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INFORMATION SYSTEM FOR DISASTER MANAGEMENT DATA PROCESSING AT THE REGIONAL DISASTER MANAGEMENT AGENCY (BPBD) OF NORTH ACEH REGENCY

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Abstract

This research aims to address the pressing need for an efficient and comprehensive information system application for disaster management. Natural disasters can have devastating impacts on communities, and effective disaster management is crucial to minimize losses and ensure a swift and well-coordinated response. To meet this objective, the study develops a website-based application that manages critical disaster-related data, such as information on disaster victims, aid distribution, handling processes, and visual documentation (photos and videos) of the disaster. The design of the application incorporates three essential methodologies: Data Flow Diagrams (DFD), Entity-Relationship Diagrams (ERD), and Context Diagram. These methodologies ensure a clear and systematic representation of data flow, database structures, and system boundaries. By utilizing these tools, the researchers ensure the application's efficiency, effectiveness, and user-friendliness in managing disaster-related information. The research employs a mixed-method approach, combining quantitative and qualitative data collection techniques. Surveys, interviews, and observations are conducted to assess the application's usability, effectiveness, and impact on disaster management. Quantitative data is analyzed using statistical tools, while qualitative data is thematically analyzed to gain deeper insights into user experiences and perceptions.

Keywords: Disaster, Mitigation, Information System; etc.

INTRODUCTION

During an enriching two-month Kerja Praktek (internship program) at the esteemed BPBD Office in North Aceh Regency, the author had the opportunity to closely observe and analyze the prevailing disaster management practices. It came to light that traditional and conventional methods were still employed for disaster data collection. Critical information, such as the number of disaster victims, the exact locations of disasters, and the extent of damages, was being recorded manually on whiteboards. This antiquated approach hindered efficient data management, leading to difficulties in accessing and sharing information promptly. Consequently, updates on disaster situations were not disseminated swiftly, posing challenges in coordinating effective disaster relief operations.

To address these inefficiencies and improve disaster management practices, the author embarked on the endeavor of developing an innovative application. The envisioned application takes the form of a comprehensive natural disaster data information system. It incorporates user-friendly features to facilitate seamless data input, encompassing crucial aspects like disaster locations, types of disasters, the number of affected victims, and designated evacuation sites. This real-time data is then efficiently stored and managed in a centralized database, ensuring easy accessibility from anywhere and at any time. The primary goal of this novel application is to empower the general public with timely and reliable information concerning the prevailing conditions of natural disasters. By providing transparent and up-to-date information, the application aims to enable communities to make informed decisions and take necessary precautions during

calamities. Moreover, the application serves as a valuable resource for authorities and disaster management agencies, facilitating better coordination and planning for effective disaster response efforts. Ultimately, the hope is that this information system will contribute to more efficient and precise disaster relief measures, minimizing the adverse impact of natural disasters on affected communities. In light of the extensive research and diligent efforts put forth during the Kerja Praktek, the author is pleased to present the culmination of this undertaking in the form of a comprehensive report. The report is aptly titled *"Information System for Disaster Management Data Processing at the Regional Disaster Management Agency (BPBD) of North Aceh Regency,"* symbolizing the significance of this breakthrough application in the realm of disaster management and community resilience.

LITERATURE REVIEW

Implementation Information System Form Natural Disaster Mitigation and Response

Natural disaster management involves a series of activities aimed at reducing the impact of natural disasters on humans, animals, and the environment. These activities encompass preparedness, response, recovery, and mitigation efforts. Information systems can aid in natural disaster management by providing accurate and real-time information about natural disasters, including weather predictions, mapping of affected areas, and inter-agency coordination. In the journal, the author emphasizes the importance of utilizing semantic technology and social media to enhance information exchange services in natural disaster management. In a broader context, both natural disaster management and information systems play crucial roles in minimizing losses and expediting recovery after natural disasters occur. They can assist governments, organizations, and communities in taking appropriate and effective actions to cope with natural disasters.(Beydoun et al., 2018)

The implementation of information systems in the mitigation and management of natural disasters has both broad and narrow impacts(Johnson, 2000). The broad impacts of implementing information systems in the mitigation and management of natural disasters are as follows:

1. Improving the effectiveness and efficiency of natural disaster management, thereby minimizing losses and expediting recovery after disasters occur.
2. Enhancing inter-agency and inter-stakeholder coordination in natural disaster management, leading to faster response and recovery efforts.
3. Enhancing the quality of available information about natural disasters, aiding in more accurate and effective decision-making in disaster management.

