TOPSIS
JOBSHEET 6

Arranged By:

Rajendra Rakha Arya Prabaswara

(1941720080/21)

PROGRAM STUDI D-IV TEKNIK INFORMATIKA

JURUSAN TEKNOLOGI INFORMASI

POLITEKNIK NEGERI MALANG

Experiment 1

Understanding TOPSIS Method

Experimental Procedure :

1. Consider the following questions:
   Class XI students of SMA N 16 Jakarta, will move up to class XII and begin to enter majors which consist of 3 types (Natural Science, Social Science, and Language). By using the help of the DSS, you will find the appropriate major for each student. One of the students who will be used as an example of finding a solution with this DSS is Sandi with 9 existing criteria, namely science specialization, social studies specialization, language specialization, science psychology, social science psychology, language psychology, science report card, social studies report card, and language report card.

2. Mention the step by step solution to problem no. 1 with TOPSIS method!

Question :

1. Why is it necessary to find the ideal solutions A+ and A-?
2. What happens if we equate the cost criteria with the benefit criteria?

1. STEP SOLUTION

A. Normalize Table from description number 1
B. Sum All of The value, for example the total of c1 has a 3, 4 and 3. Then we calculated it all, same as the c2 until c9
C. Divided all of The Value, for example c1 language with the sum result on the c1 until c9 social science with sum result on the c9 column
D. Calculate Weight by SQRT result x Weight
E. From step D we got weighted normalized decision matrix. Then Calculate Vj+ & Vj-
   Vj+ get from highest c1 – c9
   Vj- get from lowerst c1-c9
F. Calculate Si+ and Si-

$$S_i^+ = \left[\sum_{j=1}^{m} \left(V_{ij} - V_j^+\right)^2\right]^{0.5} \qquad S_i^- = \left[\sum_{j=1}^{m} \left(V_{ij} - V_j^-\right)^2\right]^{0.5}$$

   Si+ is calculated by the language row from weighted normalized decision matrix
G. Sum si+ & si- So we get Stotal
H. Calculate Pi by Stotal/Si+ + Si-
I. Then we get final result from the pi we sorted from the number of final alternative result. And we got the best alternative by counting the highest number from the each alternative.

2. To get the result we need to calculate each criterion first and for each column we need to square it first. So we can get values to add to the next criteria with the highest Vj+ for A+ and Vj- for A-.after getting the result we need to square again to get the result.

3. Maybe inaccurate results

EXPERIMENT 2

Finding the best Alternative Solution with TOPSIS

Experimental Procedure :

1. Consider the following questions:
   Based on the questions in experiment 1, it is known that the decision matrix is as follows

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Languange	3	3	4	2	2	4	3	3	5
Natural Science	4	3	3	3	2	2	5	4	4
Social Science	3	4	3	2	3	2	3	5	4
Weight	4	3	3	4	3	3	2	2	3

1. Normalize the weights on the questions above!

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Language	3	3	4	2	2	4	3	3	5
Natural Science	4	3	3	3	2	2	5	4	4
Social Science	3	4	3	2	3	2	3	5	4
SUM	34	34	34	17	17	24	43	50	57

SQRT

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Language	0,088235	0,088235	0,117647	0,117647	0,117647	0,166667	0,069767	0,06	0,087719
Natural Science	0,117647	0,088235	0,088235	0,176471	0,117647	0,083333	0,116279	0,08	0,070175
Social Science	0,088235	0,117647	0,088235	0,117647	0,176471	0,083333	0,069767	0,1	0,070175

Weight

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Language	0,352941	0,264706	0,352941	0,470588	0,352941	0,5	0,139535	0,12	0,263158
Natural Science	0,470588	0,264706	0,264706	0,705882	0,352941	0,25	0,232558	0,16	0,210526
Social Science	0,352941	0,352941	0,264706	0,470588	0,529412	0,25	0,139535	0,2	0,210526

Weight

C1	C2	C3	C4	C5	C6	C7	C8	C9
4	3	3	4	3	3	2	2	3

2. **Perform the best alternative calculations using the TOPSIS method according to the stages described previously!**

Wighted Normalized Decision Matrix

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Language	0,352941	0,264706	0,352941	0,470588	0,352941	0,5	0,139535	0,12	0,263158
Natural Science	0,470588	0,264706	0,264706	0,705882	0,352941	0,25	0,232558	0,16	0,210526
Social Science	0,352941	0,352941	0,264706	0,470588	0,529412	0,25	0,139535	0,2	0,210526
Vj+	0,470588	0,352941	0,352941	0,705882	0,529412	0,5	0,232558	0,2	0,263158
Vj-	0,352941	0,264706	0,264706	0,470588	0,352941	0,25	0,139535	0,12	0,210526

Weight

C1	C2	C3	C4	C5	C6	C7	C8	C9
4	3	3	4	3	3	2	2	3

	Si+	Si-	Si+ + Si-	Pi
Language	0,350977	0,270288	0,621265	2,040389
Natural Science	0,337021	0,281882	0,618903	2,118276
Social Science	0,388475	0,212902	0,601377	1,760948

Alternative	Pi	RANK
Language	3,284251	2
Natural Science	3,422632	1
Social Science	2,928191	3

3. **Does the DSS for the selection of majors at the high school level have a cost criterion? If so, state the cost criteria!**

   Yes

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Language	3	3	4	2	2	4	3	3	5
Natural Science	4	3	3	3	2	2	5	4	4
Social Science	3	4	3	2	3	2	3	5	4
SUM	34	34	34	17	17	24	43	50	57

SQRT

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Language	0,088235	0,088235	0,117647	0,117647	0,117647	0,166667	0,069767	0,06	0,087719
Natural Science	0,117647	0,088235	0,088235	0,176471	0,117647	0,083333	0,116279	0,08	0,070175
Social Science	0,088235	0,117647	0,088235	0,117647	0,176471	0,083333	0,069767	0,1	0,070175

Weight

C1	C2	C3	C4	C5	C6	C7	C8	C9
4	3	3	4	3	3	2	2	3

Weight

Alternatives	Criteria								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
Language	0,352941	0,264706	0,352941	0,470588	0,352941	0,5	0,139535	0,12	0,263158
Natural Science	0,470588	0,264706	0,264706	0,705882	0,352941	0,25	0,232558	0,16	0,210526
Social Science	0,352941	0,352941	0,264706	0,470588	0,529412	0,25	0,139535	0,2	0,210526

4. **Which criterion has the greatest priority in determining the chosen alternative?**
5. **Mention the ranking of alternative calculations based on the calculation of the TOPSIS method for the case study above!**

Alternative	Pi	RANK
Language	3,284251	2
Natural Science	3,422632	1
Social Science	2,928191	3