



Designing an Android-Based “Digital Library Batik Tegal” Application

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Abstract

Inventory and documentation efforts as an effort to protect and preserve craft products, to provide an informative function for batik industry players, students, tourists, and the wider community can be done with a digital library. This research was conducted to design an android-based application which displays information about Tegal batik motifs in the android display of the application related to the initial display (home), a brief history of Tegal Regency, maps of Tegal Regency, the development of Tegal Regency typical batik, 400 kinds of motifs Tegal batik with its philosophical meaning, and the distribution of batik business actors in Tegal Regency and equipped with an audio explanation of the philosophical meaning of batik. The Tegal Batik Digital Library application was developed using the Flutter framework with the Dart programming language. In this study we used the System Development Life Cycle (SDLC) method with a Waterfall method. This research produces an android application called “Digital Library Batik Tegal” which can be used by batik industry players, vocational students, and the general public. Application testing conducted by media experts showed good results, where in Black Box testing all features ran as they should.

Keywords: *Digital Library; Batik Tegal; Flutter; Black Box Testing*

1. Introduction

The requirements for information, which will be supported by rapidly advancing information technology, will have an effect on the availability of information that is faster, precise, and accurate (Noor, 2019). Humans cannot play a significant role in their surroundings without access to information (Cangara, 2008). Several factors, including a lack of initial understanding about the existence of the traditional batik craft product itself, have contributed to the market's limited availability of variations on Tegal batik motifs (Hodijah et al., 2019).

The progression of technology and communication has an effect on the creation of a faster flow of information, which in turn has an effect on society, which in this instance is the topic of the times. The global community, including Indonesia, is currently becoming more active in implementing the growth of communication and information technology, which is necessary for it to be classified as an information society (Faidlatul Habibah & Irwansyah, 2021).

Inventory and documentation efforts as an effort to protect and preserve handicraft products, to provide an informative function for SMEs, students, tourists, and the wider community. In addition, product literacy is expected to provide more extensive information about the specifications of traditional handicraft products, so that through this process these products will be more easily accessible to national and international markets (Hodijah et al., 2019).

One of the inventory and documentation efforts can be done through the library (Yuda & Muludi, 2021). Libraries as reading sources where to improve their functions and services must also use information technology to the fullest, namely by using an application-based digital library application on a smart phone. Information technology-based digital libraries are an important part of supporting reading sources for the community which broadly provide opportunities for the public to access and obtain information practically from anywhere (Ilahi, 2019).

In this research, we aimed to design Digital Library Batik Tegal as an android-based application program that displays information about Tegal batik motifs in the android display of applications related to the initial display (home), a brief history of Tegal Regency, a map of Tegal Regency, the development of typical batik of Tegal Regency, various motifs and philosophical meanings, and the distribution of batik business actors in Tegal Regency along with an audio explanation of the meaning of batik. The Tegal Batik Digital Library also can be downloaded at the AppStore and installed on an Android device. The Tegal Batik Digital Library application was developed using the Flutter framework with the Dart programming language.

As a result of the rapid development of mobile technology, smartphones have become one of the most popular mobile devices now in use. The bigger the number of mobile device owners and users, the greater the potential for technical device utilization in all disciplines (Astuti et al., 2018).

Testing or software testing is a process that is made to identify discrepancies with the performance of a program or system to get the expected results (Novianti, 2014). In this case, testing was done by black box testing. Black box testing is a form of testing implementation in functional terms, this method only tests whether the application is valid or not (Khafid & Putri, 2020).

Software testing plays an important role in maintaining software quality. There is a close relationship between software testing and the quality of the software produced, so that software testing is a very important stage in the software development cycle (Saman & Ratnasari, 2022).

2. Method

In this study, we used the System Development Life Cycle (SDLC) method with a waterfall approach model. System Development Life Cycle (SDLC) was a step-by-step approach to the analysis and design of the use of analysis-specific activity cycles and users (Sagita et al., 2015). A special feature of the waterfall model was that the steps were sequential by walking downward from the requirements, design, implementation, testing, to maintenance phases (Alshamrani & Bahattab, 2015). The author uses this method since the work steps in this method were done in stages which allows the focus in each phase to be maximized as each phase in the waterfall model should be completed first.

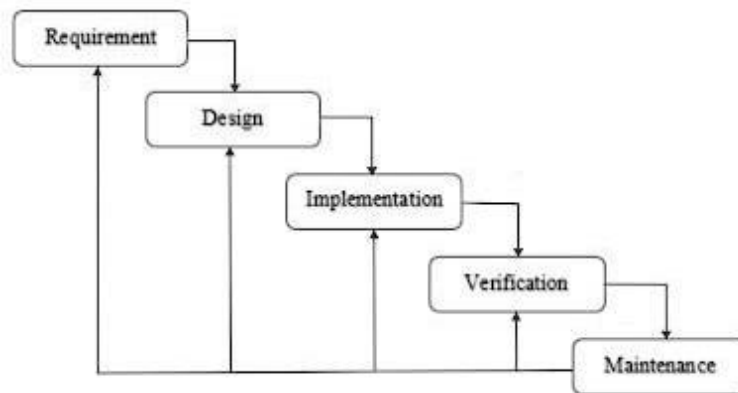


Figure 1. Waterfall Model

2.1. Requirements

The initial stage for designing an application is to determine the software specification requirements to determine the functional and non-functional requirements of the application to be designed.

a. Functional Requirements

The “Digital Library Batik Tegal” is an application on an android device that can be used by batik SMEs actors in Tegal Regency and the wider community as a source of digital literacy about existing Tegal batik motifs. The application design which includes a functional system is as follows :

- The application provides information about the brief history of Tegal Regency, a map of Tegal Regency, and the development of Tegal Regency's typical batik.
- The application presents information related to hundreds of kinds of tegal batik motifs and their philosophical meanings, as well as the latest data related to the distribution of batik business actors in Tegal Regency.
- The application is equipped with an audio option explaining the meaning of the philosophy of batik.

b. Non-Functional Requirements

Non-functional requirements are stages in development to analyze the resources needed in designing this application. The resources used in designing consist of software and hardware.