The narrow impacts of implementing information systems in the mitigation and management of natural disasters are as follows:

1. Improving the ability to monitor and predict natural disasters, providing early warnings and better preparedness.
2. Enhancing the capacity to map areas affected by natural disasters, thereby accelerating response and recovery efforts.
3. Improving the ability to coordinate and share information among agencies and stakeholders in disaster management, leading to faster response and recovery after disasters occur.

METHOD

This research focuses on the development of an information system application for disaster management, utilizing Data Flow Diagrams (DFD), Entity-Relationship Diagrams (ERD), and Context Diagram to design the system. DFD is a powerful tool that helps visualize the flow of data within the system, identifying inputs, processes, and outputs. It enables the researchers (Sitinjak Daniel Dido Jantce TJ & Suwita, 2020)to understand how information is processed and moved between various components of the application. By employing DFDs, the researchers can ensure efficient data flow and communication within the disaster management system, enhancing its overall effectiveness.

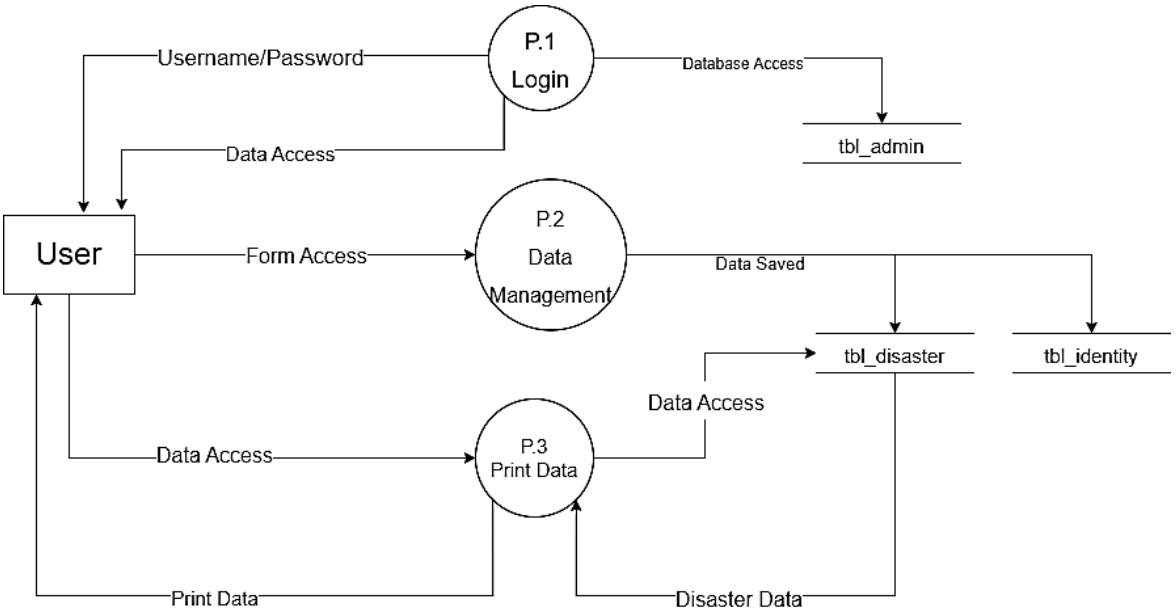

Image 1 DFD Level 0

ERD, on the other hand, aids in designing the database structure for the application. It allows the researchers to identify and define relationships between different entities within the system. This ensures that the data is appropriately organized and stored, facilitating easy retrieval and manipulation of critical disaster-related information.

