Journal of Geomatics Engineering, Technology, And Sciences (JGETS)
ISSN 2830-1811, 2022, VOL. 01, NO. 01, 19 – 23
https://doi.org/10.51967/gets.v1i1.8

Geographic Information System Fire Disaster Mapping in Samarinda City Web-Based

Muh. Ibnu Fajar[a], Ida Maratul Khamidah[a] & F. V. Astrolabe Sian Prasetya[b]

[a] Software Engineering Technology, Agricultural Polytechnic of Samarinda
[b] Geomatics Technology, Agricultural Polytechnic of Samarinda

ABSTRACT

One of the problems that are often faced by the fire department at the time of a fire is the obstruction of the main post in determining the PMK assistance post which is deployed in the closest radius to the location of the incident. The purpose of this research is to build a web-based geographic information system that can determine and provide information about the location of fires in Samarinda City. The benefits of this geographic information system for mapping fire disasters can determine and become a source of information for the community and also the Fire Department regarding the location of the fire.

ARTICLE HISTORY

Received: 01 April 2022
Accepted: 16 June 2022
Published: 01 September 2022

KEYWORDS

Geographic Information System, Fire Disaster, Samarinda

CORRESPONDING AUTHOR

Ida Maratul Khamidah
Email: idamaratul@gmail.com

How to cite: Fajar, M. I., Khamidah, I. M. & Prasetya, F. V. A. S. (2022). Geographic Information System Fire Disaster Mapping in Samarinda City Web-Based. *Journal of Geomatics Engineering, Technology, and Sciences (JGETS)*, 1(*1*), 19 - 23. https://doi.org/10.51967/gets.v1i1.8

1. INTRODUCTION

Samarinda is the capital city in the province of East Kalimantan, part of which has functioned as a residential area in a densely populated area, where factories, markets and buildings are located. Of course, with such a dense area, it is possible for various disaster problems to arise, one of which is the most frequent occurrence of fires.

Disasters are divided into two types, namely natural disasters and man-made disasters. Natural disasters are disasters consisting of earthquakes, tsunamis, volcanic eruptions, floods and landslides. Meanwhile, man-made disasters are disasters consisting of industrial, non-industrial and social disasters (Ramli, 2010).

Fire is a phenomenon that occurs when a material reaches a critical temperature and reacts chemically with oxygen to Produce heat, flame, monoxide or other products and effects (Yunita, 2018).

The Fire Department is a government agency that acts as an information command center in disaster management, especially fires. One of the problems that are often faced by firefighters when a fire occurs is the obstruction of the main post in determining the PMK assistance post which is deployed in the closest radius to the location of the incident in reaching the location of the fire as well as obstacles in finding the point of the water source closest to the location of the incident.

Therefore a Geographic Information System for mapping fire disaster areas will be very useful to provide an overview of information for spatial (spatial) based fire disaster areas. So that the information can be easily processed by the Samarinda City Fire Department.

This study aims to build a web-based system that can determine and provide information about the location of fires in Samarinda City. The expected result is that with the application of the Geographic Information System, this fire disaster mapping can be a source of information for the community and also the Fire Service regarding the location of fires in Samarinda City.

CONTACT Ida Maratul Khamidah idamaratul@gmail.com

2. METHOD

2.1. Place and Time

This research was carried out within 6 months, starting from the making of the proposal until the completion of the research from Jan 2021–Sep 2021. The place of this research was carried out at the Samarinda City Fire Department.