- Software Analysis

The software system requirements needed in designing the application are as follows:

- Windows 10 64bit
- Visual Studio Code
- Figma
- SDK Flutter 2.0.5
- Darts 2.10
- Android SDK 28

- Hardware Analysis

The following hardware requirements in designing applications:

2.2. Design

- ASUS A456UR Laptop Intel Core i5-7200U, CPU @ 3.1 GHz, 8GB RAM, 1 TB hard drive, 256 GB SSD.
- Android Smartphones (Samsung A52)

At this stage, the required analysis is converted into a form that users can understand, such as user interface design. In designing applications, we also use the Unified Modeling Language (UML) which includes Use Case Diagrams and Activity Diagrams and Flowcharts.

2.2.1. Use Case Diagrams

Use Case Diagrams is a model to describe an interaction between one or more actors with the information system to be created, Use Case is used to find out the functions of the information system and who has the right to use these functions. The following is a use case diagram for the Tegal batik digital library application system.

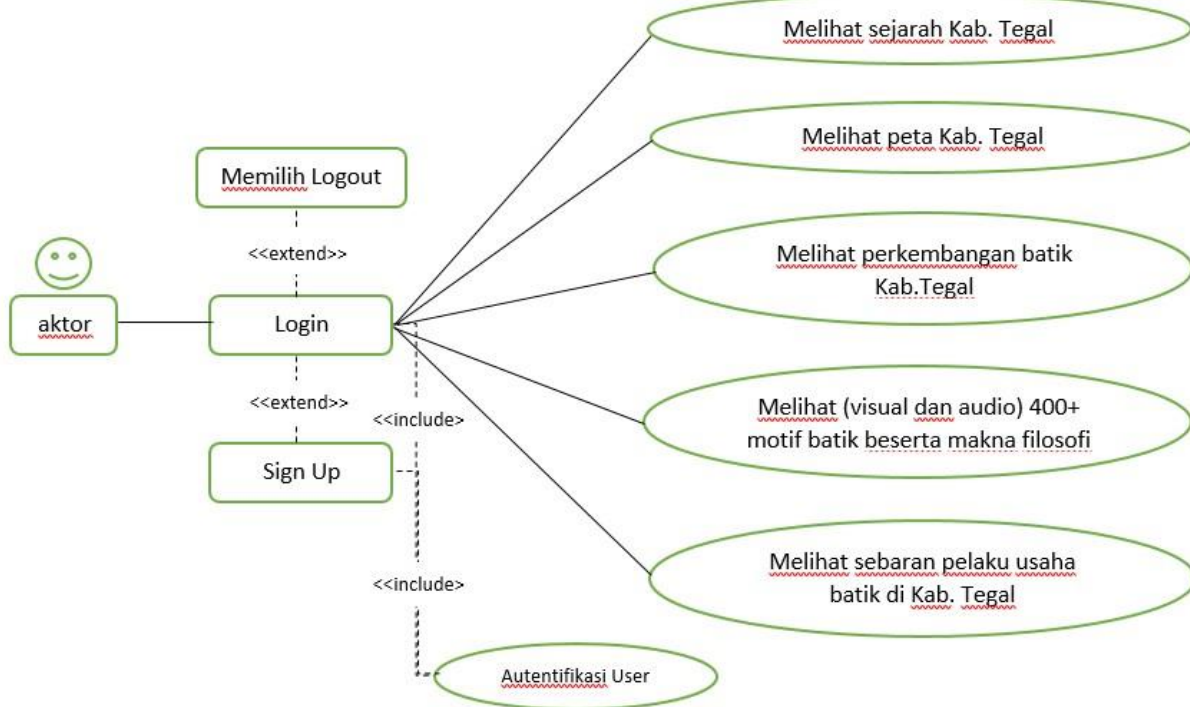


Figure 2. Use Case Diagram

2.2.2. Activity Diagrams

Activity diagrams is a description of the work flow of the system to be developed. This diagram is designed based on use case diagrams that have been made before and serves to understand the detailed process of each system feature. The following is a description of the Activity Diagram of each system feature.

