E-VOTING MANAGEMENT SYSTEM FOR BEGINNERS VOTERS

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Abstract

Elections at the beginner voter level are still mostly done manually. This manual method is considered lacking in efficiency and is still considered conventional because it does not take advantage of technological advances. Based on this statement, several discussions emerged regarding the process of modernizing voting, namely the election process using e-voting. The e-voting system provides convenience for both voters and the executive committee. The implementation of the election by e-voting requires a system to regulate matters relating to the implementation of the election because in its implementation each agency that uses e-voting has different election data. Therefore, this study makes an e-voting management system for novice voters. This e-voting management system can manage election data such as agency profiles, election schedules, and candidates, up to the Permanent Voters List (DPT). The data used in this study were obtained from agencies that use e-voting. The method used is the waterfall model which consists of system analysis, system design, coding, and testing. Based on the test results, this system is running well according to its function. The e-voting management system makes it easier for the organizers and the implementing committee, before the election and in the post-election process.

Keywords: E-voting, Young Voter, Management System.

Introduction

Indonesia is a democratic country, the real manifestation of democracy in Indonesia is general elections [1]. The law of the Republic of Indonesia number 3 of 1999 states that elections are a means of democracy in order to realize a system of government of a country that is sovereign by the people [2].

elections in Indonesia are usually held by voting manually, namely ticking or punching on the ballot paper [3]. Voting is the process of voting for people who can vote provided they meet the requirements to vote. Voting has the aim of agreeing, rejecting, or choosing to determine matters that cannot be reached through deliberation or consensus [4]. Voting activities are carried out by the General election Commission (KPU). Not only the KPU, voting activities are also carried out on a smaller scale, such as the election for organizational leaders in the campus environment or the election for organizational leaders in the school environment, each school or campus has an organization whose election is carried out by voting [5]. The smaller scale is called the beginner selector [6]. Beginner voters are voters consisting of students, university students or voters with an age range of 17-21 years. The voting process for beginner voters is mostly still using the manual method. This manual voting method is considered to be lacking in terms of efficiency and is considered to be conventional because it does not take advantage of advances in technology [7]. The existence of the Covid-19 pandemic outbreak also had an impact on the implementation of manual voting. Covid-19 has caused almost all activities to be carried out online, including the implementation of this voting [8]. Therefore, there has been some discussion regarding the process of modernizing voting, namely the implementation of elections using an electronic device called e-voting. E-voting is a system that uses computers or electronic devices for the voting process in election activities [7]. The e-voting system facilitates the implementation of elections, such as facilitating voters in giving voting rights and facilitating the implementing committee in preparing, voting and counting the votes. In addition, e-voting also reduces the risk of errors due to security, and can reduce expenses [9]. The implementation of elections by e-voting requires a system to regulate matters related to the implementation of these elections, because in practice each agency that uses e-voting has different election data. The required system can manage such as agency profiles, election schedules, candidates, up to the Final Voter List (DPT).

Based on the problems above, this research creates an e-voting management system for first-time voters. This e-voting management system is an implementation of voting modernization by utilizing internet voting types. This type of internet voting is very appropriate for use during the Covid-19 pandemic, where its use can be done anywhere, the existence of an e-voting management system means that the e-voting application can be used by any agency within the scope of first time voters. The e-voting management system was created with the aim of being able to manage election data such as agency profiles, candidates, election schedules, up to DPT. The DPT is an important factor in the election process, because the DPT will affect the number of votes in the election. Article 218 paragraph 2 UU7/2017 states that KPU and Regency/Municipal KPU are required to maintain and update voter data. Updating voter data must be carried out on an ongoing basis to avoid problems related to the implementation of elections [10].

It is hoped that the e-voting management system for novice voters can be useful and provide convenience in the implementation of elections, in particular to make it easier for the organizing committee to arrange matters related to the implementation of elections in accordance with the needs of agencies that use e-voting applications.

