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Design and Build a Web-Based Medical Record Information System Using Codeigniter and Bootstrap

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A R T I C L E I N F O

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A B S T R A C T

The application of information systems has been widely applied today, not least in the health sector. Currently, there are many hospitals, clinics, health centers, and doctor's practices that have used information systems to facilitate management, processing and improving the security of patient data. However, not a few clinics or private health agencies still use paper media as a tool to process pa-tient data. The purpose of this research is to build a web-based information system that can be used to process patient data. This research uses literature study as a data collection method. The data taken covers the application of medical record information system records such as application de-velopment methods, system flows, and features used. To test the functionality of the system, re-searchers used the black box method in order to get precise and desired results. The result of this research is a medical record information system that was built using two frameworks, namely co-deigniter as a back-end application and bootstrap as a front-end application. With the construction of this medical record application, it is hoped that it can help health agencies that need an information system to process patient data.

1. Introduction

The development and application of technology is currently increasing, especially in the era of the COVID-19 pandemic where almost all of a person's activities and work are carried out with the help of technology. Technological developments can also be very helpful in managing information, especially if you have large, complex and much needed data.

Currently, there are many hospitals, clinics, health centers, and doctor's practices that have used information systems to facilitate management, processing and improving the security of patient data. However, not a few clinics or private health agencies still use paper media as a tool to process patient data. Manual data processing is very risky because errors can occur in writing medical record numbers which make the data invalid. Manual data storage can also make patient medical records lost or damaged, this will make it difficult for doctors to maintain and treat patients.

The flow of data management can be started from the patient registering and then inputting all social data and complaints experienced into the system, after which the officer can print a medical card from the system. After conducting the examination, the officer can also record the patient's medical record data and then save it into the system, if needed it can be reprinted. The hope of this research is that this medical record application can be a solution for every health agency that needs an application to process and store patient data.

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2. Research Method

The software development method used to build this information system is the waterfall method.

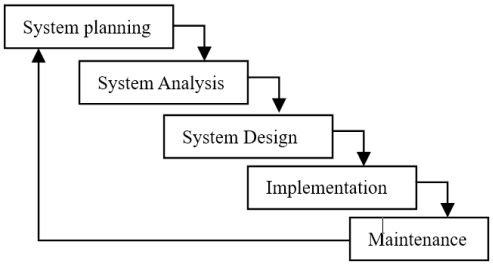

Fig 1. Research Methods

a. System planning, the planning stage is the initial stage of system development that defines the estimated resource requirements such as physical equipment, people, methods (techniques and operations), and budgets that are still general in nature.
b. System Analysis, The system analysis stage is the research stage of the existing system with the aim of designing a new or updated system. The activities carried out at this stage are identifying problems with the system and organizing the required resources.
c. System Design, Activities carried out at this stage are the first to make process modeling. User activity modeling uses use case diagrams and describes the workflow system model in the form of Activity Diagrams. Then make data modeling by drawing tables and relations between tables in the database using the Entity Relationship-ship Diagram.
d. Implementation of the System, at this stage all the results of the design and design will be translated into the coding stage and produce an alpha version of the user interface design that displays at least the application input and output.
e. Maintenance, The system maintenance stage includes all processes needed to ensure the continuity, smoothness, and refinement of the system that has been operated

3. Result and Discussion

3.1 System Development

a. Login Page

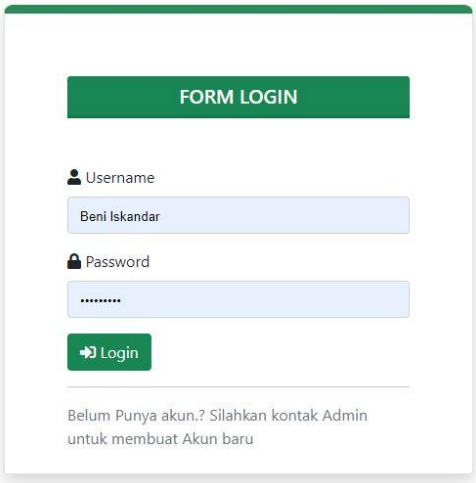

Fig 2. Form Login

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In the login form, you will receive input in the form of a username and password that was previously registered by the admin. In this application there are three types of users or two types of access rights granted to users, namely admin, registration and medical records.