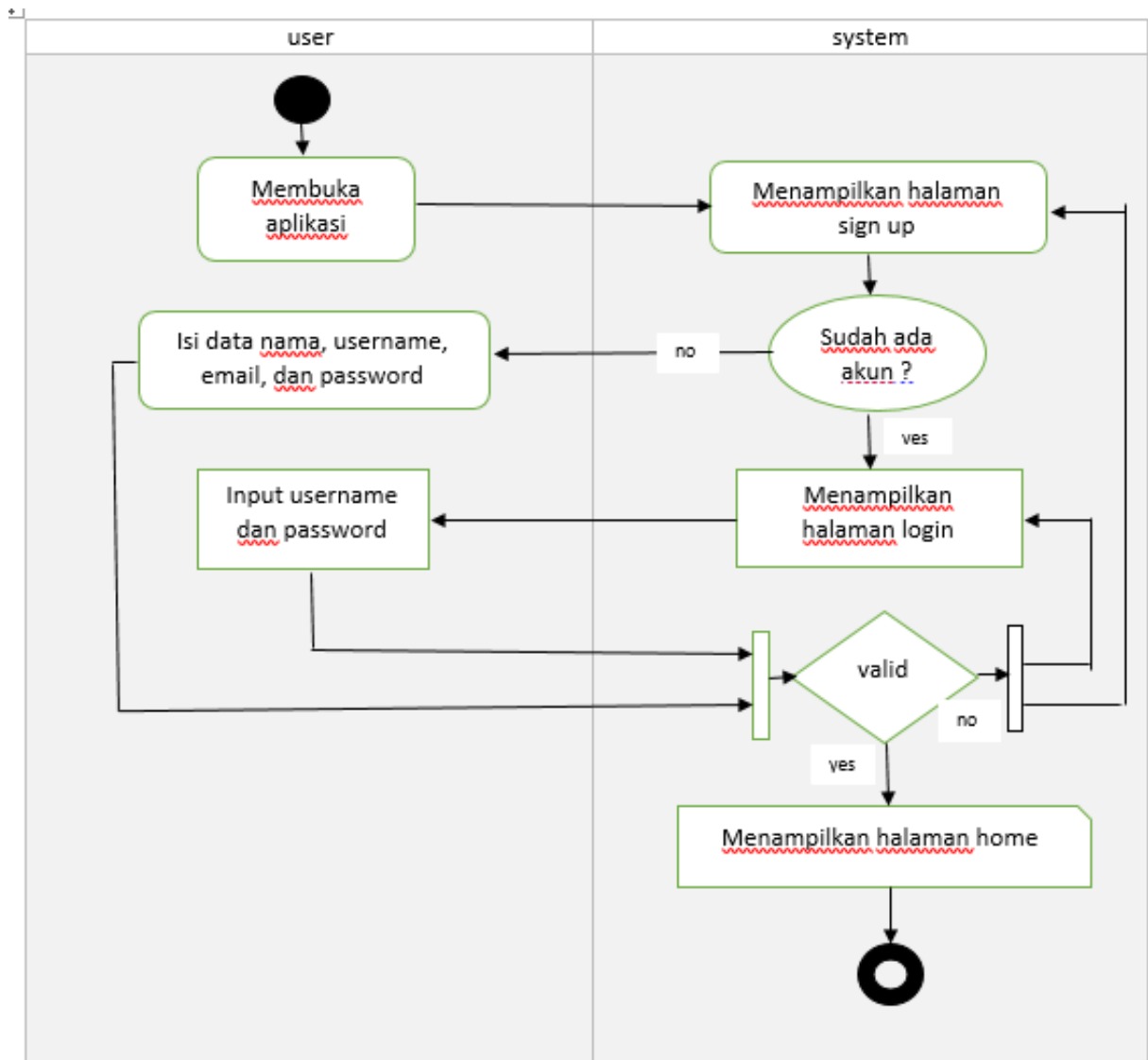


Figure 3. Login and Sign Up Diagram Activity

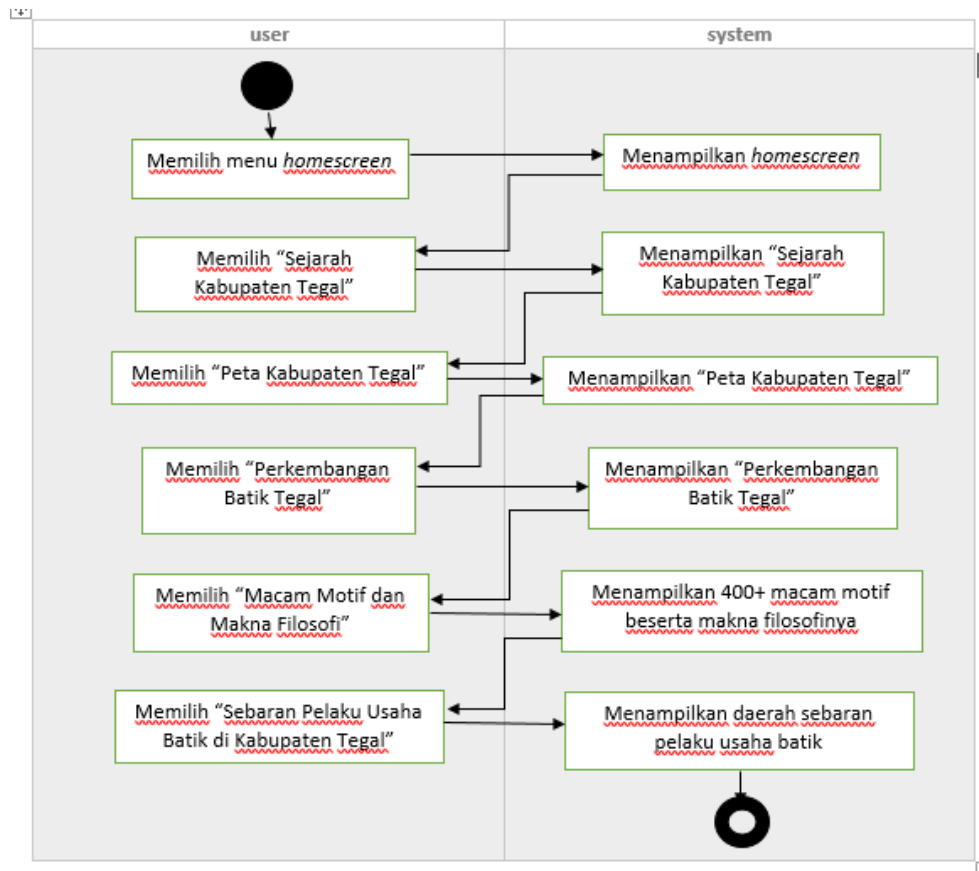


Figure 4. Homescreen Diagram Activity

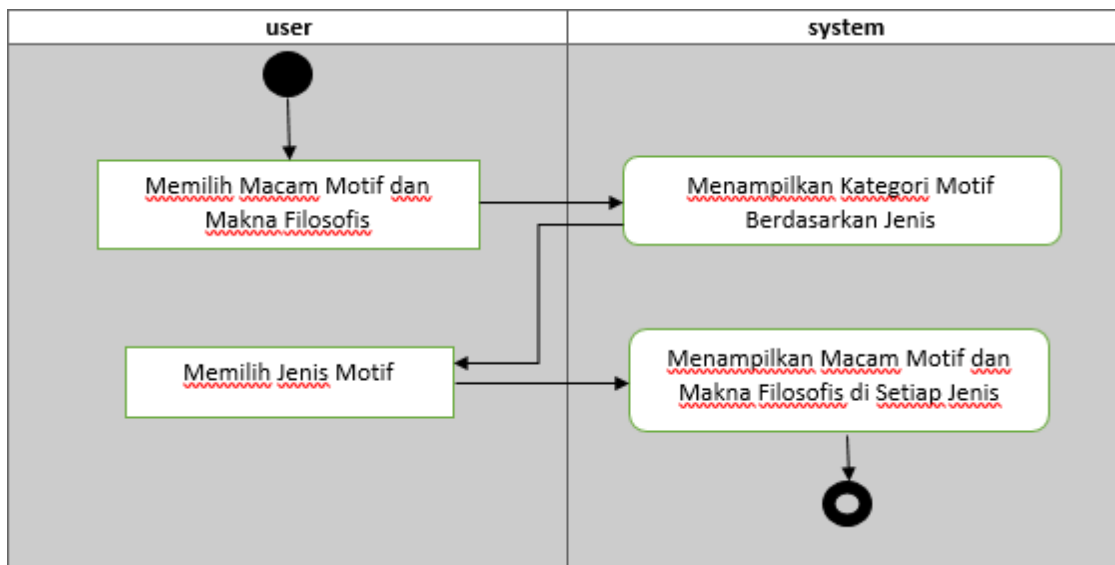


Figure 5. Menu Diagram Activity (Types of Motives and Philosophical Meanings)

2.2.3. Flow Chart

The following is a flowchart of the design of the Tegal Batik Digital Library application system.

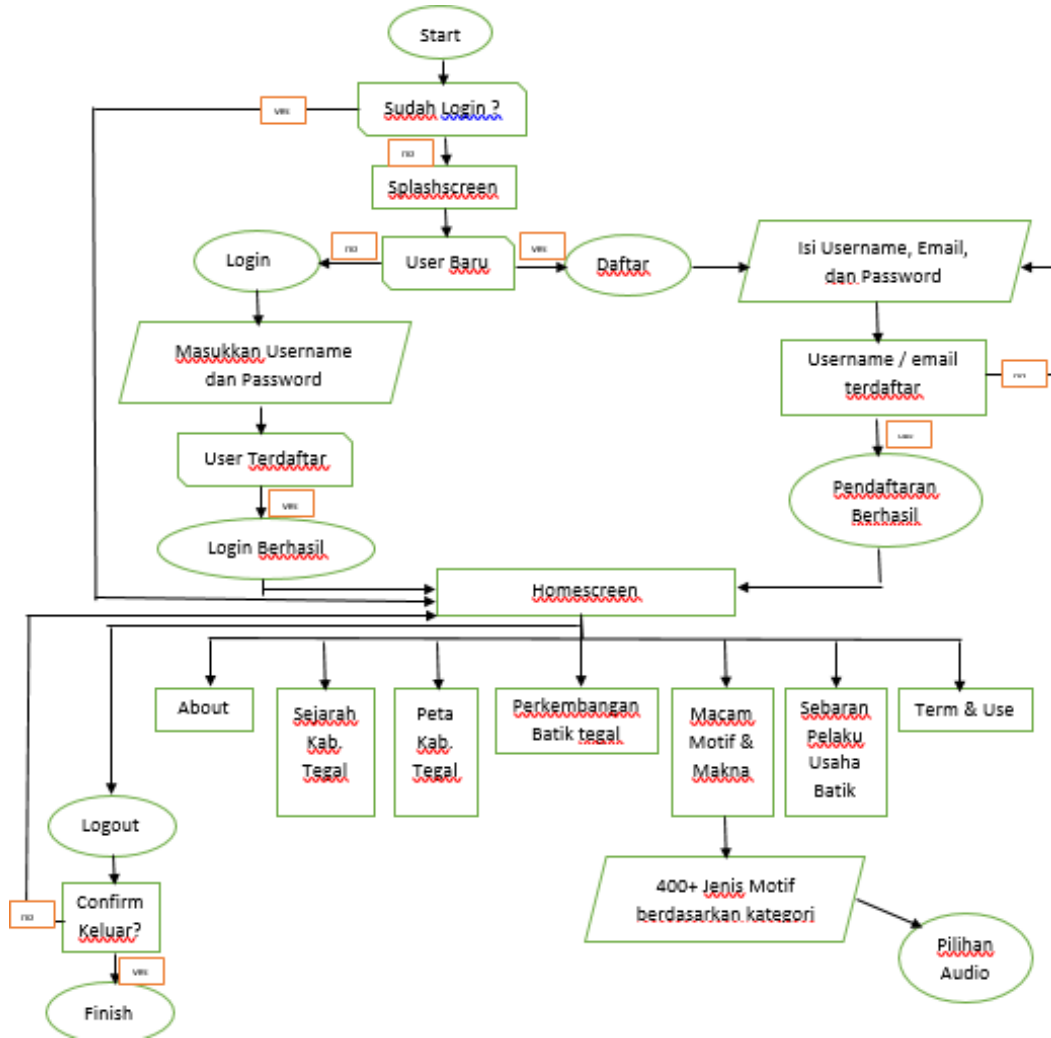


Figure 6. Flowchart

2.3. Implementation

The application creation process uses Visual Code application software using Flutter's software development kit (SDK) and Dart programming language and uses Firebase as a server to store user authentication data and data needed by the application.

2.4. Verification

Application testing is carried out after the process of making the Tegal batik digital library application has been completed and can be installed on an Android smartphone. Testing is carried out to evaluate the usability, efficiency and effectiveness of the application, whether it is running well or not. In this case, we use the black box testing method to test applications. Black box testing is a form of testing

implementation in functional terms. This method tests whether the application is valid or not valid (Khafid & Putri, 2020).