Methodology

The research method uses the waterfall model which includes data collection, analysis, design, implementation or coding and testing. In Figure 1, the research stages are shown as illustrated by a flowchart.
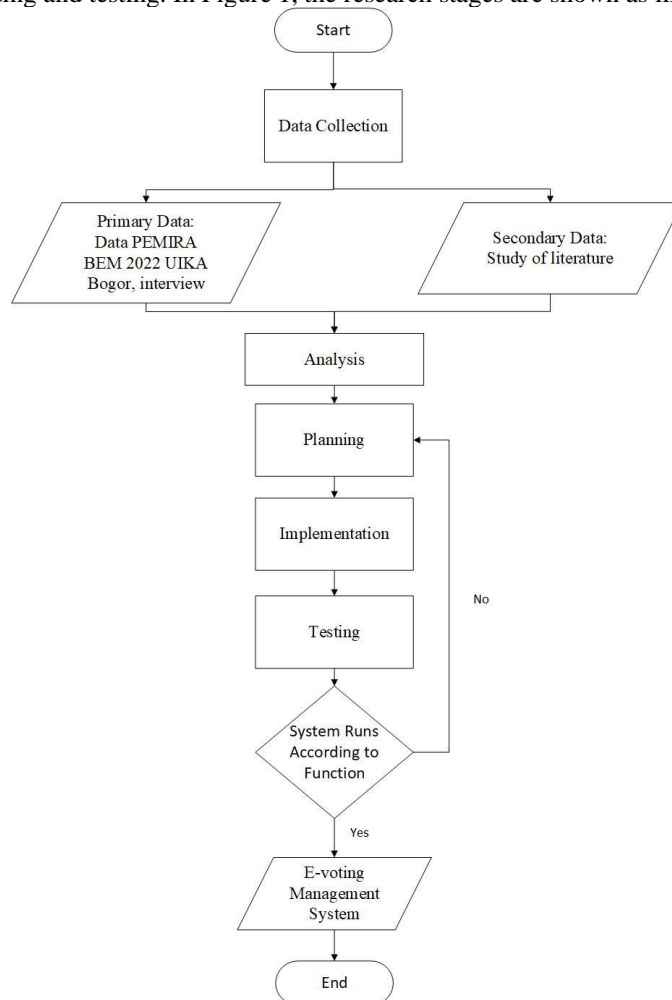

Fig 1. Waterfall Method Stages

Data Collection
This stage is the process of finding and collecting data related to research. The data collection stage is carried out to facilitate the analysis process on the e-voting management system for first-time voters. The data collection process is divided into two parts, namely:
Primary Data
Primary data was obtained from UIKA Bogor in the form of PEMIRA BEM 2022 data and through joint interviews with the Bogor City KPU.

Secondary Data
Secondary data was obtained from sources such as journals, books, e-books, and others by studying the literature related to e-voting and how to implement an e-voting management system in e-voting applications.

Analysis
The analysis carried out in this study includes analysis of user requirements, analysis of functional requirements, analysis of non-functional requirements, analysis of system architecture, analysis of the running system, and analysis of the proposed system.

Analysis of User Needs
Analysis of user needs is shown to analyze users who are directly involved with the system. Users in the e-voting management system are Admins who can manage election data such as agency profiles, DPT and candidates. The admin can also see the results of the election recapitulation according to a predetermined time and can make an official report.

Functional Requirements Analysis
Functional requirements define the things needed by the system to serve the needs of users (users). Functional requirements analysis includes: 1.Login function, 2. Logout function, 3. dashboard function, 4. Agency profile management function, 5. E-mail management function, 6. DPT management function, 7. Candidate management function, 8. election result function, 9. The function of making an event report.

Non Functional Needs Analysis
Non functional needs define the things that are the limitations of the service or function of the system. Non functional needs include: 1. Correctness, e-voting management system presents correct data, 2. Reliability, e-voting management system can be accessed by Admin anywhere according to a predetermined time, 3. Integrity, e-voting management system has the ability to be able to monitor user access to data, 4. Testability, e-voting management system can be tested, 5. Usability, e-voting management system is easy to use because the features available using an easy-to-understand design.