2.2. Tools and Materials

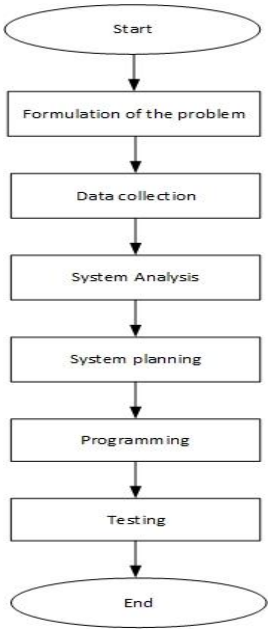
The development of this system uses the following hardware and software specifications tools and materials:

1) Hardware, using Acer Laptop (i3 Processor, 4GB RAM)
2) Software:
   a) XAMPP version 7.4.32.-0
   b) Laravel 7 framework
   c) Browser google chrome
   d) Sublime Text version 3
   e) Microsoft Office (Word, Visio) 2013
   f) Leaflet version 1.7.1
3) Ingredients

   The materials used in this study are as follows:
   a) Non-spatial data for the 2020-2021 Fire Service.
   b) Fire disaster spatial data in the form of longitude and latitude.

2.3. Research Procedure

In this study, the stages of making a web-based geographic information system for fire disaster locations in Samarinda City used the waterfall method. According to Sasmito (2017). The waterfall method or what is called the waterfall method describes a systematic and sequential approach in building a system. It can be seen as Picture 1.



Picture 1. Research Method

1) Formulation of the problem

At this stage is the first step for research, namely the formulation of the problem. What problems arise in this research, and the problem is how to create a Geographic Information System for mapping fire disasters in Kota Samarinda District.

2) Data collection

Data collection is carried out by taking data from the relevant agencies and systematically compiling the required data such as the location of the fire disaster and its attributes, latitude and longitude data.

3) System Analysis

System analysis is carried out to identify and evaluate problems or obstacles that occur so that they can be repaired. If there are deficiencies in the system that is being made later, there needs to be an improvement in the system. The system that was developed is inseparable from the need for the necessary information.

4) System Design

System design helps in defining the overall system architecture, at this stage there will be several stages including data flow design, database design, design making, coding.

5) Programming

In making this program what is done is to create a mapping information system application with the web that runs well. Making this system is the main stage because at this stage the system development process can solve problems and solve problems processing the data that has been collected. At this stage, the process of the design results that have been made is implemented.

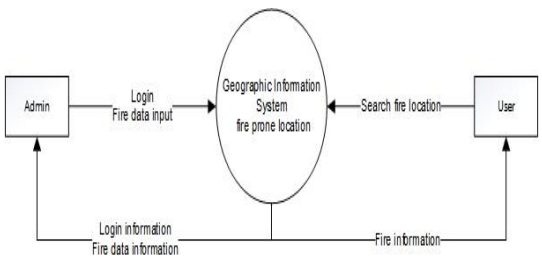
6) Testing

At this stage the system testing process is carried out to find out whether the system is running well or not, if there is a problem with the system, a redesign of the system will be carried.

At this stage, the process of checking the correctness of the data is also carried out and also testing the application to users to find out whether this application is easy to use or not by using a questionnaire.

2.4. Data Flow Diagram (DFD) level 0

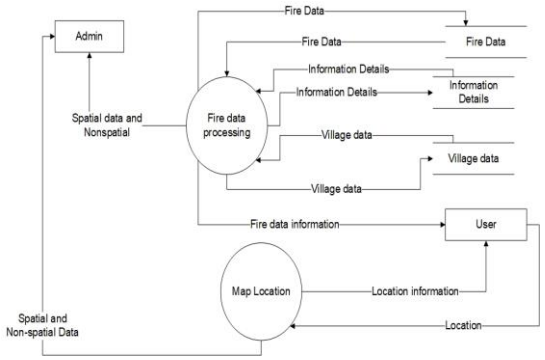
There is one process, namely the Geographic Information System for the location of the fire and there are two entities, namely admin and user. It can be seen as Picture 2.



Picture 2. DFD Level 0

GIS Fire disaster location is a system that provides information to users about the location of the fire.

DFD level 1 which is the result of the decomposition of the fire disaster map process, which has 3 processes and 2 entities, namely admin and user. It can be seen as Picture 3.



