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Optimization Of The Simple Additive Weighting Method Using The Entropy Method In Tourist Recommendation Decision Support

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Abstract - Travel recommendations are ideas or suggestions of cool places to see while traveling. Depending on the interests and preferences of each visitor, these tourist attractions can be nature tourism, beach tourism, cultural tourism or other interesting places to visit. Tourism recommendations can be offered based on criteria including scenic beauty, street access, distance traveled, children's entertainment venues, ticket prices, menu variations, parking, places to relax, toilets, prayer rooms. Therefore, tourism recommendations are needed for tourists to determine the tourist destinations they want to visit. The SAW method is applied to decision making using many criteria, and to avoid subjectivity in determining the criteria weights, the Entropy method is used. The results of this study indicate that the ranking results from the optimization of the SAW method with the entropy method in supporting tourism recommendation decisions.

Keywords - Tourism Recommendation, Tourism Recommendation Decision Support, SAW Method, SAW Method with Entropy Method

1. INTRODUCTION

The tourism sector is one that has recently experienced rapid digitalization as a result of recent technical advances. Using various social media platforms, Batang tourism can showcase the potential of the area as a tourist destination [1]. To attract more visitors from various regions to Batang, the tourism industry in Batang not only introduces but also disseminates information about amazing tourist destinations. Travel recommendations are ideas or suggestions of cool places to see while traveling. Depending on the interests and preferences of each visitor, these tourist attractions can be nature tourism, beach tourism, cultural tourism or other interesting places to visit. Tourist recommendations can be offered based on criteria including, scenic beauty, road access, distance traveled, children's entertainment venues, ticket prices, menu variations, parking, places to relax, toilets, prayer rooms.

With this, tourists will choose tourist attractions according to the wishes of each tourist, and in selecting tourist objects to visit it also influences personal preference decisions, making decisions that are difficult to determine tourist attractions using various criteria and really takes time to determine tourist destinations. which one to visit. Weighting is necessary in relation to the criteria applied. If there are multiple decision makers, the weights assigned to each criterion will differ from each other in the weighting procedure, which is usually set by each decision maker.

Using the Entropy Method is one method to find out how criteria should be weighted [2]. The Entropy method gives the highest score to the criteria with the most weight variations.

Thus, the highest value (maximum entropy) for each piece of data in a collection (entity) can be determined through the entropy method having various options [3]. The method used can provide a weight value for each field. The selection options are arranged in each field according to their weights in order to provide more accurate results. [5]. The *Simple Additive Weighting* approach is a decision making technique that can simultaneously solve cost and benefit data. The *Simple Additive Weighting* approach is used to rank a set of data using preference values [6]. By looking for weighted data on the performance of each option, you can conclude using the *Simple Additive Weighting approach* [7].

The decision making process is created to provide advice in choosing the best option to increase accuracy and time efficiency. The factors considered in the evaluation must be given weight. The Entropy Method and *Simple Additive Weighting* , two methodologies used in this work to build decision support models are used [8]. The *Simple Additive Weighting approach* is used to determine the total competency weight of each alternative on all qualities, while the Entropy method is used to weight the criteria by using entropy weights. Using the Entropy-*Simple Additive Weighting Method* in combination is more efficient. Based on this description, Optimization of *Simple Additive Weighting* is used to support decisions in tourism recommendations in order to get the best decision from various criteria and alternatives for visiting tourism. The hope is that we will get an accurate calculation of the criteria weights and attribute scale values which will be used to recommend tourists to visit the tourist destination with decision results.

2. RESEARCH METHOD

At this stage, by calculating the level of accuracy, by looking for the percentage value of accuracy produced by the entropy method, Simple Additive Weighting method, with several stages as follows:

2.1. Alternative Data

The alternative used in this research is data on the number of tourist attractions in Batang, totaling 38 tourist attractions that can be recommended to visitors. Each tourist name will be denoted with A1, A2, A3 and so on.

2.2. Determination of Criteria

In determining tourist destinations in Batang it is important to develop criteria that will serve as a standard for assessing each comparison option. Using the entropy approach, calculate the criteria required as input.

2.3. Criteria Weighting

These criteria are weighted based on a subjective process. Each was assigned a weight based on the findings of a survey conducted by the Batang Regency Youth and Sports Tourism Office.

