Mobile Based Geographic Information System for mapping and data collection Towards 4.0 Industry

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Abstract. Geographic Information System Technology makes it easier for us to manage geo-referenced information data or mapping the location of an area that is connected to the database. Nahdlatul Wathan is one of the largest organizations in West Nusa Tenggara, where there has been rapid development from year to year, especially in the field of education. The number of Islamic schools (madrasas) under the Nahdlatul Wathan organization is increasing every year. But until now, the location (geographical location) of each school is still not well recorded and mapped. Therefore, we need a geographic information system that can be used for the process of mapping and data collection of schools under the Nahdlatul Wathan organization that can help the management of Nahdlatul Wathan and each Islamic school and community to find out the location. from each school, which can be accessed quickly and precisely.

Keyword : Geographic Information System, Nahdlatul Wathan, mapped

1. Introduction
The Nahdlatul Wathan organization is one of the largest organizations in West Nusa Tenggara[1]. Location Nahdlatul Wathan's schools are scattered in almost all regions in West Nusa Tenggara. But it is not yet known or recorded either the number or location of each of these schools. The Nahdlatul Wathan school data collection[2] process based on the classification of the level of education also does not yet have a system that can be used as a medium for storing information and can provide information quickly and accurately[3].

To find out the number of Nahdlatul Wathan schools that are spread in Indonesia especially those in West Nusa Tenggara, it is necessary to have a system that can hold information about these schools. Therefore we need a geographic information system to list the locations of schools under the auspices of Nahdlatul Wathan on a mobile basis[4][5].

The purpose of this study is to map and record schools that are under the auspices of Nahdlatul Wathan with Geographic Information Systems[6][7]. Data management for each madrasa can be done by location[8]. Facilitate the organization in managing school data and find out the location of each school in the province of West Nusa Tenggara.

2. Methods
To facilitate the loading of this geographical information system, a system diagram design is used in general design for the system to be built, which aims to describe the system process to be built. The following is a Geographic Information System diagram for mapping the locations of schools under the auspices of the Nahdlatul Wathan organization.

![Geographic Information System Diagram](image.png)

**Figure 1. Diagram Geografis Information System Nahdlatul Wathan Schools**

Explanation from the picture above, that there are 3 users who will play a role in the system that will be created. Among them is that the admin has full rights in accessing data/location, to input, edit or delete location data. The data in question is the data/location of the school to be processed and processed in the system[9][10]. Next is the user or normal user, where the user has limited access to the system, can only input, edit data and cannot delete data/location of the school. Then the last is visitors. Where visitors can only see information that has been provided on the system, and can only see data and locations of schools that are under the auspices of the Nahdlatul Wathan organization[11].

The list When a user enters a website page, the user will be asked to register an account. Then the user will be able to login to the system. After logging in, the user can input school data, then look for the coordinates of the school location. After the coordinates are found, the user can directly input the coordinates of the school location. Furthermore, the data entered will be stored. After the data is saved, the system will take a user session, whether the user is logged in at an admin level or a normal user. If the user logs in with the admin level it will go directly to the admin page, if the user registers an account then the user who is logged in as a normal user. If all data is complete, the data that has been inputted will be saved to the database. If it is not complete, it will return to the school data input command. Then the data will be displayed on the list of school locations. Next, there is a command to check the correctness of the coordinates of the location of the madrasa, if the coordinates of the inputted correctly will be displayed immediately the location of the madrasa. If the coordinates are not correct, they will return to the input coordinates[12].

**3. Results and Discussion**

Geographic information system that is designed to be used in processing school location data under the auspices of the Nahdlatul Wathan organization[13]. In operating this system the user must follow the provisions that exist in the system. Here discussed how to run the system that has been created along with objects that support the formation of the system.

**3.1. Display User Interface geographic information system**
Before starting to operate the school's geographical information system, there are several steps as follows:

1. Open the Chrome browser or the like
2. Then type http://simad.nahdlatulwathan.id
3. Then click Enter then it will display the front page (homepage) on the school's geographical information system.

![Figure 2](image1.png)

**Figure 2.** the Display of the Web school's geographical information system

3.2. *The Display of Madrasa menu*

On the madrasa menu page there is a map of the distribution of school locations under the Nahdlatul Wathan organization, in addition there are also details of each school. As in Figure 3 below:

![Figure 3](image2.png)

**Figure 3.** Display of school location page

3.3. *Display of add Data Page*

On the added data page, there is a form to add more school data under the auspices of the Nahdlatul Wathan organization. For more details, see the following figure 4.
3.4. System Testing

The following are some of the cases and results of system testing that have been carried out, including:

| Cases and Test Results | Which is expected | Observation |
|------------------------|-------------------|-------------|
| Register an account    | The user registers an account to log in to the system | Can register an account | ✓ |
| Input the data         | Data can be stored in a database | Can store data | ✓ |
| Change data            | Data already stored in the database can be changed | 1. Can change data  
2. The data you want to change must first be clicked, so that data changes can be made. | ✓ |
| Delete data            | Data that has been stored in the database can be deleted | Can delete data | ✓ |

4. Conclusion

The mapping and data collection process supported by this geographic information system can be carried out more efficiently, so that it does not take long[14]. Storage of data that has been computerized optimally so that it helps the management of the Nahdlatul Wathan organization in storing, searching and making reports about the location and school data stored in the database. Optimizing the time in location reporting and school related data by each school under the auspices of the Nahdlatul Wathan organization because it is done online from their respective places[15].

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