2.5. Maintenance

At this stage, researchers periodically check applications that have been released to the public to maintain good system quality. If in the future there are additional contents of various other Tegal batik motifs, then the author will add and release the latest version of the application. In addition, periodic checks are needed on the Firebase database so that all important user data is maintained properly.

Periodic checks are also carried out on the Google Play Store system where this application is delisted so that the general public can install it. Reviews, feedback, and criticism from users are still checked and responded to by the author, so that this application can develop for the better.

3. Results and Discussion

The results obtained from this study are the Tegal Batik Digital Library is an android-based application program which displays information about Tegal batik motifs in the android display of applications related to the initial display (home), a brief history of Tegal Regency, maps of Tegal Regency, development of batik typical of Tegal Regency, kinds of motifs and philosophical meanings, and the distribution of batik business actors in Tegal Regency along with audio explanations of the meaning of batik philosophy.

3.1. Implementation

3.1.1. Splashscreen Page

Splashscreens is the first page displayed by the “Digital Library Batik Tegal” application before going to the login page. Splashscreen page can be seen in figure 7.

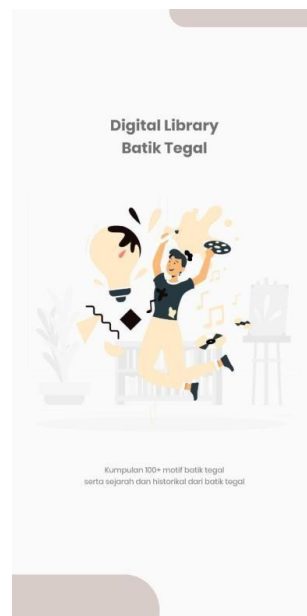


Figure 7. Splashscreen display

3.1.2. Login Page

Login page is the initial page after the splash screen page, this page is used to verify the user who will enter the main page. Users can register to create a new account by filling in their email, username and password. The login page display is shown in Figure 8.

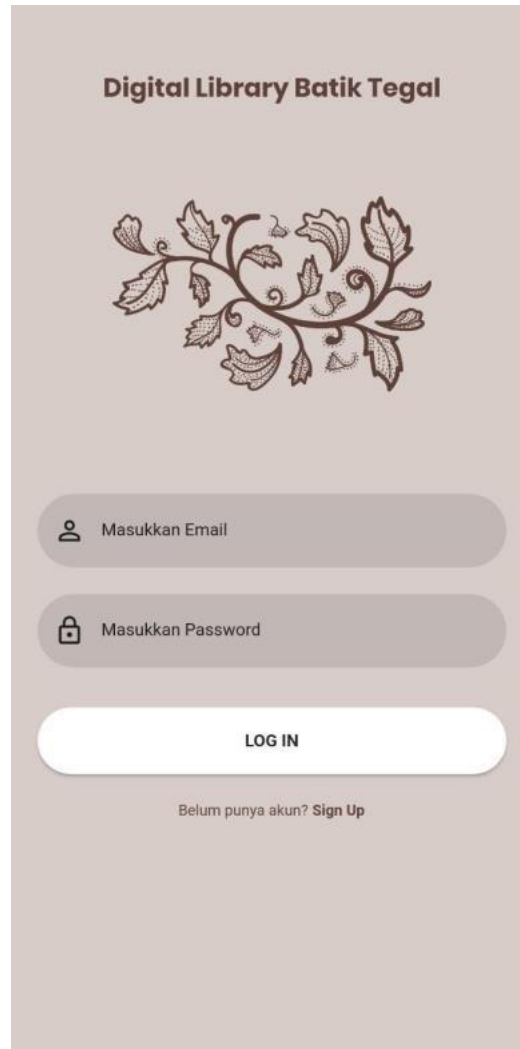


Figure 8. Login Page Display

3.1.3. Sign Up Page

The Sign Up page is a new user registration page that does not yet have an account in the “Digital Library Batik Tegal” application, the user is asked to fill in a profile photo, email, username and password. The Sign Up page display is shown in Figure 9.

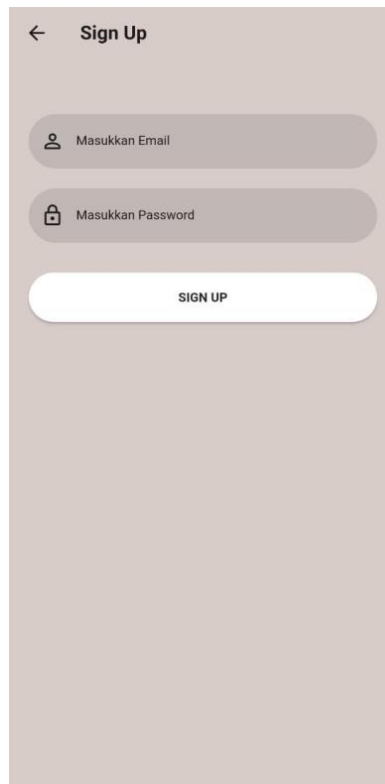


Figure 9. Sign Up Page Display

3.1.4. Main Page / Homescreen

Main page / Homescreen is the main page that appears when the user has validated authentication from the login page. The main page / homescreen display can be seen in Figure 10.



Figure 10. Main page/ Homescreen display

The main page / homescreen displays a side menu feature that can be accessed by the user, the side menu button, which displays a side tab and contains buttons for the About, Term & Use menu, and the Logout button. The side menu display can be seen in Figure 11.

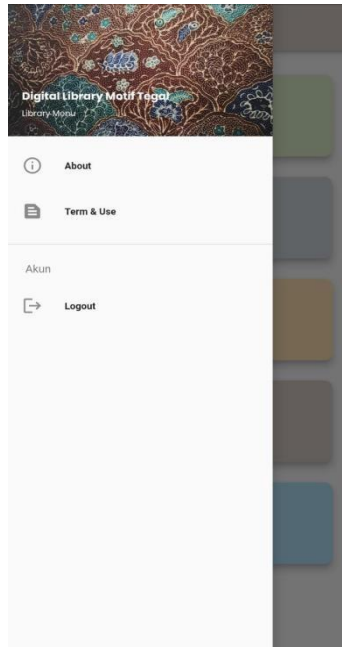


Figure 11. Side Menu Display

3.1.5. Tegal Regency History Page

This page displays a brief history of Tegal Regency such as the origin of the name Tegal, historical chronology from the beginning to the establishment of a district / city, and actors involved in history. The display of the Tegal Regency history page can be seen in Figure 12.

