

Design Application Search Location on a building with Geographic Information System Utilizing

Case studies on buildings of Widyatama University

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Abstract—Structuring territory is something that should be done, in a variety of conditions above the surface of the earth. Various layouts of buildings, sometimes unable to give detailed information to the needs of outsiders who will visit on a certain building. Generally, for a description of the layout of the building in an area large enough only depicted on a map the location of which is placed at strategic places. However, it is not only building which is the goal of a person, but more than that in searching for information. Because people are looking for building is initial question that must be done, then just look for something else, such as room where, who is responsible or the people who work in the room, including the names of people who are in a particular room. Information obtained for a guest or person concerned in the environment, often do not know the location of the building follows function, this becomes a natural because of the vast area causing people in a company just does not know any other place, except place frequented only. That is, it is important to know the location of a place / room to the following people who are in the room, and reserved / function room. Geographical Information System is one way that can be done to solve the above problems, because the ability to analyze a place on the earth's surface.

Keywords : *The layout of buildings; condition of room; Search location; geographic information systems*

I. INTRODUCTION

Along with the development of human needs are more and more; demanding every society; communities; organizations; governments; and others, always prepare for the arrangement of buildings adapted to the growing person / employee, especially in an organization. Similarly, that happened in college Widyatama University, one of the colleges that are in Indonesia, also will do the same in the construction of rooms. And the layout is already in a good and attractive design, as well as rise buildings; separation of the lecture halls; and different placement of room for the leadership; employees, professors, and others.

Besides, in general, universities have a very wide area. But in one thing, so pulling a building layout cause frequent lecturer / staff / students, confused to find a place / room that

had never visited to meet someone. Or, because of the large room that is similar from one room to another room can cause people to forget, let alone an outsider for the first time to university.

Activity in a college is very diverse, because the function of many who go in and out, and change each other a function room. Also often times, students; lecturers; or guest who confused looking for someone who will find room in universities. Various problems are the basis in the completion of the search room or person. There are many ways that universities have done to make it easier for someone to find the room or the person who will be encountered. Typically, using a map of the location but are often found in the map has not been able to provide detailed information about the person's needs.

Geographic Information Systems (GIS) is a way to find out and analyze the existence of objects in the earth's surface. GIS can be used as a means to perform the process of providing interesting information from the spatial data with non-spatial. In application development here also take advantage of this GIS, in order to integrate and display the image simultaneously maps (spatial data) with the database (non-spatial data).

Formatter will need to create these components, incorporating the applicable criteria that follow.

II. LOCATION

Planning to build a building for a college with respect to the number and area of each room; location; and decoracy that must be tailored to the curriculum used. However, because the curriculum is always changing room or building is permanent, it requires creativity in managing the efficient use of available room or building based on the curriculum that is used for the creation of teaching and learning atmosphere as it has been desired. Location theory can be defined as the science of investigating the spatial structure (spatial order) of economic activity. Or can also be interpreted as a science of geographical allocation of scarce resources, and its relationship or influence on the location of various businesses or other activities (activity).

In general, the choice of location by a unit of activity is determined by several factors such as local raw materials (local input); local demand (local demand); raw materials that can be moved (Transferred input); and demand outside (outside demand) [2].

In addition to the theory mentioned above, there are theories that need to know the location of the Central Place Theory. This theory developed by Christaller enhanced by August Losch. The conclusion that can be drawn from this theory is that a good way to provide service based on the spatial aspect to the community is by placing xx location of activities serving the needs of society in a central place. This is the main basis for any allocation of service facility location [1].

Place a central location that is intended in this case is a place that allows maximum community participation, both for those involved in service activities, or who become consumers of goods or services produced. Such places, by Christaller and Losch, assumed to be point nodes of a hexagonal shape. These places have a regional impact on the surrounding area. Christaller, based on the assumption that "people will walk to where the closest place of residence to obtain goods", so for people who live in the area of influence of central places bertampalan, they will go to the nearest central place.

