



DECISION SUPPORT SYSTEM FOR DETERMINING THE LOCATION OF SEMINAR

Muttaqin^{1†} --- Agus Harjoko²

¹Computer Science faculty of Universitas Ubudiyah Indonesia, Banda Aceh, Indonesia

²Computer Science & Electronics of Gajdah Mada University, Yogyakarta, Indonesia

ABSTRACT

The appropriateness of a location to be selected as a seminar location is affected by many supporting factors, so that the location is suitable as a single choice. Hence, there should be made a process to decide a location whether it is proper or not to match some assessment criteria conceived before. There are 8 assessment criteria with 22 sub-criteria each. The result of the assessment forms as a total values which has limited values, determined by equal intensity (degree of assessment), which are low, medium, and high. Once the assessment process is done, then the next step is verifying comparison between one criteria with others, as well as comparison between one sub-criteria and other sub-criteria to acquire alternative ranking value. Decision making support system which is developed in this study uses Analytical Hierarchy Process (AHP). AHP is used as a decision making process tool by the decision maker to exercise a decision which faces several problems from a range of criteria. While Geographical Information System (GIS) is used to handle geography-reference data, which are input, output, data management (data storage and retrieval), and analysis and data manipulation which resulted on a map. The combination of both processes would create a new system which its mathematic calculation uses AHP but the result is outputed on an interactive map, generated by the GIS.

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Keywords: AHP, GIS, Decision maker, Seminar, Location, Map, Geography

Contribution/ Originality

This study is one of very few studies which have investigated about the location needed to serve as a reference that can be used to determine the location that corresponds to the desired to be used as an option and this study contributes in the existing literature for similar studies.

† Corresponding author

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1. INTRODUCTION

Alumni is an inseparable part of an education cycle, but their existing is often not organized well, while the number of the alumni is keep increasing. Sometimes, member of alumni from a region doesn't know with other region, due to the different batch year, either some levels below or above. The alumni of Graduate Program in Computer Science (ILKOM), Universitas Gadjah Mada who has finished his/ her study, will return to the province where they come to extract the lesson they have learnt while on the college. The lesson will be taught back to the students in their region, since most of Computer Science are lecturers, and only little of them are practitioner.

As mentioned above, the location of alumni's dormitory between one person and others is a part of problem to determine the location of seminar, where the information of alumni's position is a very important thing. It is regarding the potency of alumni which has some capacity as seminar's speakers, in local or national scale.

Another problem is the difficulty to get information about seminar presenter in the region where the event will be held, due to lack of information between alumni. With spatial information about the existence of the alumni, it is expected as to be underlying consideration of deciding the seminar location in making the decision, based on spatial data of alumni spread to be mapped into geographical information system. This system will virtually show the location that is recommended as the location of seminar, from the alumni spatial data as one of some criterias.

Based on his problem, therefore the researcher attempts to carry out a research on how to determine the location of seminar, based on the existence of the alumni.

2. LITERATURE REVIEW

Carried out a study, titled "Supporting System of Decision Making Based on Geographical Information System to manage Cemeteries in Urban Area" suggested that the lack of land area for cemetery and the increasing vales of land in the city of Yogyakarta will create some problem in the future. The cemetery in Yogyakarta, managed by DKPP or personal or foundation, in general has not been planned and organized in a good manner, physically or administratively [1]. Conducted a blue print of decision making support system with assistance of Geographic Information System to visually view the location of Center of Waste System (TPA) of garbage and other perimeters possessed by the future TPA location be used as a helping tools to support the decision making in determining the location of TPA, by certain modelling thath can generate a decision alternative and implement it in a computerized decision support system to help authorities [2]. Did a research by using AHP to examine quality, quantity, continuity, and environment of of raw water sources which can be prioritized to prop up basic infrastructure and solve the problem of clean water for the society [3]. In his research explained that with rapid thrust of technology, results in the growing facilities which can ease people's life, where one of it is the rise of notion regarding software application of geographical information system to assist the selection of strategic advertisement banner by the user. By using geographical information system, it will be much easier by the decision maker to analyze the existing data [4]. In his research suggested that with the massive growth of Learning Assistance Institution (LBB) from primary school to senior high school in

studying. The geographic information system (GIS) is an information system that can visualize the pattern of consumer's spread to be identified and analyzed, while analytic hierarchy processing (AHP) is a method which can be used to make a decision with multi-criteria and multi alternative [5]. In her study explained that the ranking of medium class of micro business unit (UMKM) as a method to arrange decision making system of UMKM ranking. It is aimed to be the training of finance management and capital loan in UMKM of salty egg business by using weighted product model (WPM) method, where the criteria used is adjusted with the provision imposed by Office of Industry and Trade, Cirebon City and done with quantitative method [6].