Picture 3. DFD Level 1

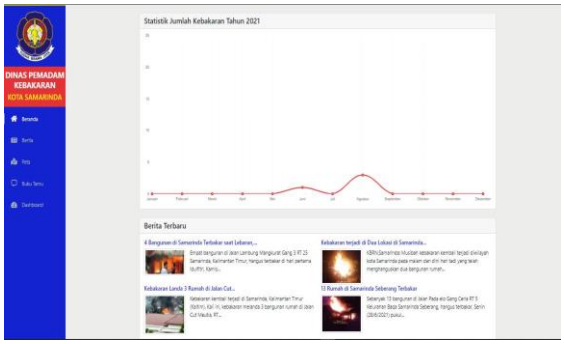
The user searches for the location of the fire disaster area, which will then be processed by the system, namely the fire disaster map. Fire disaster map checks and searches data in the database. After the searched data is found, the map location system will provide the information requested by the user

3. RESULT AND DISCUSSION

The results of making the Geographic Information System application for Fire Disaster Mapping in Samarinda City are as follows:

3.1. Home

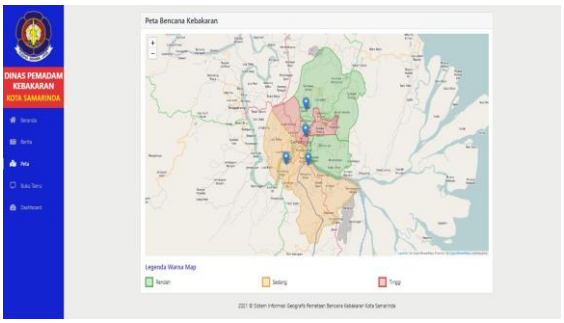
On the home page will display the latest news and statistics on events in 2021. It can be seen in Picture 3.



Picture 4. Home

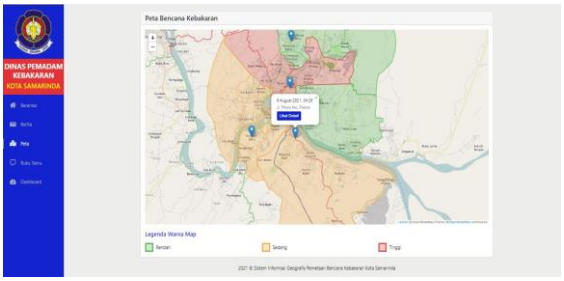
3.2. Maps

On the maps page displays a map with the fire location points that have been inputted. It can be seen in Picture 5.



Picture 5. Maps

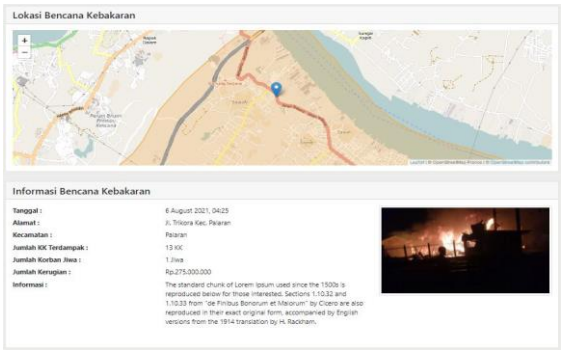
On this page, the user can select a point to view detailed information by clicking on the marker icon and it will appear in the form of a window (info window) then click the view details button.



Picture 6. See details

3.3. Detailed Information

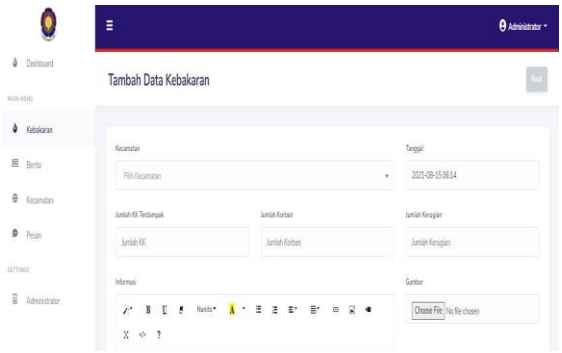
The detail info page displays a pre-selected marker to view detailed information which includes information such as date, address, sub-district, number of affected families, and other information. It can be seen in Picture 6.