Accessibility can also be interpreted easier location to another location. Education accessibility can thus be interpreted as the ease of building sites in providing service to the community. States that accessibility refers to the ease of moving from one place to another in an area that is closely related to the distance [8].

III. CURRENT SYSTEM

The system now in use, that there is only one map of the location of the area Widyatama University stored at the entrance to campus. Beside that, there are markets on Widyatama University buildings. The information presented has not been able to represent the needs students; faculty; and guests, who will find the room or the leadership at the Widyatama University housed in a specific room. The problems that often arise include :

- The students are having trouble finding the classroom, because there are lectures replacement / additional or place of the exam.
- The students are having trouble finding work room lecturer in various courses of study, because subjects can be served from a different study programs.
- Parents who will seek leadership of faculty room / study program / part of academic / financial section to know the progress their children.
- Guests will find lecturer / head of faculty / courses of study for the purposes of cooperation
- Often leaders / lecturers / employees Widyatama University not knowing where the room is on the campus because the area is very spacious.

So conclusion, many students / faculty / staff / leadership; do not know the location of the room following their function in the campus of Widyatama University, especially guests who will visit the campus.



Figure 1. Layout of some buildings at the University Widyatama Bandung Indonesia

As shown in Table 1 below, the area recapitulation of all existing buildings at the Widyatama University

TABLE I. Recapitulation partial of the floor area data

Building A (Foundation & Rectorate)			
NO	Floor	Area (ha)	Information
1	Basement	935.40	
2	1	758.17	
3	2	850.47	
4	3	750.67	
5	4	588.71	
TOTAL		3,883.62	
Building B (Graha Widyatama, Classroom, Laboratory, Office of technique faculty, office of language faculty, visual and design faculty)			
NO	Floor	Area (ha)	Information
1	Basement	1,368.00	
2	1	1,368.00	
3	2	1,368.00	
4	3	1,368.00	
5	4	1,368.00	
6	5	1,368.00	
7	6	1,368.00	
TOTAL		9,576.00	
Building C (Economics Faculty)			
NO	LANTAI	Area (ha)	Information
1	1	2,592.50	
2	2	2,466.50	
TOTAL		5,059.00	
Building D (Calsroom & Office of Economic Faculty)			
NO	LANTAI	Area (ha)	Information
1	1	445.00	
2	2	445.00	
3	3	445.00	
TOTAL		1,335.00	

IV. GEOGRAPHICAL INFORMATION SYSTEM (GIS)

GIS applications can be used for various purposes for which processed data has a geographic reference, meaning the data is composed of a phenomenon or object that can be expressed in physical form and has a spatial location [4].

The main objective of the utilization of Geographic Information System is to facilitate getting information that has been processed and stored as attributes of a location or object. The main characteristic of data that can be used in a Geographic Information System is the data that has been tied to location and is the basic data that have not been specified [11].

The data that is processed in GIS is basically composed of spatial data and attribute data in digital form, so analysis can be used is spatial analysis and attribute analysis. Spatial data is data related to the spatial location of the general shape of the map. While attribute data is a data table that serves to explain the existence of various objects as spatial data.

GIS software, at this moment already provides the facilities to communicate with software applications until they were able to exchange data dynamically either through OLE and driver facilities ODBG. In addition, GIS has many implementation the form of software components that can be reused by those users who want to display digital maps on the application with the capabilities and quality standards of appearance.

GIS has capabilities for a very good following in visualizing spatial data attributes. Modify color; shape; and size of symbols required to represent the elements of the earth's surface can be done easily. And almost all GIS software has a Gallery or a library that provides standard symbols that are often necessary for the sake of cartographic or map production.