2.4. Normalization Criteria

The data that has been capitulated is then normalized according to the legend below to determine the quantity .

$$d^k i = \frac{x^k i}{x^k i\ max} \qquad di = d^1 i, \ldots, d^m i \tag{1}$$

$$Di = \sum_{k=1}^{m} d^k i \qquad i = 1,2, \ldots, \tag{2}$$

Information:
$d^k i$ = normalized data value
$x^k i$ = data value that has not been normalized
$x^k i\ max$ = unnormalized data value with the highest value
Di = number of normalized data values
m = number of alternatives

2.5. Entropy Method Calculation

A method for revealing a point by performing Entropy analysis on previously collected and normalized data. Entropy reduction is carried out for each criterion using the collaborations described below:

$$emax = \ln m \tag{3}$$

$$K = \frac{1}{e\ max} \tag{4}$$

$$\mathrm{e}\,(d_i) = -k \sum_{k=1}^{m} \frac{d^k i}{d_i}\ in\left(\frac{d^k\, i}{d_i}\right), k > 0 \tag{5}$$

Information :
$emax$ = Maximum entropy
K = Entropy constant
$e\,(d_i)$ = Entropy for each i-th attribute/criterion

2.6. Entropy Method weighting results

After getting $e\,(_i)$ for each criterion, the total accumulated Entropy for each criterion can be determined using Equation .

$$E = \sum_{\mathrm{i}=1}^{n} e(di)\,, \text{n adalah jumlah kriteria} \tag{6}$$

The next step is to measure the initial entropy for each i-th criterion using the equation.

$$\bar{\lambda}_l = \frac{1}{n-E}[1 - e(d_i)], \quad 0 \le \bar{\lambda}_l \le 1 \tag{7}$$

$$\sum_{i=1}^{n} \bar{\lambda}_l = \pm 1 \tag{8}$$

Information :
$\bar{\lambda}_i$ = Entropy weight
n = number of attributes/criteria

E = total Entropy for each Criteria

The real entropy weight finding for each comparison will be derived from the equation equation after obtaining the initial entropy weight for each indication.

$$\lambda_k = \frac{\bar{\lambda}_l * w_j}{\sum_{k=1}^{n} \bar{\lambda}_l * w_j}, k = 1, 2, \dots, n \quad (9)$$

Information :
λ_k = final Entropy weight
$\bar{\lambda}_l$ = Entropy weight
w_j = initial weight of the criteria
n = number of criteria

To make a decision on the final entropy weight obtained, it can be done by ranking it based on the average lecturer competency (Ai). This value is multiplied by the entropy weight of each indicator [8]

2.7. *Simple Additive Weighting* Method Calculation

The stages in solving using the *Simple Additive Weighting method* are as follows:

1. create a decision matrix
2. normalize the decision matrix using the equation.

$$rij = \{ \begin{matrix} zij \\ \text{M}\alpha x\ z\iota j \end{matrix} \text{, jika } j \text{ adalah benefit} \quad (10)$$

Information :
rij = normalized decision matrix
xij = rows and columns of the decision matrix
max xij = maximum value of row and column

3. Calculate the preference value of each alternative using equation 11, previously determined weights (wj) and normalized matrix (rij). A higher Vi value indicates a preference for the Ai option.

$$v_\iota = \sum_{j=1}^{n} w_j r_{ij} \quad (11)$$

Information :
V_i = Alternative final value

2.8. Evaluation

After getting the ranking results from the SAW method with the entropy method, you will get the best tourist destination decision results.

3. RESULTS AND DISCUSSION

3.1. Alternative Data

In calculations using the entropy method, alternatives are needed for consideration. There are 38 alternative data taken for the calculation process in this research as follows:

Table 1. Alternative Data

No.	Alternative	Name – Name Tour
1.	A^1	THR Kramat
2.	A^2	Tour Natural Sikembang
3.	A^3	Kembanglangit Park
4.	A^4	Sri Mountain
5.	A^5	Agrotourism Pagilaran
6.	A^6	Agrotourism Selopajang
7.	A^7	Agro Tour Village Tombo
8.	A^8	Patran Peak
9.	A^9	Tour forest Polowono etc. Hole
10.	A^{10}	Hill Hawk etc. Tombo
11.	A^{11}	Tronggolasi Hill
12.	A^{12}	Natural forest Losari etc. Sodong
13.	A^{13}	Etc. Tour Beach Jodo
14.	A^{14}	Etc. Tour Sangubanyu
15.	A^{15}	Etc. Tour Celong Beach
16.	A^{16}	Etc. Tour Mentosari
17.	A^{17}	Etc. Tour Pandansari
18.	A^{18}	Safari Beach Central Java
19.	A^{19}	Rowing Competition
20.	A^{20}	Waterfall Gombong
21.	A^{21}	Fir Beautiful Etc. Kuripan
22.	A^{22}	Waterfall great Etc. Purbo Bawang
23.	A^{23}	Beach estuary Rejo
24.	A^{24}	Beach Coral mahesa
25.	A^{25}	Waterfall Sigandul Etc. Sodong
26.	A^{26}	Waterfall Kolorokno Ds. Silurah
27.	A^{27}	Waterfall Genting
28.	A^{28}	Waterfall Kanoman
29.	A^{29}	Beach Sicepit Kasepuhan
30.	A^{30}	Beach Charm Beautiful West Roban
31.	A^{31}	Pool Swimming Bookie
32.	A^{32}	Beach Ujungnegoro
33.	A^{33}	Beach Sigandu
34.	A^{34}	Statue Ganesha Ds. Silurah
35.	A^{35}	Grave Sheikh Maulana Ujungnegoro Morocco
36.	A^{36}	Grave Lord Kajoran
37.	A^{37}	Grave Sheikh Tholabudin
38.	A^{38}	Grave Sheikh Maulana Maghreb Wonobodro

3.2. Determination of Criteria

In determining tourist destinations in Batang it is important to develop criteria that will serve as a standard for assessing each comparison option.

Table 2. Criteria Weight Table

Code	Criteria
C1	Beauty View
C2	Access Street
C3	Distance Go
C4	Place entertainment Child
C5	Price Tickets
C6	Variation Menu
C7	Parking
C8	A place to relax
C9	Toilet
C10	Islamic Prayer Room

Criteria weights are very important in this calculation because they indicate how much influence each factor has on the final decision. Setting appropriate weights can help reflect the preferences or priorities that are truly desired in the decision-making process.

3.3. Criteria weighting

Provides a weight value for each specified criterion.

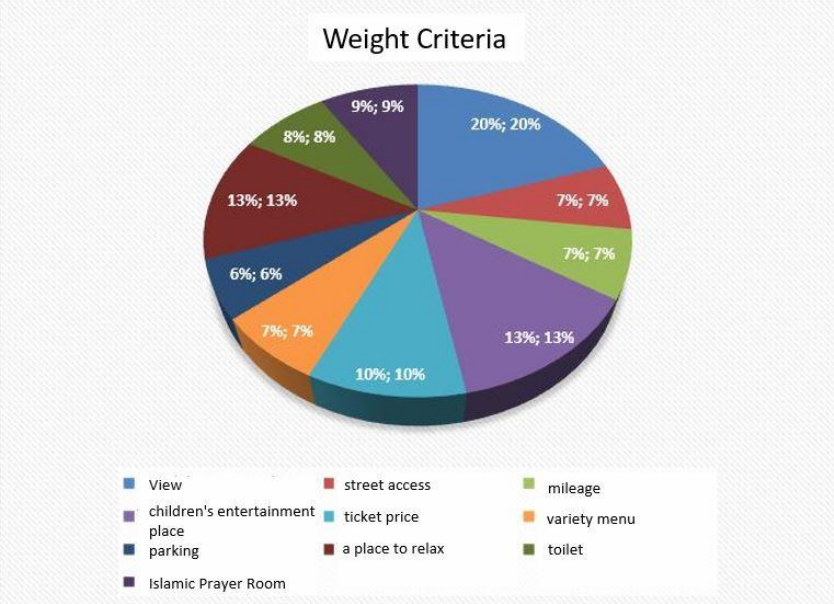

Figure 3.3 Graph of weight criteria

3.4. Normalization criteria

In calculations using equation (1) and equation (2), the following amount of normalized data is obtained:

Table 3. Table equality (2) Normalization Criteria

D1 =	0.6+ 0.8+ 1+ 1 + 0.4+ 0.8+ 0.8+ 0.6+ 0.6 + 0.8	= 7.4
D2 =	1+ 0.8+ 0.4+ 1 + 0.8+ 0.8+ 1+ 0.6+ 0.6+ 0.8	= 7.8
D3 =	1+ 0.8+ 0.4+ 1 + 0.8+ 0.8+ 1+ 1+ 0.6 + 0.8	= 8.2
D4 =	1 + 0.8 + 0.4 + 0.6 + 0.8+ 0.8 + 0.8 + 1 + 0.6 + 0.8	= 7.6
D5 =	1+ 0.8 + 0.4+1 + 0.8+ 0.8+ 1 + 1+ 0.6 + 0.8	= 8.2

3.5. Entropy Method Calculation

The next step is to calculate the entropy for each i-th criterion using the formula in equations (3), (4), (5).

e_{max} = in 10 = 3,637

k = 1/3,637 = 0,275

$e(d1)$ = (0,275 x [($\frac{0,6}{7,4}$) in $\frac{0,6}{7,4}$ + ($\frac{0,8}{7,4}$) in $\frac{0,8}{7,4}$ + ($\frac{1}{7,4}$) in $\frac{1}{7,4}$ +

($\frac{1}{7,4}$) in $\frac{1}{7,4}$ + ($\frac{0,4}{7,4}$) in $\frac{0,4}{7,4}$ + ($\frac{0,8}{7,4}$) in $\frac{0,8}{7,4}$ + ($\frac{0,8}{7,4}$) in $\frac{0,8}{7,4}$ +

($\frac{0,6}{7,4}$) in $\frac{0,6}{7,4}$ + ($\frac{0,6}{7,4}$) in $\frac{0,6}{7,4}$ + ($\frac{0,8}{7,4}$) in $\frac{0,8}{7,4}$])

= (0,275 x [(-0,2037) + (-0,2405) + (-0,270) + (0,270)

+ (-0,1578)+ (-0,2405)+ (-0,2405)+ (-0,2037)+ (-0,2037)+

(-0,2405)]

=(0,275 x (-2,2709)= - 0,6244

$e(d2)$ = (0,0275 x [($\frac{1}{7,8}$) in $\frac{1}{7,4}$ + ($\frac{0,8}{7,8}$) in $\frac{0,8}{7,4}$ + ($\frac{0,4}{7,8}$) in $\frac{0,4}{7,8}$ +

($\frac{1}{7,8}$) in $\frac{1}{7,4}$ + ($\frac{0,8}{7,8}$) in $\frac{0,8}{7,4}$ + ($\frac{0,8}{7,8}$) in $\frac{0,8}{7,4}$ + ($\frac{1}{7,8}$) in $\frac{1}{7,8}$ +

($\frac{0,6}{7,8}$) in $\frac{0,6}{7,4}$ + ($\frac{0,6}{7,8}$) in $\frac{0,6}{7,8}$ + ($\frac{0,8}{7,8}$) in $\frac{0,8}{7,8}$])

=(0,275 x [(-0,2633) + (-0,2336) + (-0,1523) + (-

0,2633) + (-0,2336)+ (-0,2336)+ (-0,2633)+ (-0,1873)+ (-

0,1973)+ (-0,2336)]

=(0,275 x (-2,2663)=-0,6222

$e(d3)$ = (0,026 x [($\frac{1}{8,2}$) in $\frac{1}{8,2}$ + ($\frac{0,8}{8,2}$) in $\frac{0,8}{8,2}$ + ($\frac{0,4}{8,2}$) in $\frac{0,4}{8,2}$ +

($\frac{1}{8,2}$) in $\frac{1}{8,2}$ + ($\frac{0,8}{8,2}$) in $\frac{0,8}{8,2}$ + ($\frac{0,8}{8,2}$) in $\frac{0,8}{8,2}$ + ($\frac{1}{8,2}$) in $\frac{1}{8,2}$ +

($\frac{1}{8,2}$) in $\frac{1}{8,2}$ + ($\frac{0,6}{8,2}$) in $\frac{0,6}{8,2}$ + ($\frac{0,8}{8,2}$) in $\frac{0,8}{8,2}$])

=(0.275 x [(-0.2566)+ (-0.2270) + (-0.1473) + (- 0.2566) + (-0.2270) + (-0.2270) + (-0.2566)+ (-0.2566)+ (- 0.19133)+ (-0.2270)]