System Architecture Analysis
System architecture analysis refers to a client-server model with servers providing services to clients that are active in sending and requesting services. Figure 2 shows an architectural analysis of the e-voting management system.
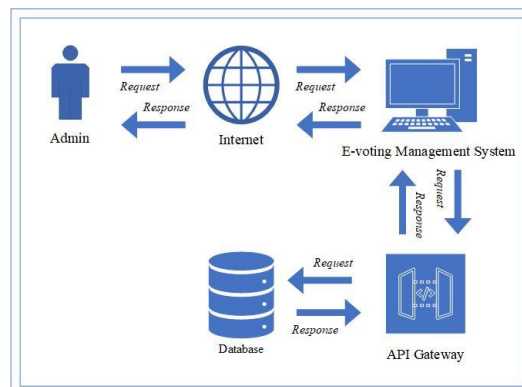

Fig 2. System Architecture Analysis

Running System Analysis
The system analysis describes the flow of process activities carried out before using the new system, where the executive committee in preparing matters related to the implementation of elections at the beginner level still does it manually.

Proposed Stem Analysis
The proposed system analysis is a picture of the new system to be created. The system proposed in this study is an e-voting management system for first-time voters shown in Figure 3.
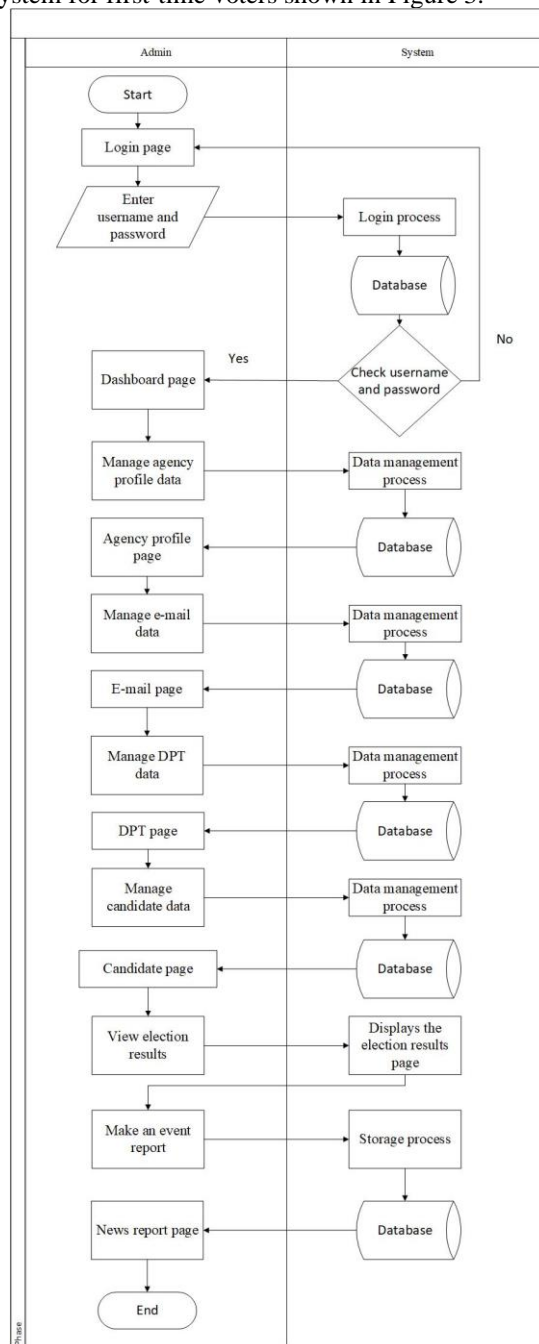

Fig 3. Analysis of the Proposed System

Planning

In this study, the design is described by use case diagrams, component diagrams, deployment diagram design, and database design.

Use case diagram

Use case diagrams illustrate the interaction between actors and the system to be created. Figure 4 shows a use case diagram of an e-voting management system for first-time voters.
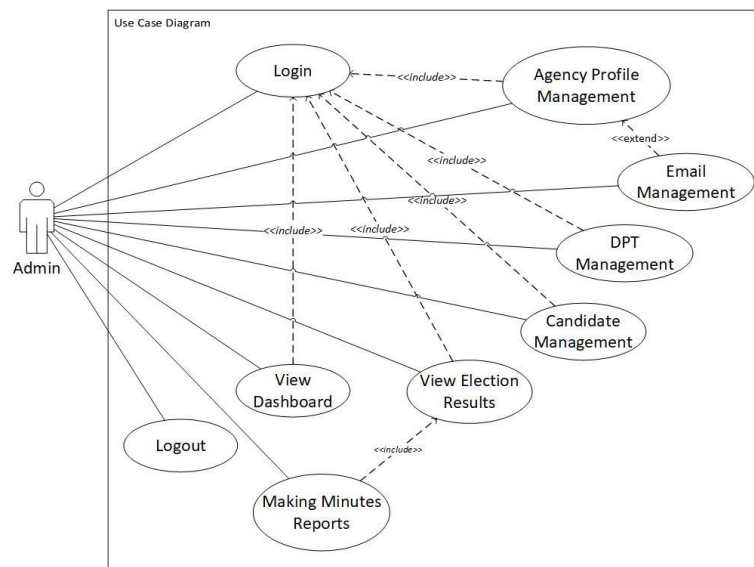