V. SYSTEM DESIGN

Application design builds upon the merger between geographic information systems (Mapinfo) with visual basic. Being an intermediary software to recognize the function that is in Mapinfo, then used Mapbasic which is a known language to manipulate data in Mapinfo. The general stages, which performed like Figure 2. Here :

- Take measurements campus area, the next measurement in software design in autocad.
- Convert files from autocad into the MapInfo software, resulting in spatial data.
- Data was recorded against each area of the building follows the room; record the function of each room and leader / lecturer in the room. This result will be a reference to the establishment of a database table in MapInfo (non-spatial data)
- Spatial data and non-spatial data combined, by first determining the coordinates of each point of room (spatial data) The following databases (non-spatial), the process is carried out in the MapInfo.
- Furthermore, drawing pictures of every building; room; leadership; lecturers; laboratory, library, parking, etc. each image will be in a link in visual basic program.
- The final step, the main program will merge a Visual Basic program that has the image link, with MapInfo (which already contains the spatial data and non-spatial data). To use the functions in MapInfo, the basic map used as an intermediary between the visual basic with MapInfo.

Stages as in Figure 2. Is an activity that needs to be done to produce an application program based on needs of air, which looks will make it easier for everyone who will look for an object physically at the Widyatama University.

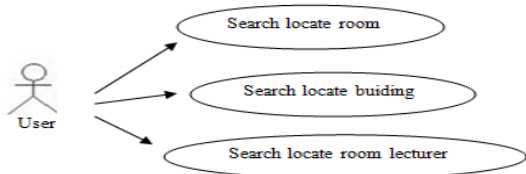


Figure 3. Use Case Diagram

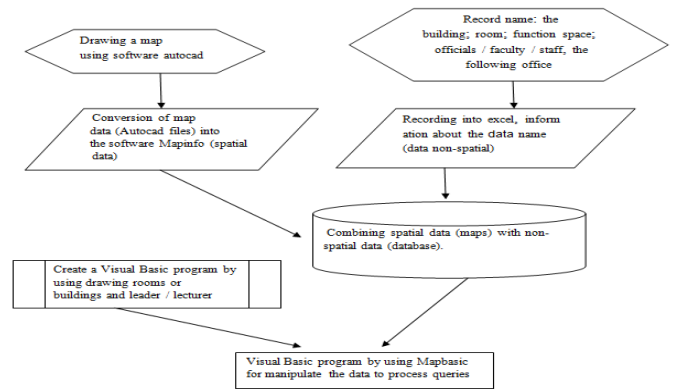


Figure 2. General stages of system design

VI. IMPLEMENTATION SYSTEM

Here will be explained about the stages of system implementation starting from use cases and scenarios; class diagrams; sequence diagrams; and lists the form and list of attributes. Each of these steps only represent the number of designs that have been done before.

Definition of use case is an explanation of the use case or the processes that take place at the Widyatama University. The description of use cases that exist in the application Mapping Widyatama University are as follows :

Scenario (flow of events) for each use case of the Application Mapping Widyatama University are as follows :

TABLE II. Use Case Scenarios Seeking Data Room

Name	Looking for data room (Do a search room data)
Level	User Level
Actors	User
Goal	Search locate room
Precondition	Search based on data room
Postcondition	Searching
Steps	1. user selects the search menu on the room, the name of officer 2. user presses the search button to view the information room 3. room information appears in accordance with the searches performed by users
Variation	users to search data in accordance with the needs, room information appears in accordance with user demand

Class diagram is a depiction of linkage analysis of the objects that exist in the developed information system environment. Here is the class diagram analysis of mapping applications Widyatama University:

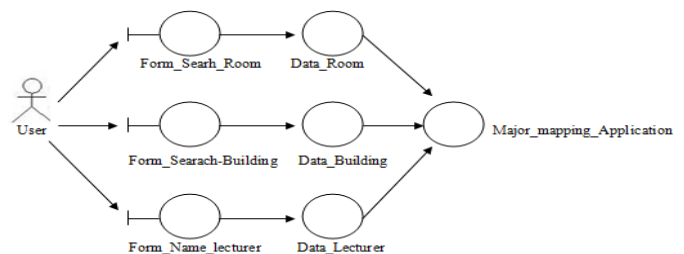


Figure 4. Class Diagram Analysis Mapping of Widyatama University Application

The responsibility (form) is a process performed on the control class, while the attribute is a description of each bondery, entity and control. List the responsibilities (forms) and attributes of the Application Mapping Widyatama University are as follows :

TABLE III. List Form and Attribute

Class Name	Form List	Attribute List
<i>FormSearch_Data_Room</i>	1. <i>getForm_Data_Room</i>	
<i>FormSearch_Data_Room</i>	1. <i>getForm_Data_Building</i>	
<i>Data_Room</i>	1. <i>getData_Room</i> 2. <i>serachData_Room</i> 3. <i>viewData_Room</i>	1. Floor 2. Number 3. Room Number 4. Room Name 5. Area 6. Information 7. Official Name 8. Position
<i>Data_Room</i>	1. <i>getData_Room</i> 2. <i>serachData_Room</i> 3. <i>viewData_Room</i>	1. Number 2. Building Code 3. Building Name 4. Area 5. Information

Sequence diagrams are used to describe events that do external actors on the system, and every event that occurs in the internal systems that are in a use case.

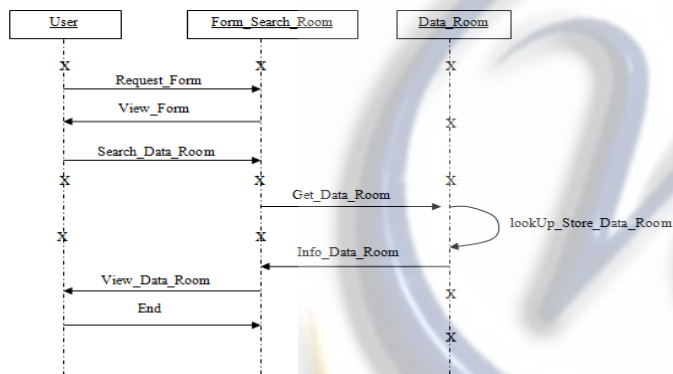


Figure 5. Sequence Diagram of Managing The Data Room

Deployment diagram is a depiction of the concrete tasks of each node / software involved in the network system, featuring a whole nodes in the network and the relationship of these nodes, including the processes involved. Deployment Diagram Mapping Applications Widyatama University is described as follows :

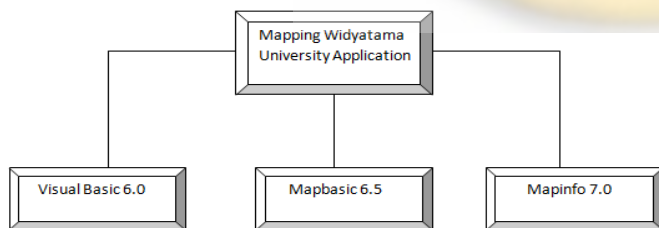


Figure 6. Diagram Deployment of Mapping Widyatama University Application

Results from the implementation of this system, will generate a search application program room, based on the needs of users, such as produced in the form of deployment

diagrams. At each appearance will be explained about the map location of the room that in the search; photo of the owner of the room, and room conditions. Some expressed the view that following is a form of search result data room. Images displayed on :

- Data room foundation chairman; the following conditions and location of office room
- Data room rector; following conditions of the room and office locations
- Data of laboratory room



Figure 7. Room of Rector Widayatama University

VII. CONCLUSION

Based on the implementation of the system that has been done, it can be concluded as follows :

- Placement of the application program should make it easier for users to see, and usually placed at strategic places.
- Ease of finding fulfillment locations by the user to efficiently and effectively, will give satisfaction to the service user (consumer)

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