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Vocational High School Mapping of Islamic Boarding Schools in East Java Using Geographic Information Systems

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Abstract— A survey, which was conducted in July 2017 by the Regional Office of the Ministry of Religion of East Java, showed that there were 2,109 Islamic boarding schools in East Java in the 2016/2017 Academic Year. Currently, information about vocational schools (SMK) in Islamic boarding schools can be found on the website of vocational school at https://datapokok.ditpsmk.net/school?menu=0&ubah=&id_prov=050000&id_kab=&id_kec=&id_bidang=&id_program=&id_kompetensi=&sts=&id_prov=050000.

Unfortunately, the public can only get information about the SMKs with their specific major or competency on the site. They still cannot see if the particular SMK is a part of Islamic Boarding Schools or is managed by regular educational foundations outside Islamic boarding schools. On the other hand, the data of the Islamic boarding schools themselves can be accessed through the website; <https://jatim.kemenag.go.id/>. On the website, the public can only see information about the boarding school but do not know the environment around the boarding school, especially information about the existence of the SMKs, the competency offered, and other related information. Based on the above reason, the research was conducted to generate solutions for the community and also the Regional Office of the Ministry of Religion of East Java to provide information on boarding schools. The result of the research is called the Geographic Information System (GIS) of the boarding schools. The research method used is the observation and the direct interview with the Head of Information and Public Relations (INMAS) Regional Office of the Ministry of Religion of East Java, laboratory research, and the implementation of the Object-Oriented Development Life Cycle (OODLC). The GIS was developed with an

HTML website framework, with programming languages (Javascript and PHP), MySql as a database, and the Google Maps API.

Keywords— Vocational Schools, Islamic Boarding Schools, WEB, Geographic Information Systems (GIS)

1. Introduction

The society makes use of information technology as a medium to find information about their daily life, including a boarding school location. Google Maps is an accessible information technology for finding places. However, Google Maps only provides information about the site of Islamic boarding schools. If people want to know the environment and information about the desired area, they can use a technology called Geographic Information Systems (GIS). This system can provide the information needed by the community. Geographic Information System (GIS) is a combination of three main elements, namely systems, data, and geography. GIS is a type of software, hardware, people, procedures, databases, and communication network facilities that are used to facilitate the processes of entry, storage, manipulation, display, and output of data or geographical information along with its attributes [1].

The community needs information about vocational school data, the competencies, the locations, names, addresses, telephone numbers, e-mails, photos of places, and other data related to the desired place. More specifically, the community needs the Geographical information about Islamic

boarding schools in East Java. A survey in July 2017 at the Regional Office of the Ministry of Religion of East Java Province showed that there was no information about the geographical boarding school. Based on the data of the Regional Office of the Ministry of Religion of East Java, there were 211 Islamic boarding schools in East Java in the 2016/2017 academic year. The existence of a large number of boarding schools makes it difficult for parents or the general public to get information about boarding schools, both general information, such as maps, names, addresses, telephone numbers, photos, and detailed information on profiles, facilities, categories, status, and the official website of each boarding school.

The common goal of parents or the general public to send their children to boarding schools is to develop the interest and desire to learn religion and to improve the child's independent behavior. But due to the lack of information about maps, names, addresses, telephone numbers, photos, and other information about the boarding school, parents go directly to the boarding school they want. Therefore, parents or the general public need the Geographic Information System that provides information about the geographical location of Islamic boarding schools in East Java, and the path to Islamic boarding schools in East Java.

Based on the background above, the researchers built a Geographic Information System (GIS) of Islamic Boarding School in East Java. The website is expected to help parents or the general public, as well as the Regional Office of the Ministry of Religion of East Java Province, to find the locations of Islamic boarding schools, along with other information about Islamic boarding schools in East Java.

2. Research Description

2.1. Related Research

Other researchers have conducted studies on the website-based Geographic Information System of Islamic boarding schools. One of which is the Geographical Information System of Islamic Based Educational Institutions (RA to Vocational Education) in East Java. The results of this study are the GIS of Vocational High Schools in Islamic Boarding Schools that displays the competencies, location maps and other school data of the Islamic Boarding Schools. Users can find information

quickly and practically if compared by using conventional map search and manual search through internet search engines [2].

2.2. Islamic Boarding School

According to [3], Pondok is a building for a temporary place that can be in the form of a house or a dormitory. Pesantren is a boarding school or a place where students learn to recite and study religion. From the above understanding, Islamic boarding school can be interpreted as a place to study religion in a house or dormitory where students are called Santri.