Fig 4. Use case diagram

Component diagram

Component diagrams illustrate the organization and dependencies between a collection of components in a created system, component diagrams focus on computers and system requirements. The component diagram can be seen in Figure 5.
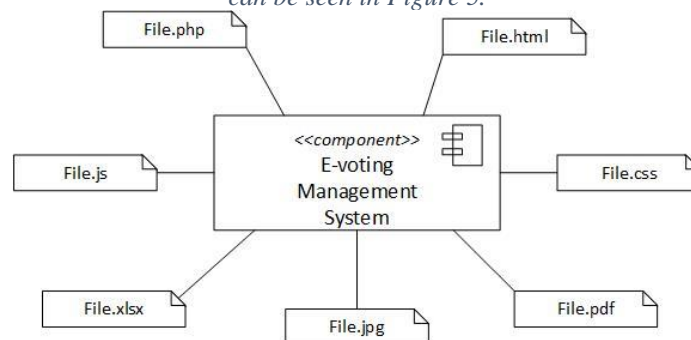

Fig 5. Component diagram

Deployment diagram

The deployment diagram illustrates the configuration of components performed during the application execution process, also illustrates how at that location the components work. The deployment diagram can be seen in Figure 6.
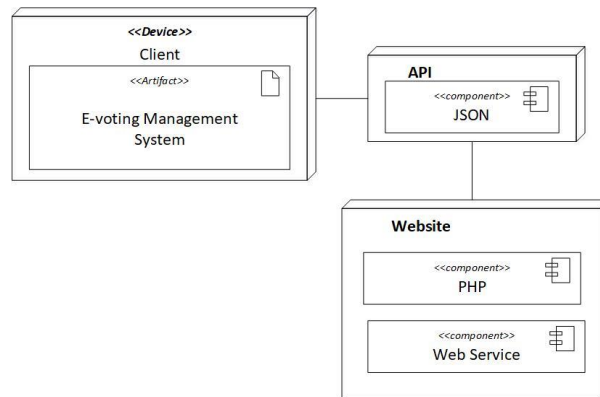
Fig 6. Deployment diagram

Database Design

The database is used to store election data. In this study, the database created had 9 tables. The database design can be seen in Figure 7.

Fig 7. Database Design

Result

Implementation Results

System implementation is the application of the system design that has been carried out. The system implementation of the e-voting management system is as follows:

Login Page

The login page is the initial display to enter the system, the Admin must enter the username and password that have been provided on the form. The login page can be seen in Figure 8.
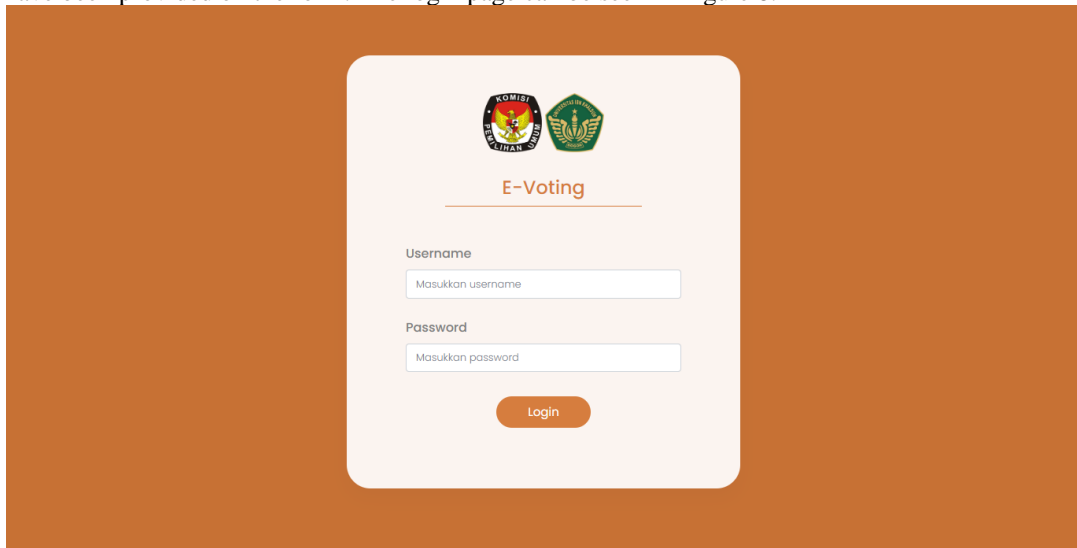