b. Home

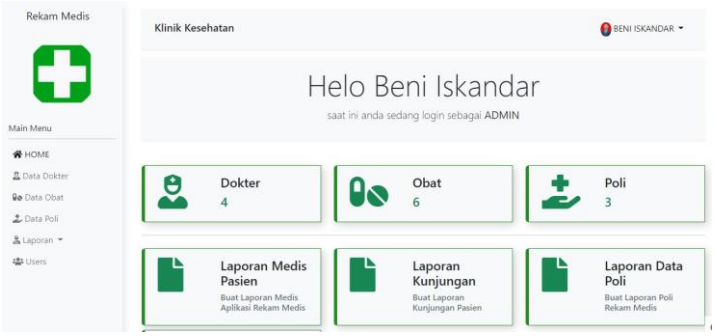

Fig 3. Home

After logging in the user will be directed to the home page where all the menus will be displayed, to access the user just need to click on the menu card or list menu in the side bar.

c. Patient Data

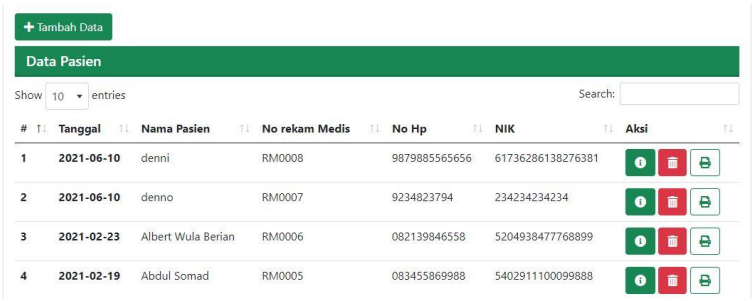

Fig 4. Patient Data

On the patient data page, it will display the patient's social data that has been previously entered into the system such as name, gender, phone number and address of the patient. The picture above shows that the patient data has several actions such as adding new data, the detail button to view detailed patient info then edit the data, delete it, and print the patient's treatment card.

d. Medical Records

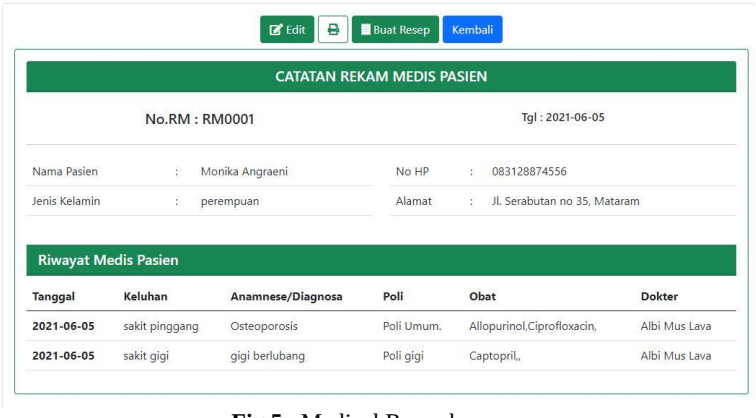

Fig 5. Medical Records

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Displays the patient's medical record, as contained in the medical record data, the difference is that there is a medical history related to the patient, to make it easier to find out the patient's previous illness.

e. Doctor Data

Fig 6. Doctor Data

On the doctor's data page, it will display social data and doctor's specialization that has been previously inputted into the system such as name, gender, specialization and poly where on duty. In the picture above it is shown that patient data has several actions such as adding new data, detail button to view patient detail info then edit data, and delete.

f. Visit Data

Fig 7. Visit Data

The menu that displays patient visit data, while the data recorded is the date of the patient's visit, name, complaint, poly and the patient's medical record number. There are several actions that can be taken, namely the user can add new visits to old patients, as well as delete and edit them.