=(0.275 x (-2,273)=- 0.6250

$$e(\text{d4}) = (\ 0{,}275 \text{ x } [(\ \frac{1}{7{,}6})\ in\ \frac{1}{7{,}6} + (\ \frac{0{,}8}{7{,}6})\ in\ \frac{0{,}8}{7{,}6} + (\ \frac{0{,}4}{7{,}6})\ in\ \frac{0{,}4}{7{,}6} +$$

$$(\frac{0{,}6}{7{,}6})\ in\ \frac{0{,}6}{7{,}6} + (\ \frac{0{,}8}{7{,}6})\ in\ \frac{0{,}8}{7{,}6} + (\ \frac{0{,}8}{7{,}6})\ in\ \frac{0{,}8}{7{,}6} + (\ \frac{0{,}8}{7{,}6})\ in\ \frac{0{,}8}{7{,}62} +$$

$$(\frac{1}{7{,}6})\ in\ \frac{1}{7{,}6} + (\ \frac{0{,}6}{7{,}6})\ in\ \frac{0{,}6}{7{,}6} + (\ \frac{0{,}8}{7{,}6})\ in\ \frac{0{,}8}{7{,}6}])$$

=(0,275 x [(-0,2668) + (-0,2370) + (-0,1550) + (-0,2004) + (-0,2370)+ (-0,2370)+ (-0,2370)+ (-0,2668) + (-0,2004)+ (-0,2370)]

=(0,275 x (-2,274)=-0,6254

$$e(\text{d5}) = (\ 0{,}275 \text{ x } [(\ \frac{1}{8{,}2})\ in\ \frac{1}{8{,}2} + (\ \frac{0{,}8}{8{,}2})\ in\ \frac{0{,}8}{8{,}2} + (\ \frac{0{,}4}{8{,}2})\ in\ \frac{0{,}4}{8{,}2} +$$

$$(\frac{1}{8{,}2})\ in\ \frac{1}{8{,}2} + (\ \frac{0{,}8}{8{,}2})\ in\ \frac{0{,}8}{8{,}2} + (\ \frac{0{,}8}{8{,}2})\ in\ \frac{0{,}8}{8{,}2} + (\ \frac{1}{8{,}2})\ in\ \frac{1}{8{,}2} +$$

$$(\frac{1}{8{,}2})\ in\ \frac{1}{8{,}2} + (\ \frac{0{,}6}{8{,}2})\ in\ \frac{0{,}6}{8{,}2} + (\ \frac{0{,}8}{8{,}2})\ in\ \frac{0{,}8}{8{,}2}])$$

=(0,275 x [(-0,2566) + (-0,2270) + (-0,1473) + (-0,2566)+ (-0,2270)+ (-0,2270)+ (-0,2566)+ (-0,2566)+ (-0,1913)+ (-0,2270)]

=(0,275 x (-2,273)=-0,6250

3.6. Entropy Method weighting results

After getting $e(d_i)$ for each criterion, the total entropy can be determined using the formula in equation (6).

E = e(d1) + e(d2) + e(d3) + e(d4) + e(d5) + e(d6) + e(d7) + e(d8) + e(d9)
+ e(d10) + e(d11) + e(d12) + e(d13) + e(d14) + e(d15)
E = -0.6244+-0.6222+-0.6250+-0.6254+-0.6250+-0.4797+-0.6077+-
0.6035+-0.6116+-0.6085+-0.6085+-0.6035+-0.6109+-0.6009+-0.6255
E = -9.5308

With the next step using equation (7), the initial entropy for each ith criterion is obtained as follows:

$$\bar{\lambda}_1 = \frac{1}{38-(-9{,}5308)}[1-(-0{,}6244)] = 0{,}0189561$$

$$\bar{\lambda}_2 = \frac{1}{38-(-9{,}0823)}[1-(-0{,}6222)] = 0{,}0189633$$

$$\bar{\lambda}_3 = \frac{1}{38-(-9{,}0823)}[1-(-0{,}6250)] = 0{,}0189542$$

$$\bar{\lambda}_4 = \frac{1}{38-(-9{,}0823)}[1-(-0{,}6254)] = 0{,}0189529$$

$$\bar{\lambda}_5 = \frac{1}{38-(-9{,}0823)}[1-(-0{,}6250)] = 0{,}0189542$$

$$\bar{\lambda}_6 = \frac{1}{38-(-90823)}[1-(-0{,}4797)] = 0{,}0194404$$

$$\bar{\lambda}_7 = \frac{1}{38-(-90823)}[1-(-0{,}6077)] = 0{,}0190108$$

$$\bar{\lambda}_8 = \frac{1}{38-(-90823)}[1-(-06035)] = 0{,}01902461$$

$$\bar{\lambda}_9 = \frac{1}{38-(-90823)}[1-(-0{,}6116)] = 0{,}0189980$$

$$\bar{\lambda} = 1\ [1-(-0{,}6085)] = 0{,}0190081$$

3.7. Simple Additive Weighting Method Calculation

Then the recapitulated weight category values are normalized according to the formula in equation [8]. Normalization results can be seen in table 4 :

