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Public Service Information System at the Department of Public Works Development and Spatial Planning

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ABSTRACT

The Public Service Information System at the Department of Public Works Development and Spatial Planning in South Sumatra Province is a pivotal solution for managing road infrastructure. Roads are crucial for regional development and economic progress. This system, utilizing the prototype model, Object-Oriented Analysis and Design (OOAD), and Unified Modeling Language (UML) tools, facilitates effective monitoring, reporting, and resolution of road damage. The methodology involves iterative prototyping, ensuring a clearer understanding of requirements and reducing risks. The system design includes various UML diagrams, depicting system functionalities, actors, and interactions, while its architecture outlines a streamlined flow of information. Initial testing validated the system's effectiveness, showcasing its ability to handle functions and interfaces proficiently. Overall, this system significantly contributes to efficient road infrastructure management, meeting community needs, and government responsibilities for effective public services. Acknowledgments are extended to the South Sumatra Public Works Department of Highways and Spatial Planning for their support.

1. Introduction

Roads are land transportation infrastructure and a very vital transportation route. One of the functions of roads is as a driving factor in the development process and equitable development of an area, as well as having an impact on all surrounding areas [1]. Apart from that, roads also play an important role in the process of connecting growth centers to other areas. For the government, roads are important transportation infrastructure to run the economy. If road conditions are good, transportation and economic activities will run smoothly. Public service is an activity of providing services to fulfill service needs carried out by public service providers to every citizen or community [2]. The government as a public service provider must provide public services to the community. The state is obliged to fulfill the community's expectations and demands regarding improving public services through a government system that supports the

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creation of excellent public service delivery. As time goes by, people's needs for public services are increasing, one of the needs of citizens or society is the need for public facilities. Public facilities are something that must be provided by the government. An example of a public facility that the government must provide is a road. One example of road work is the road repair process by the Public Works Department of Highways and Spatial Planning of South Sumatra Province.

Information systems technology has developed very rapidly. Therefore, many companies or agencies use information systems to improve their business services. Almost all companies and agencies in terms of decision-making, information dissemination, and effective improvement of work and services have used web-based information systems. A computerized system will support the success of a company or agency in obtaining precise and accurate information for the progress of the company or agency. The Public Works Department of Highways and Spatial Planning is one of the South Sumatra government agencies that operates in the fields of Public Works, Housing, and Spatial Planning. There are various works carried out by regions, deconcentration, and assistance tasks from the central government for physical activities, especially in the Highways, Spatial Planning, and Housing sectors. The main task of the South Sumatra Public Works Department of Highways and Spatial Planning is to carry out regional government affairs based on the principle of decentralization and assistance tasks in the field of public works including highways, spatial planning buildings, settlements and environmental infrastructure. As a government institution that always prioritizes public services to the community, the Public Works Department of Highways and Spatial Planning of South Sumatra Province, as much as possible, resolves community complaints regarding road and bridge networks, implementation of construction and maintenance, guidance, supervision and technical control of development. , The work of the Public Works Department of Highways and Spatial Planning also includes carrying out analysis and evaluation of the role and status of roads and bridges. In this era of rapidly developing technology, the need for a computerized system covers all fields, therefore spatial data is needed that can describe the spatial layout and condition of road sections that are well monitored. This data will be organized and processed into an integrated summary into an information system which is expected to make a good contribution to the relevant agencies and government.

The Public Service Information System at the Public Works Department of Highways and Spatial Planning of South Sumatra Province uses the prototype method as a software development methodology and the design and construction of the public service information system uses the OOAD (Object Oriented Analysis Design) design method [3], with the UML (Unified Modeling Language) tool. This information system is expected to be more effective in providing visualization of data regarding road damage, and road conditions and providing accurate road damage reports. Furthermore, this system can assist in road repair plans so that they are more structured and can always be developed in the future.