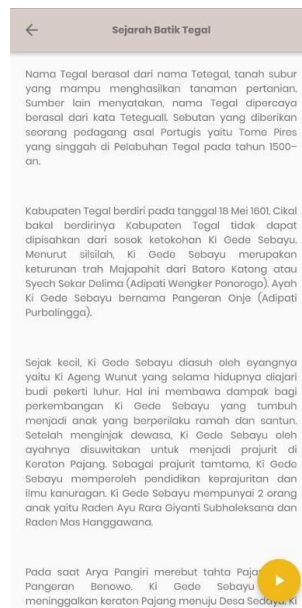


Figure 12. Tegal Regency History Page Display

3.1.6. Tegal Regency Map Page

This page displays a map of Tegal Regency such as geographical location, area boundaries, and areas bordering Tegal Regency. The display of the Tegal Regency map page can be seen in Figure 13.

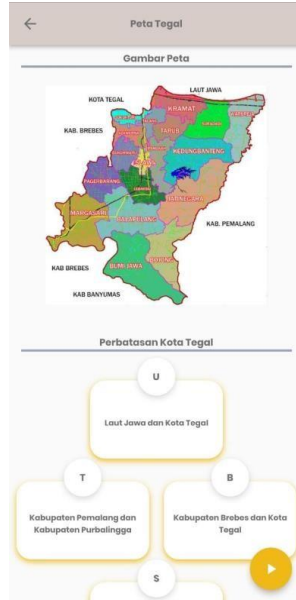


Figure 13. Tegal Regency Map Page Display

3.1.7. Tegal Batik Development Page

This page displays the development of Tegal Batik starting from the Ki Gede Sebayu period, the Sunan Amangkurat I period, the Raden Ayu Kardinah period, the acculturation period of Dutch batik and Chinese batik as well as Mas Wong Kaji. The display of the Tegal Batik development page can be seen in Figure 14.

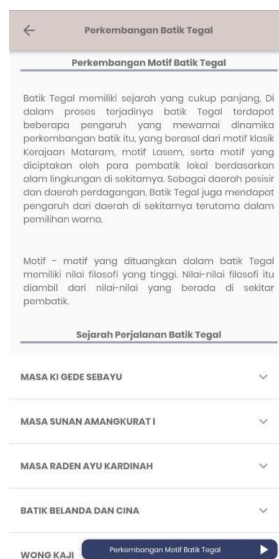


Figure 14. Tegal Batik Development Page Display

3.1.8. Pages Of Various Motifs And Philosophical Meanings

This page displays various Tegal batik motifs based on their type, there are 400+ motifs from 103 types of Tegal batik. The documented batik motif is written batik. The kinds of motifs presented are complemented by an explanation of the philosophy of meaning that can be read visually and heard with a choice of audio icons. The page display of various motifs and philosophical meanings can be seen in Figure 15.

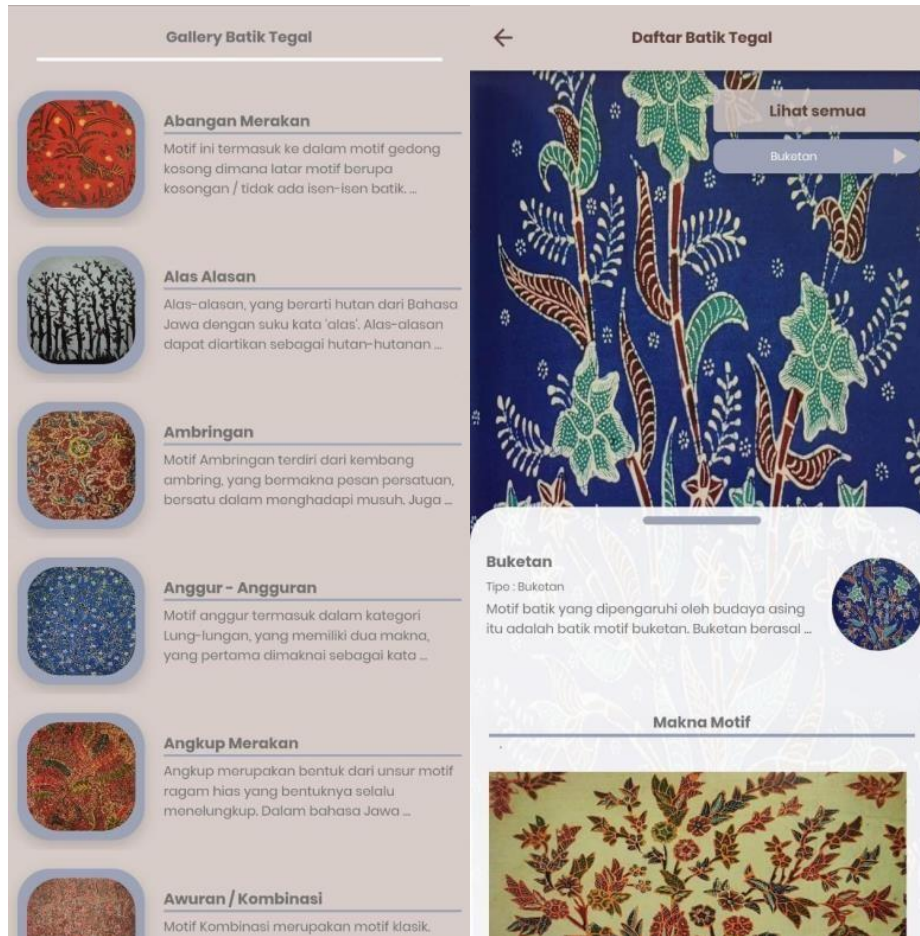


Figure 15. Page Views of Various Motifs and Philosophical Meanings

3.1.9. Page Of Distribution Of Batik Entrepreneurs In Tegal Regency

On this page will displays a map of the distribution of Tegal batik SMEs actors in Tegal Regency, complemented by dozens of samples of business actors. Aside from being a documentation effort, the android application “Digital Library Batik Tegal” is also an effort to popularize and introduce batik businesses to the general public with a wider marketing reach. The page display of the distribution of batik business actors in Tegal Regency can be seen in Figure 16.