Table 4. Table Normalization criteria

Alternative /Criteria	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
A1	0.6	0.8	1	1	0.4	0.8	0.8	0.6	0.6	0.8
A2	1	0.8	0.4	1	0.8	0.8	1	0.6	0.6	0.8
A3	1	0.8	0.4	1	0.8	0.8	1	1	0.6	0.8
A4	1	0.8	0.4	0.6	0.8	0.8	0.8	1	0.6	0.8
A5	1	0.8	0.4	1	0.8	0.8	1	1	0.6	0.8
A6	0.8	0.8	0.4	0.2	0.8	0.8	0.8	1	0.6	0.8
A7	1	0.6	0.4	0.2	0.8	0.4	0.8	1	0.6	0.4
A8	1	0.6	0.4	0.2	0.8	0.4	0.6	0.6	0.2	0.4
A9	0.6	0.6	0.4	0.2	0.8	0.4	0.6	0.6	0.2	0.4
A10	0.8	0.6	0.4	0.2	0.8	0.4	0.6	0.6	0.2	0.4

The normalized matrix with equation (10) which is normalized into a decision matrix and includes criteria in the benefit attribute as previously mentioned in table 4 is shown in Figure 3.7.

Figure 3.7 normalization matrix

0,6	0,8	1	1	0,4	0,8	0,8	0,6	0,6	0,8
1	0,8	0,4	1	0,8	0,8	1	0,6	0,6	0,8
1	0,8	0,4	1	0,8	0,8	1	1	0,6	0,8
1	0,8	0,4	0,6	0,8	0,8	0,8	1	0,6	0,8
1	0,8	0,4	1	0,8	0,8	1	1	0,6	0,8
0,8	0,8	0,4	0,2	0,8	0,8	0,8	1	0,6	0,8
1	0,6	0,4	0,2	0,8	0,4	0,8	1	0,6	0,4
1	0,6	0,4	0,2	0,8	0,4	0,6	0,6	0,2	0,4
0,6	0,6	0,4	0,2	0,8	0,4	0,6	0,6	0,2	0,4
0,8	0,6	0,4	0,2	0,8	0,4	0,6	0,6	0,2	0,4
0,8	0,6	0,4	0,2	0,8	0,4	0,6	0,6	0,2	0,4
1	0,6	0,4	0,2	0,8	0,4	0,6	0,6	0,2	0,4
1	0,8	0,4	0,6	0,8	0,4	0,8	1	0,2	0,8
0,8	0,6	0,4	0,2	0,8	0,4	0,6	0,2	0,2	0,4
0,6	0,6	0,4	0,6	0,8	0,8	0,8	1	0,6	0,8

3.8. Evaluation

In calculating the weight using the Entropy method, there is an increase in the weight by a certain percentage from the main weight calculation, then the calculation is carried out using the SAW method with the best result for tourist recommendations being 94%. In the optimization calculation of the simple additive weighting (SAW) method, the main weights used in the SAW method calculations obtained an increase in value from the entropy method in tourist recommendations of 94%, then the best result from the SAW method in tourist recommendations was Safari Beach Central Java with a score of 95%.