2. Method

Initially, the author employed a research approach to fulfill the predetermined goals. The system development phase adopted was the prototype model [4], [5]. This model in software development involves constructing, assessing, and enhancing a preliminary version of the final software system through several iterations. It proves beneficial especially when the requirements are unclear or expected to undergo changes. Following are some of the main phases in the prototype model:

1. Understanding Requirements: The development team works closely with the client or end-users to gather initial requirements. These might not be fully detailed or clear initially.
2. Building a Prototype: Based on the gathered requirements, a basic prototype or mock-up of the software is created. This prototype might not have all the features but serves as a visual representation or demonstration of the key functionalities or user interface.
3. Evaluation: The prototype is demonstrated to stakeholders, including clients and end-users. Feedback is collected and analyzed to understand what works and what needs improvement or changes.
4. Refinement: Using the feedback received, the prototype is refined, and necessary changes are made to improve its functionality, design, or features.
5. Iteration: Steps 3 and 4 are repeated in multiple cycles until the prototype meets the requirements and expectations of the stakeholders.
6. Final Development: Once the prototype is approved and refined adequately, it serves as a blueprint for the final software. The development team uses it as a guide to build the actual software, incorporating the improvements and features identified during the prototype iterations.

The main advantages of the prototype model are:

- Enhanced Understanding: It helps in clarifying and refining requirements as stakeholders interact with the prototype.
- Reduced Risk: Early feedback minimizes the chances of building a product that doesn't meet user needs.
- Cost and Time Savings: Identifying issues early avoids costly changes in later stages of development.

The prototype model is characterized by its iterative nature, allowing for continuous refinement based on stakeholder feedback until the final product meets the required standards.

3. Result and Discussion

The author started designing the proposed system by creating a UML diagram [6], [7]. The proposed system design includes Use case diagrams, Activity diagrams, Sequence diagrams, and Class diagrams.

3.1. Use diagram

Several things need to be described, namely actors and use cases. Actors are users who are connected to the system and can be people (indicated by their role and not their name/personnel). The actor is symbolized by the figure of a stick man with a noun at the bottom that states the role/system. Use cases are depicted with an ellipse symbol with the name of the active verb inside which states the activity from the actor's perspective [8], [9]. The system that the author proposes consists of four actors, namely Head of Department, Secretariat, Admin, and Public.

3.2. Activity diagram

An activity diagram is a description of function paths in an information system [10]. In full, the activity diagram defines where the system process starts, where it stops, what activities occur during the system process, and what sequence these activities occur in.

3.3. Sequence diagram

Based on the use case that has been created, a sequence diagram is obtained which describes the behavior of objects in the use case by describing the lifetime of the object and the messages sent and received between objects.

3.4. Class diagram

Class diagrams describe the types of objects in the system and the various static relationships that exist between them [11]. Class diagrams show the properties and operations of a class and the boundaries contained in the object relationships (Figure 1).