3. RESEARCH METHODS

3.1. System Analysis

The support system of decision making in assessing an appropriateness of seminar location is used to help the decision maker to give recommendation for the suitable location in a particular area located near that alumni. The process of seminar location appropriateness selection in the system is run by using AHP (Analytical Hierarchy Process) method, based on the criteria inputted, such as alumni criteria, transportation criteria, staying criteria, tourism objects criteria, natural disaster criteria, environment criteria, seminar scale criteria, and building capacity criteria. Based on the data inputted by the decision maker, as the people who responsible to give recommendation of seminar location appropriate to be suitable location by using the inputted criteria.

The data needed by system is province data, regency data, alumni data, building data, criteria data, sub-criteria data, and intensity data which will be projected into the map visually by using the google map.

3.2. The System Design

Based on the system analysis, it is identified about the need of the input, process, and output of the system. Before creating the system, the researcher needs a system design, including basis data analysis, and also data flow diagram.

3.3. Basis Data Design

Basis data design is set of specific questions that relevant with various aspect data processing. It is like the data object to be processed by the system, the composition of each data object, and relationship between those data object.

3.4. Entity Relationship Diagram (ERD)

Some of the business rules concerning relation inter-entities in database design of decision making support system of seminar location can be explained as follows:

1. Each of province has several buildings, and has some alumni in that province.
2. Each of province has few alumni.
3. Every decision maker might have several criteria, and each of criteria values has some alternative values that will be through this alternative, then will be selected the province as the location seminar, based on the highest rank.

4. Every decision maker can implement assessment to some criteria, sub-criteria, and intensity.

3.5. Data Flow Diagram Design

Data Flow Diagram is a graphical description of a system by using symbolic shapes to describe how data is flowing through some interconnected process.

The context diagram is the highest level of DFD which portrays all of the input into the system or output of the system. The diagram of system context of location seminar decision making, can be seen on Figure 1.

Level 0 DFD consisted of one process symbol that depicts the whole system. There are two terminator which interact with system, which are: admin and user. The flow of data from admin into the system are the province data, regency, alumni, building, criteria, sub-criteria, and intensity. Whereas the data flow from the user to the system are the criteria value, sub-criteria value, and intensity value.

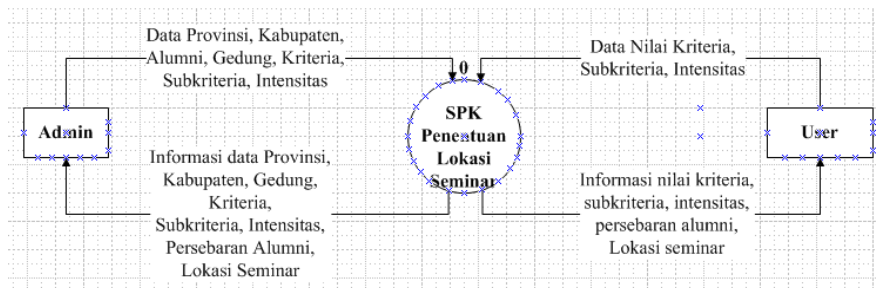


Figure-1. SPK Context Diagram of seminar location determination

4. RESULT AND DISCUSSION

To examine the system, as exist in DFD level 1, there are few procedures that must be carried out. Firstly, the data input, this process is exercised by the system administrator.

The testing of this decision making support sytem, required seven process as the DFD Level 1 to generate system by using the method used.

The first process is the provice data processing, consisted of four process also, which are the log in process, data record process of province data, update process of province data, and removal process process of province data.

The second process is the data processing of regency, which consisted of logging in to the website, recording data of the regency, updating process of regency data, removal process of regency data.

The third process is the alumni data processing, which consisted of four process, i.e, the logging in process into the website, the alumni data recording process, the alumni data updating process, and removal of alumni data.

The fourth process is the process of building data processing, which consisted of four process also, which are the logging in process, the bui,ding data recording process, building data updating process, and removal of building data.

The fifth process is the process of seeking the criteria value that consisted of four process also, which are the criteria data recording process, the process of showing the comparison value of the criteria, updating process of criteria value comparison, and also consistency checking process.

The sixth process is seeking the sub-criteria value, which arranged by four process also, which are saving the value data process into the website, value showing of comparison criteria process, and updating process of sub-criteria comparison.

The seventh process is seeking intensity value which consisted of four process also, which are the saving the value data into the website, process of showing comparison value, process of showing the intensity comparison, updating process of intensity comparison of the value, and process of showing the location of the seminar.

Before the administrator conduct the data recording process, the administrator must first get into the system and logging in into the system, and then the system will carry out a verification process to the user name and password which has been inputted, to check whether it is already correct or not, if the username and password is already match, then the administrator can directly access the system and do the processing toward the data which will be recorded or inputted into the system.