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g. Report

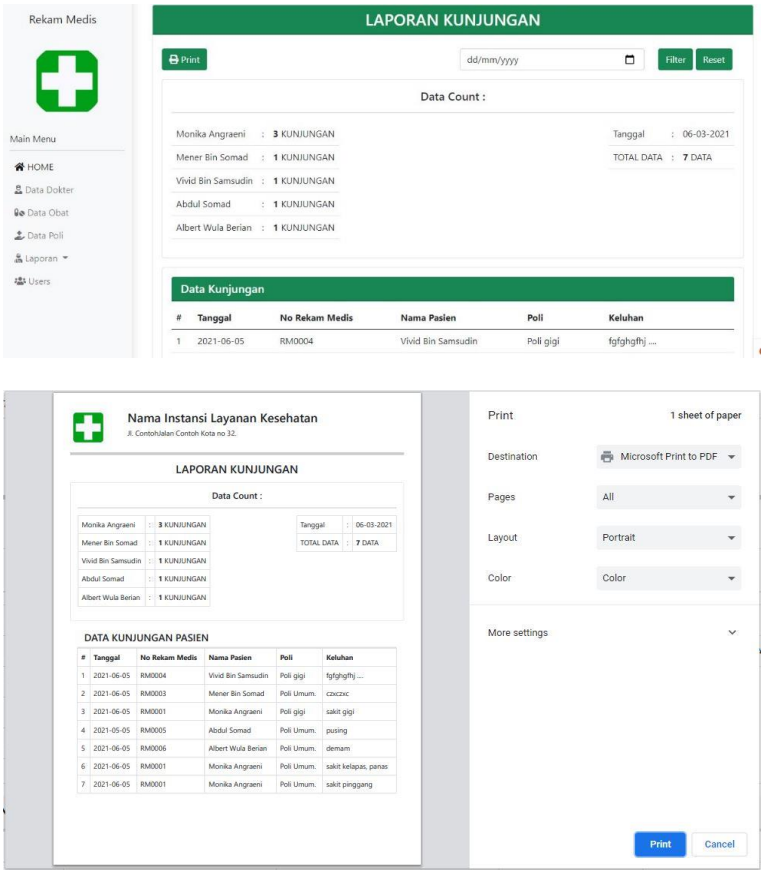

Fig 8. Report

After clicking the report menu on the homepage it will display a page for making patient visit data reports. There is a filter action to limit the reports created and become more structured, then the report can be printed directly using the printer or converted into a pdf file by clicking the print button on the page.

3.2 System Test

TABLE 1
SISTEM TEST

Code	Test description	Expected results	Test result	Conclusion
L01	Fill in username and password	Login Successful	Login Successful	Finished
L02	Fill in wrong username and password	Failed login	Failed login	Finished
P01	Fill in the input form	Successfully save data	Successfully save data	Finished
P02	There is an empty input form	Failed to save data	Show failed message	Finished
EP01	Fill out all the input forms	Data changed successfully	Successfully changed data	Finished
EP02	Fill out all the input forms	Failed to Change	Show error message	Finished
K01	Fill out all the input forms	Successfully Added Data	Successfully added data	Finished
K02	There is a blank form	Unable to update data	Show error message	Finished
EK01	Fill out all the input forms	Can update data	Successfully updated data	Finished
EK02	There is a blank form, and the patient's name does not appear	The system refuses to change data	Show error message	Finished
RM01	Fill out all the input forms,	The system adds data	Successfully added data	Finished
RM02	There is a blank form	Cannot add data	Failed to add data	Finished

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Code	Test description	Expected results	Test result	Conclusion
ERM01	Fill out all the input forms,	System update	Successfully updated data	Finished
ERM02	There is a blank form	Block update	Failed to update data	Finished
U01	Fill out all the input forms,	Insert data into the system	Successfully added data	Finished
U02	There is a blank form	Failed to insert into the system	Failed to add data	Finished
EU01	Fill out all the input forms,	Update data	Successfully updated data	Finished
EU02	There is a blank form	Failed to update data to the system	Failed to update data	Finished
D01	Fill out all the input forms,	Added data	Successfully added data	Finished
D02	There is an empty input form	The system refuses to change data	Failed to add data	Finished
ED01	Fill out all the input forms,	Update data	Successfully updated data	Finished
ED02	There is an empty input form	The system refuses to change data	Failed to update data	Finished
PO01	Fill out all the input forms	Add data to system	Successfully added data	Finished
PO02	There is a blank form	System refuse to add data	Failed to add data	Finished
EPO01	Fill out all the input forms	Update data to the system	Successfully updated data	Finished
EPO02	There is a blank form	Failed to update data to the system	Failed to update data	Finished

4. Conclusion

At the end of the discussion about the Design of Web-Based Medical Record Information System Using Codeigniter and Bootstrap, conclusions is the frameworks used to speed up and simplify application development are codeigniter and bootstrap. The features or menus contained in this medical record information system are, manage patient data, manage medical record data, record complaints, print treatment cards, print medical record cards and make reports. The application development method used is the waterfall method. Application development starts from system planning, then performs system analysis, system design, system implementation and finally performs system maintenance. The testing method used is the blackbox method which is software testing in terms of functional specifications without testing the design and program code to find out whether the functions, inputs and outputs of the software are in accordance with the required specifications.

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