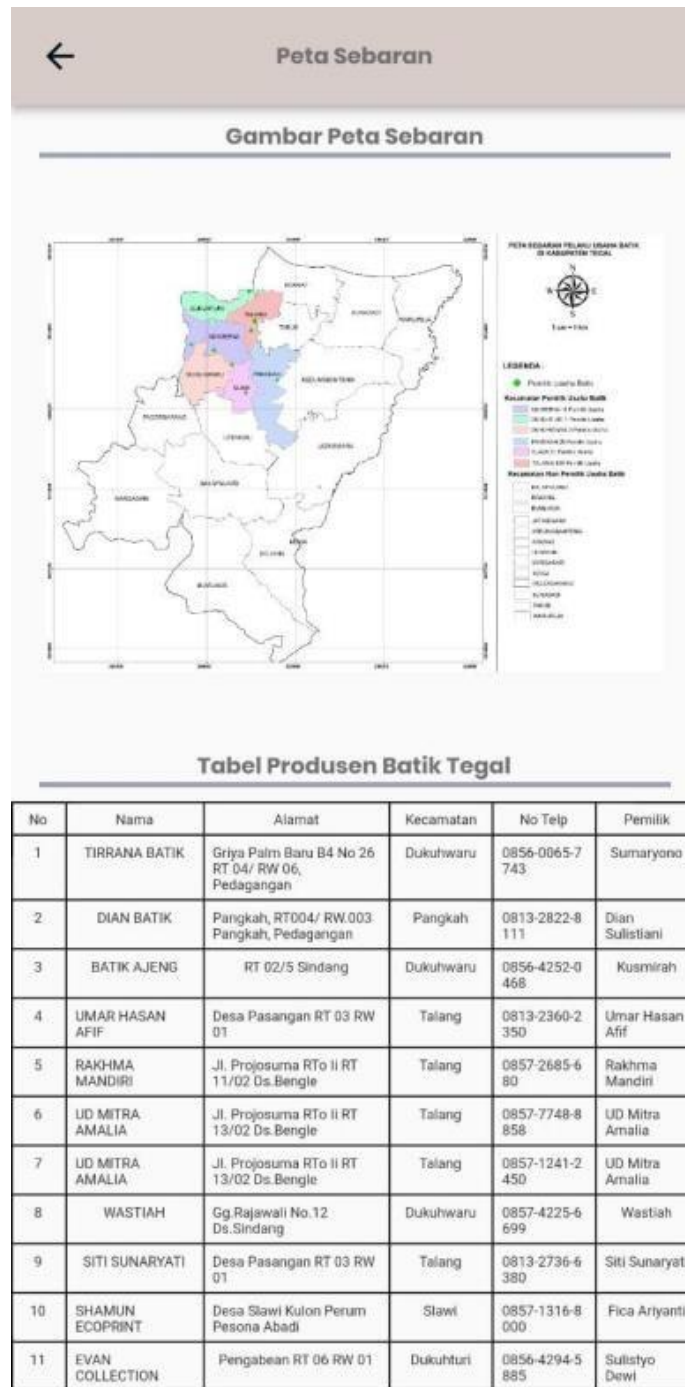


Figure 16. Distribution Page of Batik Business Actors in Tegal Regency Display

3.1.10. About Page

This page displays a message from the developer regarding the purpose and function of the android application "Digital Library Batik Tegal". There is a developer contact that can be contacted by users as a media for criticism and suggestions. The about page can be seen in Figure 17.