According to [4], in general, to graduate from the Islamic boarding school, there are two levels, which are:

- Salaf or Salafiyah, Islamic boarding schools are Islamic boarding schools that use traditional education systems that purely teach religious knowledge and books.
- Khalafi Islamic Boarding School, or Khalafiyah, is Islamic Boarding School whose education system follows the times. This boarding school is usually called the Modern boarding school.

2.3. Geographic Information Sub System I

According to [5], the GIS subsystem is described in accordance with Figure 1.

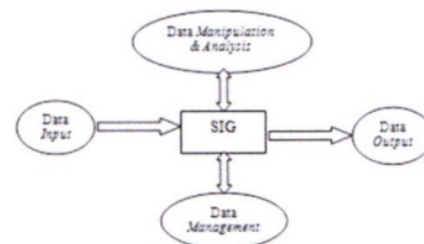


Figure 1. Illustration of subsystem SIG

1. Input Data

Collecting, preparing, and storing spatial data and attributes. This sub-system is responsible for converting the original data format into its Geographic Information System format.

2. Output Data

Displays and produces softcopy and hardcopy spatial database outputs, such as tables, graphs, maps, and so on.

3. Data Management

Organizes spatial data and attribute tables into a database system so that they are easy to recall, update, and edit.

4. Data Manipulation and Analysis

Determine information generated by Geographic Information Systems. This system manipulates and models data to produce the expected information.

3. Research and Design

A. Current System

The research data used in this study are data obtained from the Regional Office of the Ministry of Religion of East Java Province and the results of interviews and questionnaires obtained by researchers.

B. System Needed

Based on the problems that occur, then a Geographical Information System for Islamic Boarding Schools in East Java is required to be a reference for parents and the general public to find boarding schools in East Java.

C. Use Case Diagram

Use Case diagram of this study is shown in Figure 2. There are three actors: visitors, operators, and administrators. Visitors, who are parents or the general public, can access the GIS. Operators are employees of each Islamic boarding school who process the data of Islamic boarding schools. They have complete and up-to-date information on their Islamic boarding schools. The administrators are the employees of the Office of the Ministry of Religion, especially the Information and Public Relations sub-section (INMAS), who have more access rights than the operators or visitors. The administrators will later process the data of Islamic boarding schools based on the data entered by the operators of each Islamic boarding school that has been registered by the GIS. Besides these three actors, there are four lifelines, namely login, admin page, operator page, visitor page, and logout. There are a total of 21 messages, in which eight messages are administered by the administrator, nine by the operators, and five by the visitors.

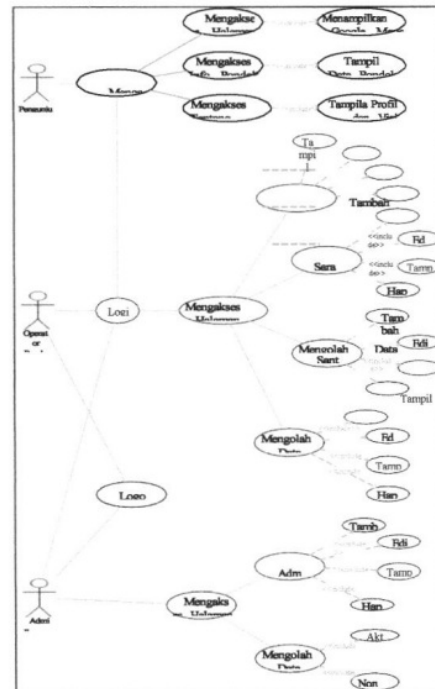


Figure 2. Use Case Diagram of Geographical Information Systems at Islamic Boarding Schools in East Java.

D. Activity Diagram

1. Activity Diagram Admin

Admin Activity Diagram illustrates all activities that can be done by the admin on the menu options on the admin page, shown in Figure 3.

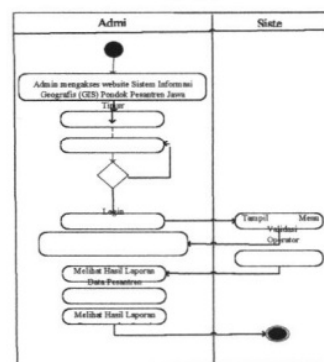


Figure 3. Activity Diagram Admin Geographic Information System Islamic Boarding School in East Java

2. Activity Diagram Operator

Activity Operator diagram illustrates all activities that can be carried out by the operators on the menu options available on the operator page, shown in Figure 4.