Fig 8. Login Page

Dashboard Page

The dashboard page displays the number of DPT and the number of voters who have voted. The dashboard page can be seen in Figure 9.
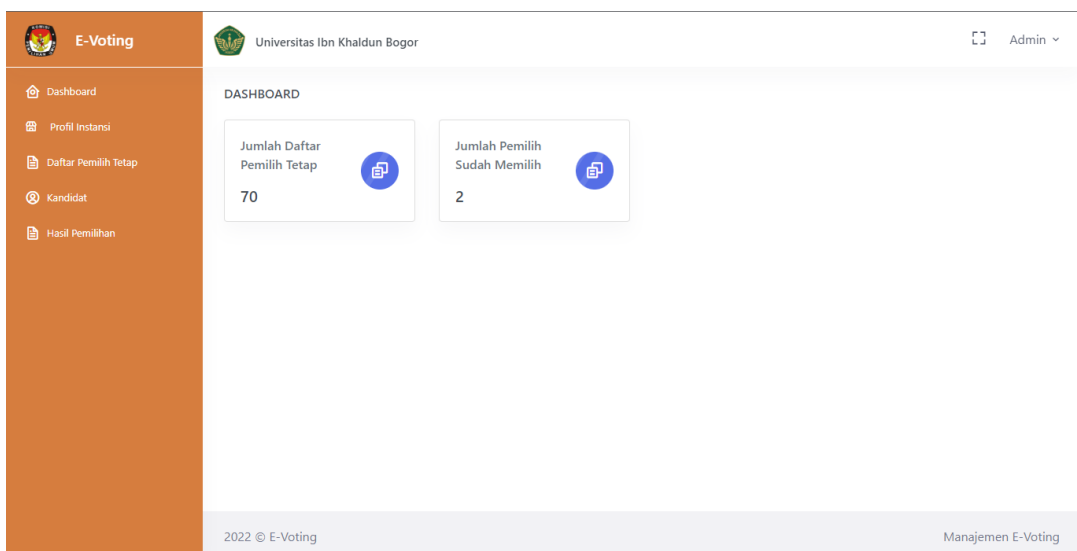

Fig 9. Dashboard Page

Agency Profile Page

The agency profile page displays agency data such as agency logo, agency name, agency address, type of election, and election time. The agency's profile page can be seen in Figure 10.
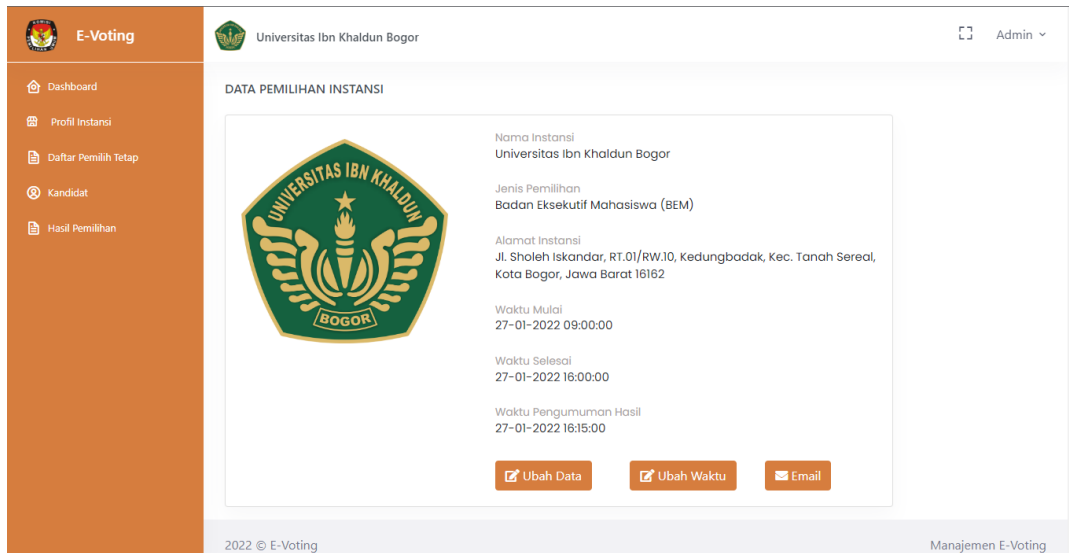