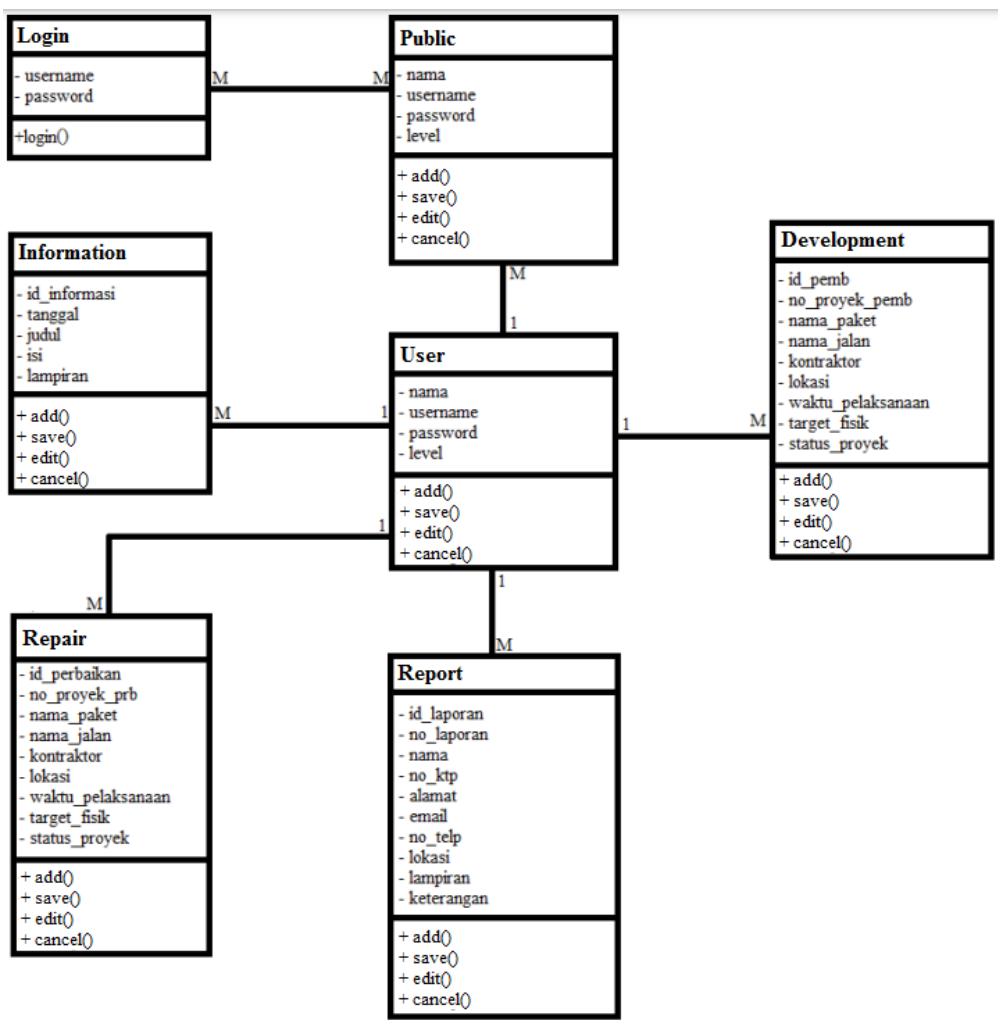

Figure 1 – Class diagram

3.5. System architecture

The system architecture describes the data flow of the information system for road damage reports at the Highways Department. The public can directly input road damage reports to the Highways Department via the Highways Department's public service website [12], [13]. The Secretariat will then manage the road damage report so that it is processed by the Highways Service. The Head of Service can evaluate reports and monitor road damage reports which are managed by the secretariat. The administrator will manage the system, set system access rights, and manage the system database as shown in Figure 2.

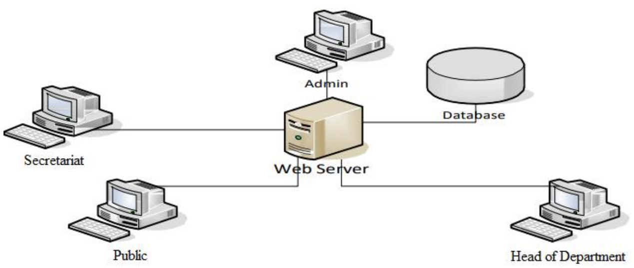

Figure 2 – System architecture

3.6. System Interface

Figure 3, Figure 4, and Figure 5 show several interfaces of the public service application at the Public Works Department of Highways and Spatial Planning.