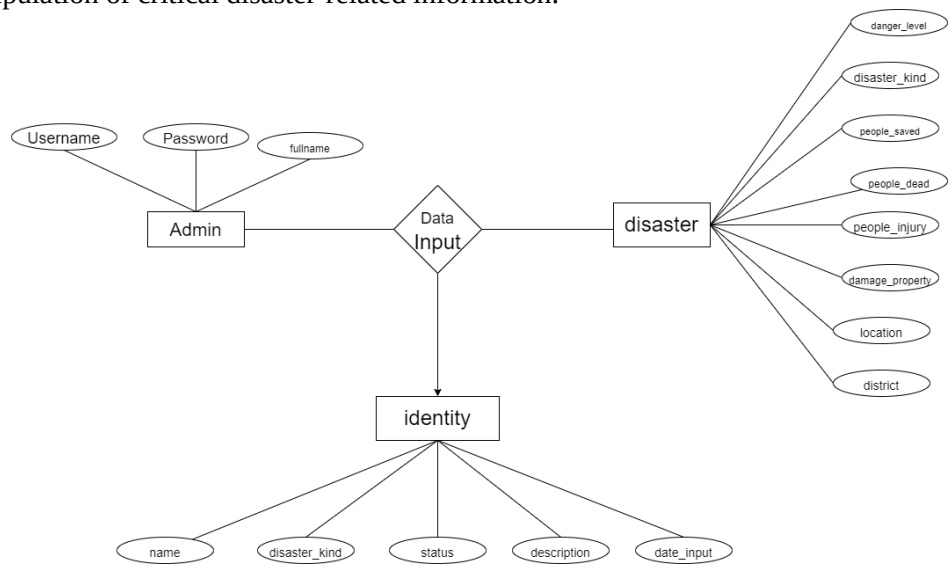

Image 2 ERD Diagram

Furthermore, the Context Diagram provides a high-level overview of the entire system, illustrating its interactions with external entities. It assists in understanding the system's boundaries, demonstrating how it interacts with users and other external components. By incorporating the Context Diagram, the researchers can achieve a comprehensive understanding of the application's scope and functionality.

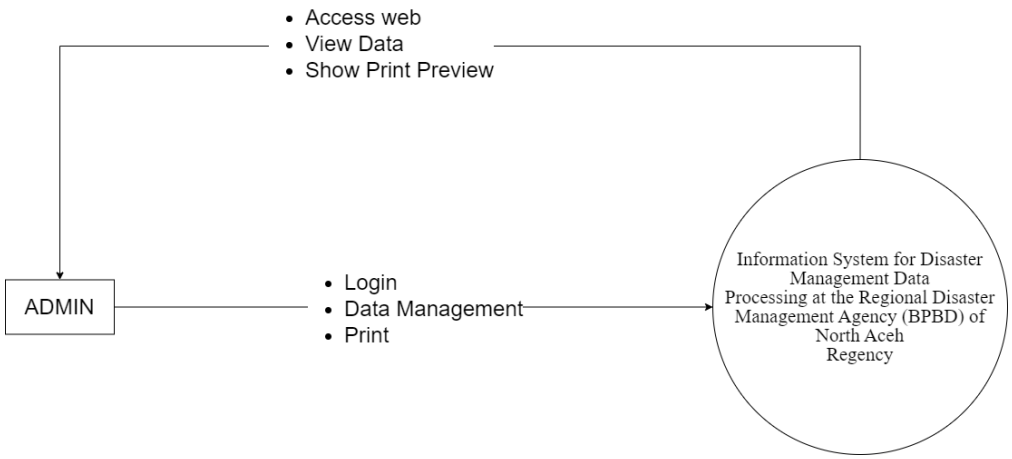

Image 3 Context Diagram

By leveraging these essential tools – DFD, ERD, and Context Diagram – in the design process, the researchers aim to create a robust and efficient information system for disaster management. The combination of these methodologies ensures that the application is well-structured, enabling seamless data flow, effective database management, and clear system boundaries, all of which contribute to a more effective and reliable disaster management solution.

RESULTS AND DISCUSSION

The result of this research is an application that encompasses a comprehensive disaster management information system, designed to handle various aspects related to disaster situations. This application efficiently manages data on disaster victims, aid received, handling processes, as well as allows users to share photos and videos related to the disaster. Additionally, it incorporates various other functions that support natural disaster mitigation efforts. The application is developed in the form of a website specifically designed for use by local government authorities.