Picture 6. Detailed information

3.4. Add Data Page

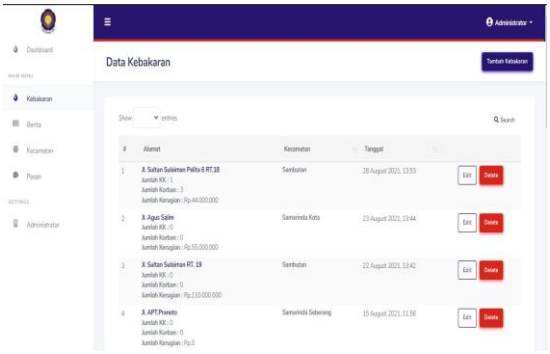
The Add Data page displays a form to input new data and on this page there is a save and return button. It can be seen in Picture 7.



Picture 7. Add data page

3.5. Data Editing Page

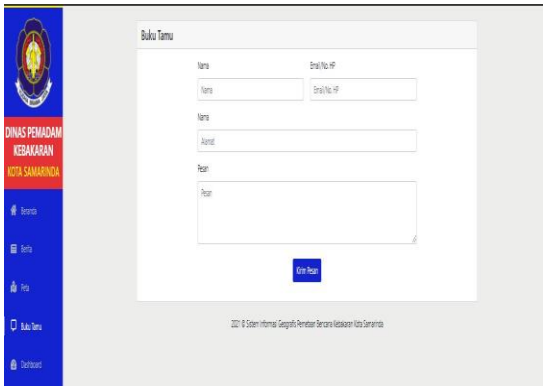
The data edit page displays a form to change the data that has been inputted, on this page there is also a save and return button. It can be seen in Picture 8.



Picture 8. Data editing page

3.6. Guestbook Page

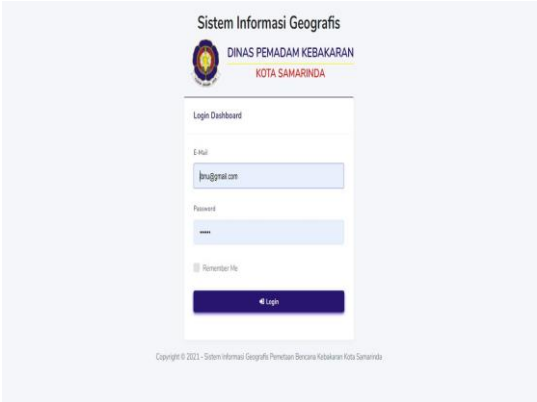
This page provides criticism and suggestions services. Can be seen in picture 9.



Picture 9. Guestbook page

3.7. Login Page

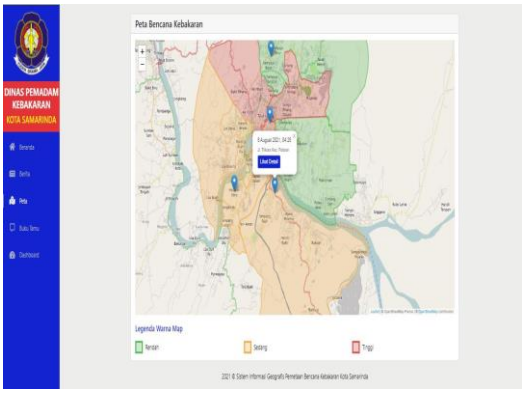
This page displays the email and password for the admin to access the data. It can be seen in Picture 10.



Picture 10. Login page

3.8. Maps

In this map view, there are drawbacks, namely not being able to add fire data in real time, in this map view it only displays the points of occurrence. The solution to this weakness is that the map should be made in real time so that users can directly input the location of the incident so that the fire service can handle it quickly. It can be seen in Picture 9.