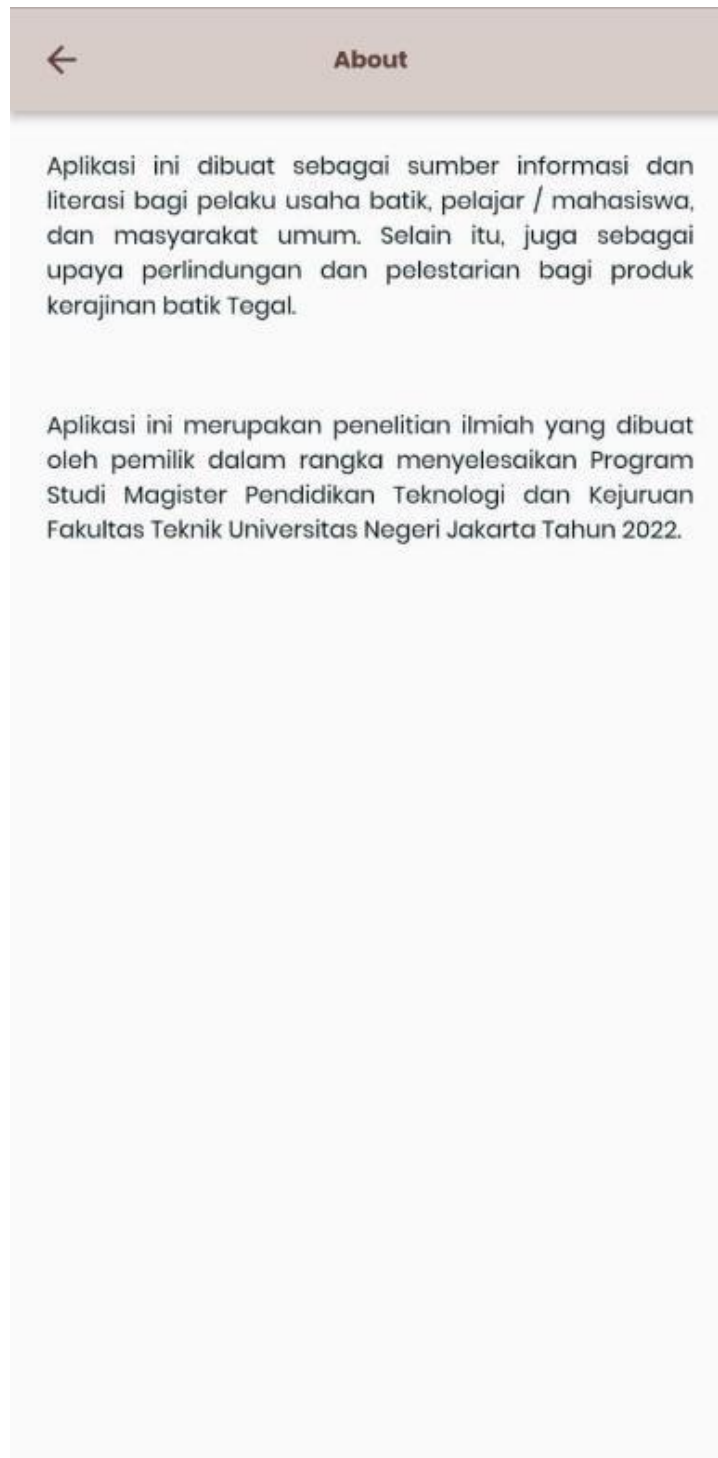


Figure 17. About page Display

3.1.11. Term & Use Page

This page displays information for the use, regulations, and legality of the “Digital Library Batik Tegal” as an android application. The Term&Use page can be seen in Figure 18.

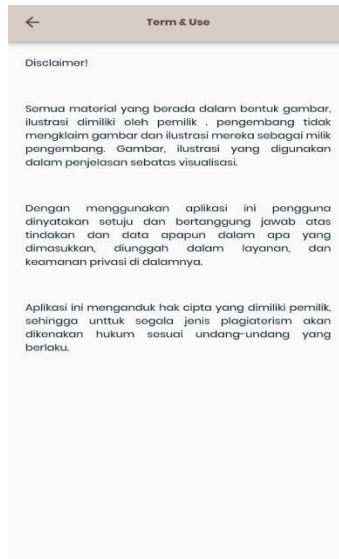


Figure 18. Term & Use page Display

3.2. Black Box Testing

Black box testing is carried out to test the features contained in the application so that it functions as it should. The results of black box testing conducted by media experts can be seen in Table 1.

Table 1. Black Box Testing Instruments

No	Activities Testing	Testing	Input	Output	Result
1	Starting the Application	User opens the app	Pressing the application icon in the smartphone menu	Display a splash screen page	Valid
2	Authentication	The user fills out the login form correctly	Filling the username, password, click the login button	Display a splash screen page	Valid
		User fills in the login form incompletely	Filling the username, click the login button	Displays a pop up of "entered data is incomplete "	Valid
		User registering a new account	Clicking the Register button	Display the Sign Up page	Valid
		The user filled the registration form correctly	Filling the username, email, password and click the register button	Display the homescreen page	Valid
		User fills out the registration form incompletely	Fill in the username, and click the register button	Displays a "enter all data" pop up	Valid
3	Displaying information	Users see detailed information on the History of Tegal Regency	Clicking the History menu of Tegal Regency	Display the Tegal Regency History detail page	Valid
		Users see detailed	Clicking the Tegal	Display the Tegal	Valid

		tegal regency map information	Regency Map menu	Regency Map detail page	
		Users see detailed information on the Development of Batik Tegal	Clicking the Tegal Batik Development menu	Displaying the detailed page of the Development of Tegal Batik	Valid
		Users see detailed information on Various Motifs and Their Philosophical Meanings	Clicking on the menu Types of Motifs and Their Philosophical Meanings	Displaying a detailed page of Motifs and Their Philosophical Meanings	Valid
4	Display image and audio information	Users see and hear detailed information on Various Motifs and Philosophical Meanings	Clicking images and audio buttons Various of Motifs and Philosophical Meanings	Displaying images and audio buttons Of Various Motifs and Philosophical Meanings	Valid
5	Account Logout	Account Logout	Clicking the logout icon button on the Sidebar on the menu page	Log out of the account session and display the Login page	Valid
6	Display a message from the Developer	View messages from developers	Pressing the About button on the side bar on the homescreen page	Display a page that contains a developer message	Valid
7	Displaying Terms & Use	View usage regulations, and app legality	Pressing the Term & Use button on the sidebar on the page homescreen	Display the Terms & Use page	Valid

4. Closing

4.1. Conclusion

The design of the Android-Based Batik Tegal Digital Library application has been completed. It contains several features including Login and Sign Up menus, Homescreen, a brief history of Tegal Regency, maps of Tegal Regency, the development of typical Tegal batik, 400 kinds of Tegal batik motifs with their philosophical meanings, and the distribution of batik business actors in Tegal Regency and equipped with audio explanation of the meaning of the philosophy of batik. Based on the results of Black Box testing conducted by media experts, all features in the application work properly and can be used by batik industry players, students, and the general public as a means of information related to the variety of Tegal batik motifs.

4.2. Suggestion

For further research in making the Android-based Tegal Batik Digital Library application, it is hoped that it will be able to develop a wider and more advanced application system, covering the latest variants of Tegal batik motifs resulting from the development and creations of batik makers, developing applications to make it more accessible for Android-based mobile phone users and iOS, and developing User Interface and User Experience so that users can have a better experience.

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