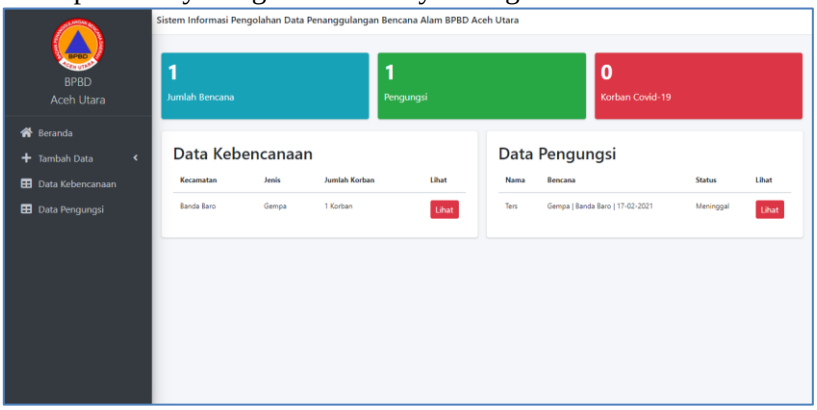

Image 4 Dashboard Page Of System

The website-based application serves as a centralized platform for managing and organizing crucial disaster-related information. It facilitates the collection, storage, and retrieval of data regarding the affected individuals, the types and amounts of aid received, and the ongoing disaster response procedures. Moreover, the application allows users to upload and share visual media, such as photos and videos, to provide a clearer understanding of the disaster's impact and aid in decision-making processes.

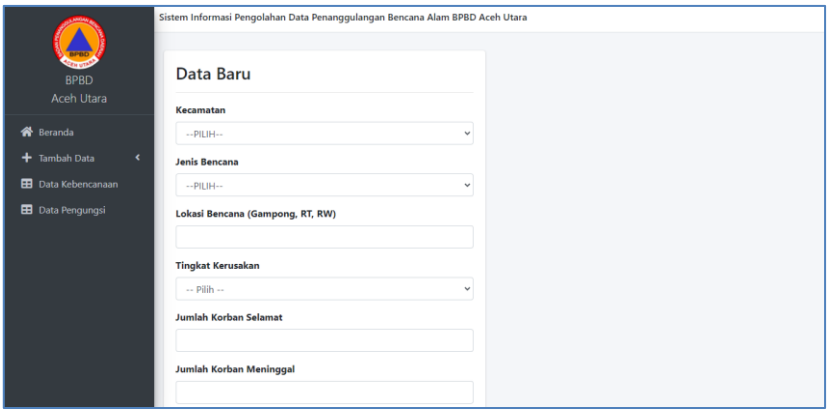

Image 5 New Data Page

With the user-friendly interface and functionalities, the website enables local government officials and authorities to efficiently coordinate their disaster response efforts. The access to real-time data ensures that they stay updated on the current situation and can promptly make informed decisions. This comprehensive information system enhances the overall effectiveness of disaster mitigation, enabling a more efficient and well-coordinated response to natural calamities.

Image 6 Disaster Information

In conclusion, the research culminates in the development of a user-friendly website application, which serves as a powerful disaster management tool for local government authorities. By streamlining data management, facilitating communication, and supporting visual documentation, this application significantly contributes to more effective disaster mitigation and response measures.

CONCLUSION

Based on the conducted research and testing regarding the, the following conclusions can be drawn:

1. The research resulted in the development of a website-based application that serves as a comprehensive disaster management information system. This application efficiently manages and organizes data related to disaster victims, received aid, handling processes, and visual media (photos and videos) to support disaster mitigation efforts.

2. The website application offers a user-friendly interface, enabling local government authorities to access real-time data and coordinate disaster response efforts more effectively. By centralizing information and facilitating communication, the application enhances the overall efficiency and coordination in managing natural disasters.
3. The implemented information system significantly contributes to improving disaster management by providing local government officials with up-to-date and well-organized data. With better insights into the disaster's impact and resources available, authorities can make more informed decisions, leading to a more efficient and well-coordinated response to natural calamities.

SUGGESTIONS AND ACKNOWLEDGMENTS

Based on the above research findings, the author hopes for the following:

1. The research resulted in the development of a website-based application that serves as a comprehensive disaster management information system. This application efficiently manages and organizes data related to disaster victims, received aid, handling processes, and visual media (photos and videos) to support disaster mitigation efforts.
2. The website application offers a user-friendly interface, enabling local government authorities to access real-time data and coordinate disaster response efforts more effectively. By centralizing information and facilitating communication, the application enhances the overall efficiency and coordination in managing natural disasters.
3. The implemented information system significantly contributes to improving disaster management by providing local government officials with up-to-date and well-organized data. With better insights into the disaster's impact and resources available, authorities can make more informed decisions, leading to a more efficient and well-coordinated response to natural calamities.

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