Picture 11. Maps

3.9. System Test

System testing is carried out to ensure the application runs properly. With this test can also find out the weaknesses of this system. So, if there is an error in the system, it can be repaired. In this test, black box and questionnaire methods areused. It can be seen in Table 1.

Tabel 1. System test

Number	Testing	Result	Description
1	Login	Input email and password	Good
2	News view	News input	Good
3	Fire map view	Fire data input	Good
4	Messages display	Guestbook input	Good
5	District view	Enter district status	Good

4. CONCLUSIONS

Based on the results of the review and analysis that has been carried out, it is concluded that in making a web-based geographic information system application for fire disaster mapping, the results are obtained to be a source of information for the community and also the Fire Service regarding the location of fires in Samarinda City.

It is hoped that this Web-Based Geographic Information System for Mapping Fire Disasters in Samarinda City will be developed with an Android-based system to make it easier to use.

5. ACKNOWLEDGMENTS

The authors would like to thank the Software Engineering Technology and Geomatics Technology Study Program, Department of Engineering and Informatics, Samarinda State Agricultural Polytechnic which has given the author the opportunity to carry out research. This research is one of the requirements for completing the Diploma 4 Study Program at the Samarinda State Agricultural Polytechnic. The authors also thank the Department of Engineering and Informatics who have provided media for publishing scientific papers in the form of journals.

6. REFERENCES

Alhakim, G., Ramdani, F., & Purnomo, W. 2019. Pengembangan Sistem Informasi Geografis Penanganan Bencana berbasis Website di Kota Malang. 3(10), 9450–9458.

Buana. 2011. Aplikasi Sistem Informasi Geografis Sebagai Media Informasi Lokasi Wisata Dan Kuliner Di Yogyakarta Menggunakan Php, Mysql, Dan Google Map. Yogyakarta: Tugas Akhir Jurusan Teknik Informatika Sekolah Tinggi Manajemen Informatika Dan Komputer AMIKOM

Raharjo, B. 2015. Mudah Belajar PHP. Language, 24, 16X24cm.

Ekadanata, Andree, Sonya Dewi, Danan Prasetyo Hadi, Dudy Kurnia Nugroho, and Feri Johana. 2011. "Geographic Information System for Management of Landscapes Based on Natural Resources." PT. Mother Earth 1: 1–38.

Eltha, R. J., & Assegaff, S. 2020. Analisis Dan Perancangan Sistem Informasi Geografis Pemetaan Bencana Alam Di Provinsi Jambi. 5(2), 274–286.

Fathansyah, B. D. (2012). Bandung. Informatika.

Lukas, M., Kom, S., & Kom, M. 2016. Sistem informasi geografis bencana kebakaran pada badan penanggulangan bencana dan daerah kota samarinda.

Palit, R. V, Rindengan, Y. D. Y., & Lumenta, A. S. M. 2015. Rancangan Sistem Informasi Keuangan Berbasis Web Di Jemaat GMIM Bukit Moria Malalayang.

Raharjo, B. (2015). Mudah Belajar PHP. Language, 24, 16X24cm.

Ramli, S. 2010. "Manajemen Kebakaran". Jakarta: DIAN RAKYAT

Saputra, F. P. 2017. Sistem Informasi Geografis Penanggulangan Bencana Kebakaran Pada Badan Penanggulangan Bencana Daerah Kota Samarinda Berbasis Web Munggunakan Platform Google Maps.

Sasmito, G. W. 2017. Penerapan Metode Waterfall Pada Desain Sistem Informasi Geografis Industri Kabupaten Tegal.

Swastikayana, I Wayan Eka. 2011. "Web-Based Geographical Information System for Tourism Mapping of Gianyar Regency (Case Study at the Gianyar Regency Tourism Office)." Geographical Information Systems 1 (1): 1–163. https://doi.org/10.1007/978-90-481-3609-4.