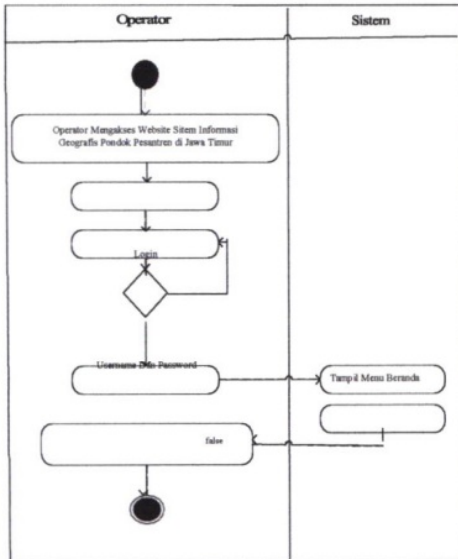


Figure 4. Activity Diagram Operator Geographic Information Systems Islamic Boarding Schools in East Java.

Figure 4 explains when the operator wants to log into the system, he must first register to get the approval from the administrator. If the login is successful, then the operator menu page appears where there is a boarding school input menu.

3. Activity Diagram Pengunjung

Activity Visitor diagram illustrates all activities that can be done by visitors to the menu choices that are on the visitor page, shown in Figure 5.

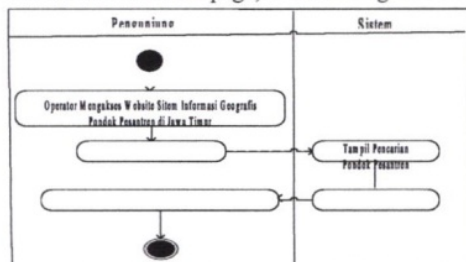


Figure 5. Activity Diagram of Geographical Information System Visitors in Islamic Boarding Schools in East Java

Figure 5 explains that visitors can immediately search for the desired boarding school with the Pondok Pesantren info menu. Visitors can choose the boarding school by entering the name of the desired boarding school. Visitors can see in detail about the boarding school by clicking on the text written next to the name of the boarding school that has been sought. After clicking on the details, visitors can see the detail information about the boarding school.

E. Class Diagram

Class diagrams are attributes and functions contained in a system that describes the structure and the description of the system, in terms of defining the classes to build the system. Classes have attributes and methods or operations.

The proposed class diagram can be seen in Figure 6.



Figure 6. Class Diagram of Geographic Information System Islamic Boarding Schools in East Java

4. RESEARCH RESULTS AND ANALYSIS

A. Implementation Results

From some implementation activities, it can be seen that the main page display of the East Java Islamic Boarding School's Geographic Information System (GIS) can be accessed by parents and the general public (visitors). The following are inputs from the stages of implementing the system that had been designed previously.

1. Input Menu

a. Operator Registration Entry Form

The page (shown in Figure 7) is an interface display from the operator menu that can be used to register an operator account to log in. It also functions to record the data of Islamic boarding school operators in East Java so that the admin can see the data of Islamic boarding schools registered at the Regional Office of the Ministry of Religion East Java Province Sub-section Information and Public Relations (INMAS), based on the name of the operator.

After the operator registers, a confirmation of registration will appear. The message displays if the operator registration is successful is shown in Figure 8. The operator must wait for confirmation from the admin. If the admin has confirmed the registration, the boarding school operators can log in.

Figure 7. Menu Registration Operator Islamic Boarding School

Figure 8. Message If Operator Registration is Successful

b. Operator and Admin Login Form

This page is an interface between the operator menu that can be used to log in to the main page of the operator and admin. Figure 9 is a display of the operator and admin login form menu that can only be accessed by the operator and admin.

Figure 9. Operator and Admin Login Form

c. Operator Confirmation Form

After logging in, the admin can confirm the operator on the operator confirmation form (shown in Figure 10). This confirmation is done so that only registered operators can input pesantren data, data on the number of teaching staff, data on the number of students, and data on the number of facilities available at the boarding school that he manages.

Figure 10. Operator Confirmation Form

d. Pesantren Data Entry Form

The Pesantren Data Entry Form (shown in Figure 11) is a form used by the operator to input Pesantren data.

Figure 11. Pesantren Data Entry Form

e. Data Entry Form Number of Teachers

The teacher data entry form (shown in Figure 12) is a form used by the operator to input data on the number of teachers registered at the boarding school.

Figure 12. Data Entry Form Number of Teachers

f. Number of Student Data Entry Form

The data entry form for the number of students (shown in Figure 13) is the form used by the operator to input data on the number of students registered at the boarding school.