Fig 10. Agency Profile Page

Email Page

The email page displays agency email data that can be managed by the Admin. The email page can be seen in Figure 11.
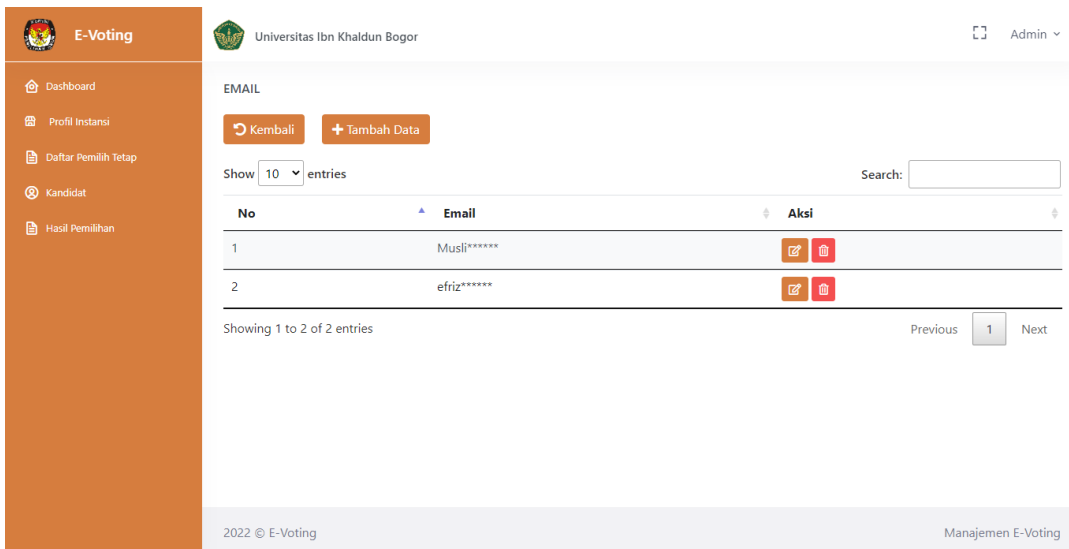

Fig 11. Email Page

Permanent Voters List Page

The voter list page still displays voter list data that can be managed by the Admin. The fixed voter list page can be seen in Figure 12.
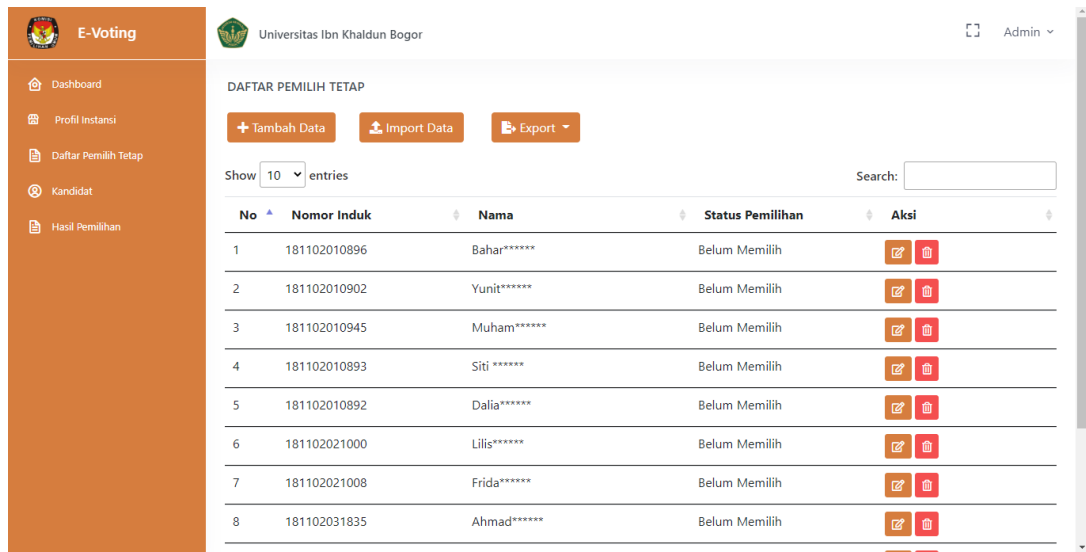
Fig 12. Permanent Voters List Page

