	0.5558 / (0.5558 / 0.5956)	0.4827

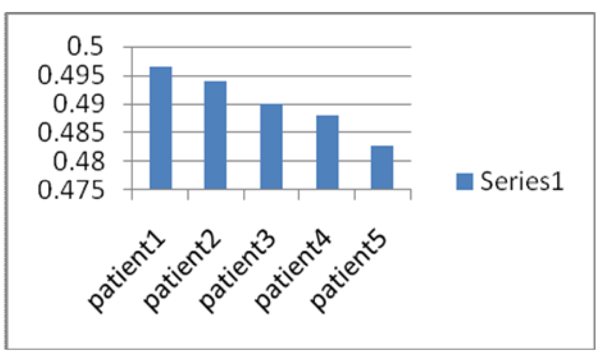

Fig2. The Negative ideal solution

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III. CONCLUSION

Thus by using the TOPSIS technique easy decision has been made for both positive and negative criteria.

REFERENCES

[1] Ashok Murugesan, Aishwarya Balakrishnan, “A SMAC based Business Model for Data Embezzlement System”, IJMTER, Volume 02, Issue 01, January 2015 e-ISSN: 2349-9745, p-ISSN: 2393-8161
[2] Ashok Murugesan, Umadevi Ashok,” A SMAC based Business Model for Data Embezzlement System “ , NCRAIT’ 2015, ISBN NO: 978-81-928100-8-9.
[3] Ritu Yadav, Anuradha Sharma, “Advanced Methods to Improve Performance of K-Means Algorithm: A Review”, GJCST Volume XII, Issue IX, Version 1, April 2012, pp : 47 to 51