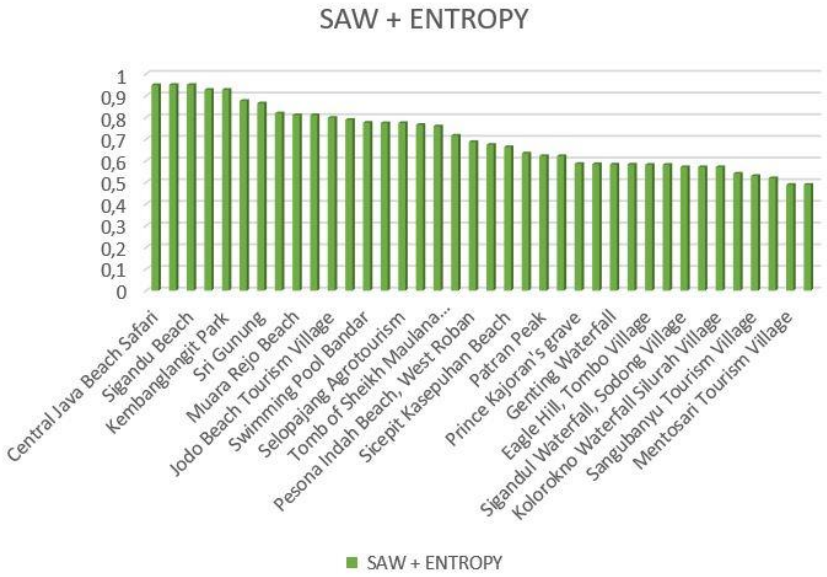

Figure 3.8.1 simple additive weighting + entropy graph

Based on the SAW + entropy graph in Figure 3.8.1, the best ranking results were obtained by Safari Beach Central Java tourism with a score of 95% according to the weighting criteria. Safari beach occupies first position out of 37 other tourist attractions.

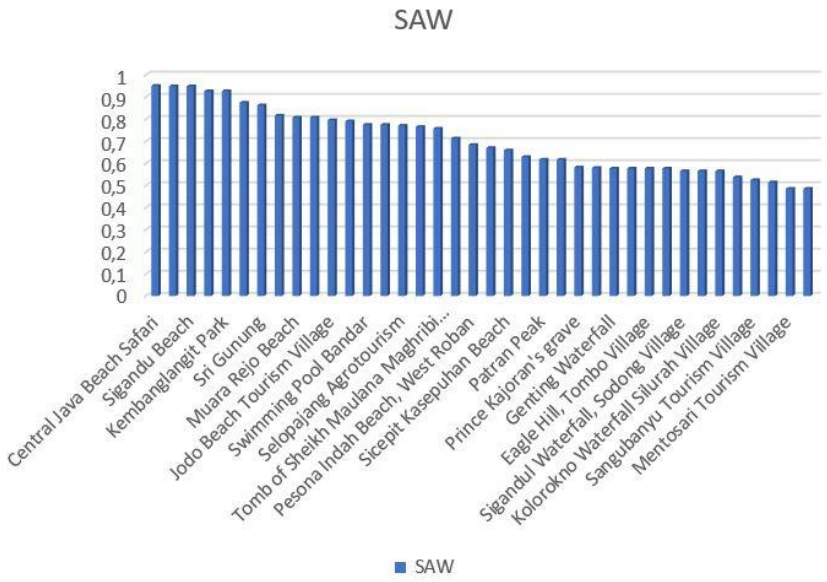

Figure 3.8.2 simple additive weighting graph

Based on the SAW graph in Figure 3.8.2, the best ranking results were obtained by Safari Beach Central Java tourism with a score of 94% according to the weighting criteria. Safari beach occupies first position out of 37 other tourist attractions.

Thus, from the description of Figure 3.8.1 and Figure 3.8.2, it can be concluded that the weight of the criteria using SAW + entropy has a greater difference than the weight of the criteria using the SAW method.

4. CONCLUSION

Research conducted on the tourism recommendation dataset, which is a dataset used for research on tourism recommendations, uses the simple additive weighting (SAW) method with the entropy method. This research was carried out in several stages, namely: determination of criteria, input of alternative criteria, weighting of criteria, normalization of criteria, calculation of the entropy method, results of the weighting of the entropy method, calculation of the SAW method, decision making. After carrying out the process of the above stages, it is hoped that researchers will get the best results from one of the recommended tourist spots.

In calculating the weight using the Entropy method, there is an increase in the weight by a certain percentage from the main weight calculation, then the calculation is carried out using the SAW method with the best result for tourist recommendations being 94%. In the optimization calculation of the simple additive weighting (SAW) method, the main weights used in the SAW method calculations obtained an increase in value from the entropy method in tourist recommendations of 94%, then the best result from the SAW method in tourist recommendations was Safari Beach Central Java with a score of 95%.

Thus, from the description above, it can be concluded that the simple additive weighting method with the entropy method is the best method for tourist recommendations that produces accuracy values from the Safari Beach tourist attraction in Central Java.

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