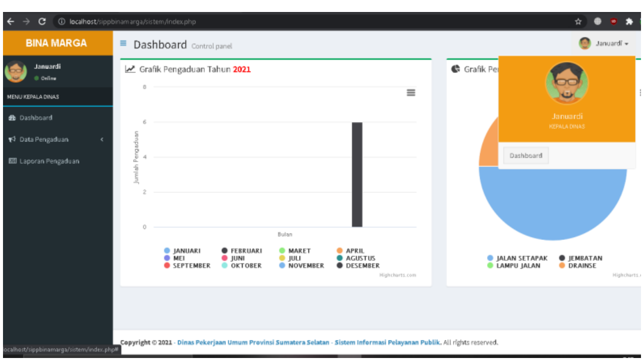

Figure 3 – Head of department interface

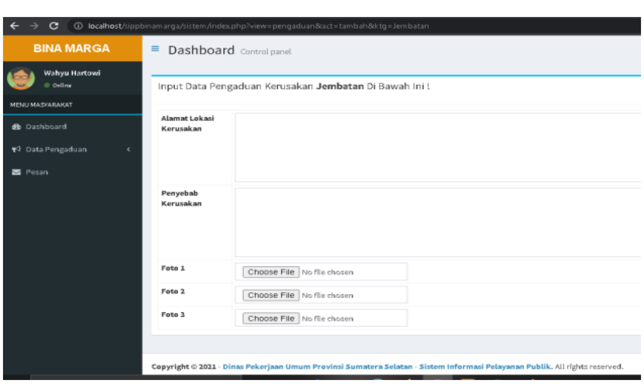

Figure 4 – Public complaints interface

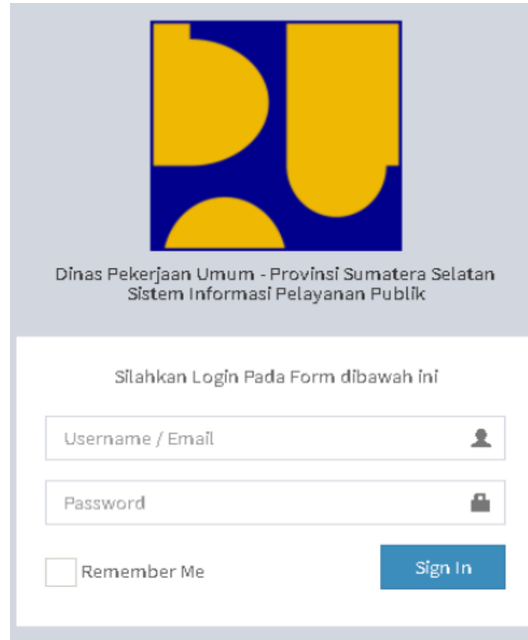

Figure 5 – Public complaints interface

Next, the author carries out black box testing as an initial stage of evaluation of the system that has been created. The test results show that all functions and interfaces of the proposed system can run well.

4. Conclusion

The Public Service Information System at the Department of Public Works Development and Spatial Planning in South Sumatra Province emerges as a critical solution to address the challenges in managing road infrastructure efficiently. Roads play a pivotal role in development and economic progress, necessitating a robust system to monitor, report, and address road damage effectively. The system's development followed a prototype model, employing Object-Oriented Analysis and Design (OOAD) methodology and Unified Modeling Language (UML) tools to create a comprehensive system.

The methodology involved multiple phases, starting from understanding requirements through iterative prototyping, evaluation, refinement based on feedback, and eventual final development. This approach offered advantages like a clearer understanding of requirements, risk reduction, and cost savings by identifying and addressing issues early in the development process. The system's design encompassed various UML diagrams, including use case diagrams, activity diagrams, sequence diagrams, and class diagrams, illustrating the actors involved, system functionalities, activity paths, object behaviors, and relationships between different elements of the system.

Additionally, the system architecture was delineated, depicting the flow of information from the public reporting road damage through the Highways Department's website, managed by the Secretariat, evaluated by the Head of Service, and administered by system administrators. Furthermore, the system interface was presented through visual representations showcasing interfaces for department heads, public complaint submissions, and other pertinent interfaces. Initial black box testing of the system validated its functionality, indicating that all proposed functions and interfaces operated effectively. Overall, the developed Public Service Information System serves as a crucial tool in managing road infrastructure, enabling efficient reporting, assessment, and resolution of road damage, thus contributing significantly to the community's needs and government responsibilities in ensuring effective public services.

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