Figure 13. Data Entry Form Number of Santri

g. Form Number Data Entry Form

The number of facilities data entry form (shown in Figure 14) is the form used by the operator to input data on the number of facilities available at the boarding school.

Figure 14. Form Number Data Entry Form

2. Process Menu

a. Main Page Visitors

The visitor's main page (shown in Figure 16) is the main page display of the East Java Islamic Boarding School's Geographic Information System (GIS) that can be accessed by parents and the general.



Figure 15. Main Page Visitor Menu

In Figure 15, there is a red marker indicating the distribution of Islamic boarding school locations in East Java. The marker represents 211 distribution locations of Islamic boarding schools in East Java. With the existence of these markers, parents, the general public, and the Ministry of Religion of East Java Province especially INMAS can get the following benefits:

1. The community can find out the address of the Islamic boarding schools in East Java.
2. The Regional Office of the Ministry of Religion of East Java Province is easier to inform the location of Islamic boarding schools available to parents and the general public.
3. Facilitate the community in finding the place of Islamic boarding schools in East Java.

a. Boarding School Info

Islamic Boarding School Info (shown in Figure 18) is a form of process that is generated from the Islamic boarding school data in the Islamic Boarding School Info menu. When visitors click on the Islamic Boarding School Info menu, there is the Islamic boarding school information, such as NSPP, Boarding School Name, Address, and Details.



Figure 16. Islamic Boarding School Info Page

On the Details menu, there are written Details that contain data relating to the pesantren, namely the leadership, Website, Categorical Boarding School, address, telephone, number of teachers, number of students, number of facilities and also a map of the location of each boarding school in East Java by clicking Tracking To Location. For more details, detailed information on Islamic boarding schools can be seen in Figure 19 and Figure 20.



Figure 17. Details of Islamic Boarding School

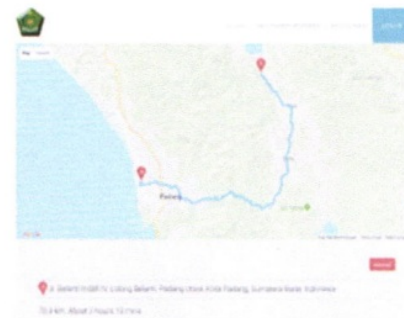




Figure 18. Location Tracking

Figure 18 explains to parents and the general public how to find out the location of pesantren. Map image illustrates the path map location of Islamic boarding schools. The path in symbol A starts from where the community is accessing, while the routing in symbol B accompanied by a red marker is the location of the intended boarding school. The specific information about Islamic boarding schools is also explained in detail. Also, Figure 18 describes the path information that can be used to determine the distance to the destination boarding school.

The benefit² obtained from the detailed information of the Islamic boarding school in Figure 18 are:

1) People can easily find the location of Islamic boarding schools in East Java.

2) The community can determine which Islamic boarding school that is considered as an option easily.

3. Output Design

a. Islamic Boarding School Report

Figure 19 is a report of Islamic boarding schools from every Islamic boarding school in East Java. This Islamic boarding school report is derived from Islamic boarding school data that has been entered on the boarding school entry forms by the operators of each Islamic boarding school.



Figure 19. Pesantren Data Report

b. Report on Islamic Boarding Schools and Santri

Figure 20 is a report of Islamic boarding schools and students in East Java. This pesantren and santri data report is derived from pesantren and santri data that have been entered in the pesantren and santri entry forms by the operator.



Figure 20. Pesantren and Santri Report

c. Operator Report

Figure 21 is the operator data report from each pesantren in East Java. This report is derived from operator data that has been entered on the operator registration entry form and confirmed by the admin.



Figure 21. Operator Report

5. Conclusion

Based on the analysis and discussion that has been carried out, the researcher built the Geographic Information System (GIS) website for the East Java Islamic Boarding School Location that assist the Regional Office of the Ministry of Religion in East Java Province in providing:

1. Convenience to parents and the general public in finding information related to the Islamic boarding schools, and other information of every Islamic boarding schools in East Java, from where they are accessed.
2. Presentation of information in the form of a special website, so that the delivery of information about the location and the route to the existing Islamic boarding school in East Java, by the Regional Office of the Ministry of Religion of East Java Province, particularly the Information and Public Relations (INMAS) section, is easily accessible to parents and the general public.

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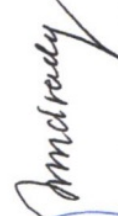
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