Candidate Page

The candidate page displays candidate data on the election. The candidate data can be managed by the Admin. The candidate page can be seen in Figure 13.

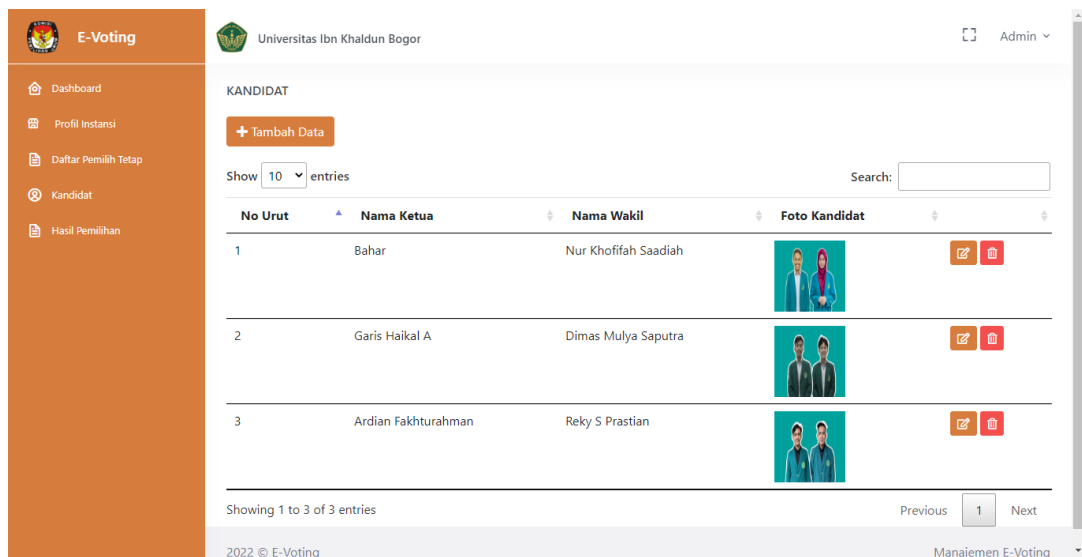Fig 13. Candidate Page

Election Result Page

The election results page displays the results of the election recapitulation according to the specified time. This page also displays event news reports. The selection page can be seen in Figure 14.
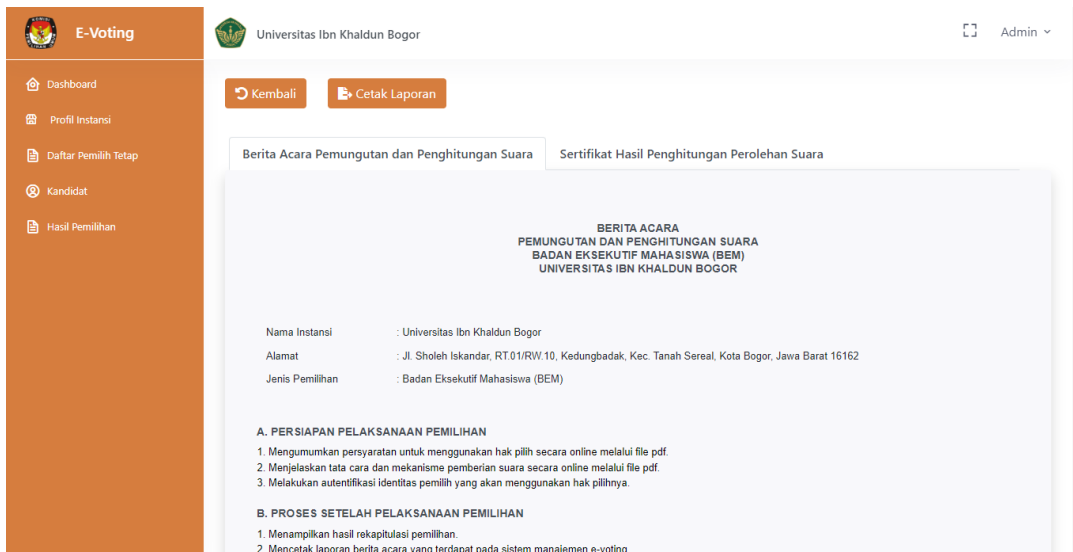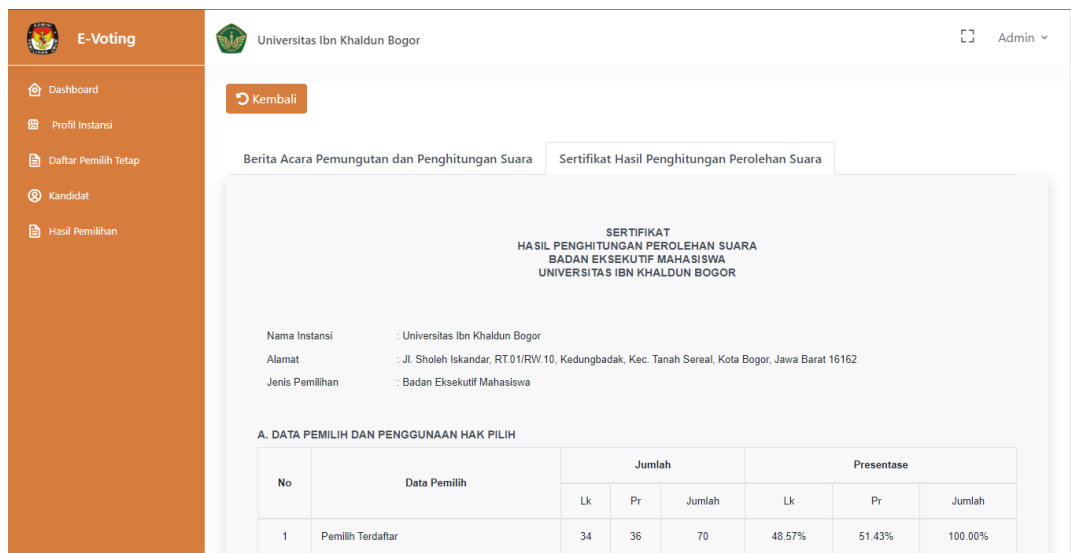
Fig 15. First Form Minutes Report Page

Fig 16. Second From Minutes Report Page

Testing

System testing is intended for testing each stage of the system that has been built. System testing in this study used the blackbox method. The blackbox method performs validation testing of the results issued by the system when the system is given a command. System testing on the e-voting management system can be seen in Table 1.

Table 1. Testing

No	Function Name	Testing	Test Status
1	Login	Enter your username and password	Succeed
2	Dashboard	Displays the number of DPT and the number of voters who have already voted	Succeed
3	Agency Profile Management	Change instance profile data	Succeed
4	Email Management	Manage email data	Succeed
5	DPT Management	Manage DPT data	Succeed
6	Candidate Management	Manage candidate data	Succeed

7	Election Results	Display the selection results according to the specified time	Succeed
8	Create a Minutes Report	Create an election minutes report, which can be printed and re-uploaded	Succeed

Conclusion

The e-voting management system for novice voters is made to make it easier to manage matters related to the implementation of elections, according to agencies that use e-voting applications within the scope of novice voters. This is indicated by the Admin who can manage election data such as agency profiles, DPT, and candidates. Admins can also see the results of the election recapitulation according to a predetermined time, and can make news reports. The existence of this e-voting management system makes it easier for the organizers and organizing committees, both in preparation before the election and the process after the election. The e-voting management system must be reset for each election to be held, because the data contained in the e-voting management system adjusts the agencies that carry out elections using the e-voting application.

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