4.1. Alumni Data Input

The alumni data input done by the system administrator by inputting some of the data, which are: the very first data that will be inputted formed in the data of college student registration number, name of the alumni, his/ her status as academician or practitioner. Another thing that will be inputted is the address of the alumni, the province where she/ he comes from, the regency of her/ his belonging, the latitudes dan longitudes of earth coordinate of the alumni is taken, from the address of each alumni that will be projected into the alumni position scattered map.

4.2. Building Data Input

The next data input is inputting the building data, where this building will be used as the place of the seminar, where there are 5 items to be inputted into the building data, whereas one of it starts from the name of the building, the address of the building, the province where the building located, the latitude and longitude values, and then when administrator press the save button, the whole data which has been inputted will be automatically saved into the databases.

4.3. Province Data Input

The province data input is intended to identify the existence of an alumni, where she/ he comes from, while also to see what area is he/she comes from, how much alumni is there, and how many percentage is the spread of the alumni in that area. The data inputted into the province data input form consisted of five items to be inputted into the province data form, where the first one is the code of the province, name of the province, the latitudes, longitudes, and also the zooming level used to see the location from a close direction or farther direction, based on the input.

4.4. Regency Data Input

The regency data input is similarly carried out in inputting the data in the province data. The data that is inputted consisted of code of a regency, name of the regency, and also the province where the regency located, latitudes, longitudes of the regency and also the zoom that is inputted.

4.5. The Input of Criteria Data, Sub-Criteria Data, and Intensity

The input of criteria data, sub-criteria, and intensity is put by using the number choice from 1 until 9. The input of criteria value, where the criteria inputted are the alumni criteria, transportation, staying, tourism objects, natural disaster, environment, seminar scale, and criteria of building capacity, which all of it has been inputted by the administrator of the system, while the user only input score 1 until 9 with the requirements as already set out in the AHP model. For the input of the sub-criteria value, and also the input of the intensity value are High, Medium, and Low.

4.6. The Process of Alternative Ranking Assessment

To gain the alternative ranking process that will be used as the recommended city of the location of the seminar that will be conducted from the inputted system, the subtraction is implemented of every priorities, either the criteria of priority, criteria of sub-criteria, and intensity priority that we have already possessed in the previous discussion, where the value of every priority has already acquired. After every value is already gained, finally there will appear the scoring of the value, whereas the highest value score will be set as the recommendation of the city of the seminar place, and also this alternative scoring is sorted based on the highest score value to the lowest score value, due to the the number of the cities that is inputted into the system to be calculated of what city is the most suitable to be recommended.

5. DISCUSSION

After the test is carried out, either the testing by using white-box method (testing by the programmer to the programme control structure comprehensively) or by using the black box which involved system user party, but then the user or the policy maker or decision maker of the system is expected to be well-educated or at least know when the administrator shall input the value, especially the input of criteria value, the input of sub-criteria value, and the input of intensity value.

The number of alumni in a region or province doesn't guarantee and can't determine that the seminar location which will be used is from the province, or even on the contrary, due to many number of alumni can be as the criteria compared, as well as other eight criterias that must be take into comparison account, the transportation criteria, the criteria of staying, criteria of tourism object, criteria of natural disaster, criteria of environment, criteria of seminar scale, and building capacity criteria that will be used as the place for hosting the seminar.

The highest rank shown by the system is the City of Semarang, with score value percentage of 1,59 on the first rank, and the second rank with score value percentage 1,42 awarded to Medan City, and the third rank with score value 1,42 is Banda Aceh City. Because in this case, there is only three regions inputted to conduct the calculation of what areas is the best recommendataion to be the place of the seminar which will be held. From the result shown by system with the value we

have inputted before, thus Semarang City is highly recommended to be the location of the seminar, because it get the highest rank.

The result of scoring by using *Weighted Product Model* (WPM) method is not much different from what is generated by the *Analytical Hierarchy Process* (AHP) method, which is from three different seminar location compared, between a city and other, from the location aspect as a result is the Semarang city on the first place with the value of 0.398, taken from the WPM method, whereas AHP method generated value of 1.59, which shows that Semarang City get a higher rank and highest priority as the Location of Seminar compared to Medan City which only get 0.342 with WPM method and value 1.52 gained by using AHP method and Banda Aceh City get value 0.259 from the result of ranking by using WPM method, and value 1.42 by using AHP method alternatively.

6. CONCLUSION

Based on the description above, we can conclude several statements:

1. There has been built an application system to determine the location of seminar by using AHP method, that will be consideration or recommendation for the decision maker, later.
2. System can give information regarding the spread of alumni in a province, until the level of regency/ city.
3. The value generated from the Weighted Product Model (WPM) method comparison is not much different from the values resulted from the Analytical Hierarchy Process (AHP) method.

7. SUGGESTION

There is a significant need of doing a further research with other method to get result comparison with the work that has been done to get a better accuracy.

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