

Kediri City Tourism Object Application Using Firebase Realtime Database Technology

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Abstract— Often an area that exploits the attractiveness of an area as a tourist destination in order to raise regional revenue. Kediri city is a city located in East Java with an interesting tourism object in it, but still not widely known by many people. This study aims to make a Kediri city tourism object application using a firebase realtime database. The system that we made was built using the concept of client-server consisting of admin actors to enter data into the server and client users to display data. This application shows the description of tourism objects such as the name, picture, address, opening hours, and the price of the admission about tourism object. Testing of this system is done using unit testing and taking questionnaires to several respondents. And the responses of respondents to this application are very good with 93.65% presentations.

Keywords— *firebase realtime database, client-server, tourism object, Kediri city*

I. INTRODUCTION

Many an area that utilizes the beauty of an area as a tourist attraction to increase regional income. The arrival of tourists from local or international communities to the tourism object improves the community's economy around the object of tourism while promoting the region [1]. Kediri city, for example, the third-largest city in East Java after Surabaya and Malang. One of Kediri city's main revenues is received from the tourism business.

Because in this area has many interesting attractions, ranging from nature tourism, artificial tourism, historical tourism, religious tourism, culinary tour, etcetera but these interesting tourism objects still not widely known by many people [2].

Firebase real-time database is a database that is widely used by developers and online usage systems. Firebase [3] is used to store and process data without burdening the local storage used by the application. Firebase was chosen because it can synchronize data in real-time to the client if there is a data update. Firebase has an easily accessible performance and is quite efficient in using more than one program.

There have been several previous studies on the use of Firebase Realtime Database, including A. Al-Kababji et al. [4] implementing a firebase realtime database with IoT-based fall and ECG monitoring system. In their study, researchers designed and implemented a firebase realtime database for analysis in case of a fall that sends an alert notification to caregivers application when elderlies needing help by using an MPU. They use ODROID-XU4 as the MPU and sensing device. when elderlies in an urgent situation the sensing device will work and send it to the database then will restore the analysis data to caregivers' application. Fall detection has accuracy of 95% with the ENN learning algorithm.

G. R. Payara et al. [5] Implementing Firebase Realtime Database on Android-Based Food Order Prototype Application. The researcher uses the Firebase realtime database to facilitate users in the process of ordering food faster through the application. So the process of ordering food is not done manually.

The result shows that this application is very helpful in ordering food to be effective and efficient.

A. R. Wiratno et al. [6] Implementation of Firebase Realtime Database to track BRT Trans Semarang. This journal proposed by researches to provide information about BRT Trans Semarang in effective ways. They used firebase realtime database because it can synchronize automatically without waiting for user to refresh or reload the application. This application successfully provides what user needs as evidenced by a user acceptance test.

T. Ahmed et al. [7] proposed research about A Real-Time Controlled Closed Loop IoT Based Home Surveillance System Using Firebase. in this paper, researchers introduce low-cost IoT for home security systems that allow users to have complete control over the system. Their application uses a firebase realtime database to interpret sensor data. The security system combines a motion sensor and a camera module for intruder detection and alerts the user instantly through an online alert notification.

E. A. W. Sanad et al. [8] proposed research about the utilization of firebase realtime database for E-tourism application in Nabire District. This journal describes an e-tourism application that can give information to users regarding the position of tourist locations and user positions that can change in real-time using firebase. the system is tested by moving the user's position to see data changes in realtime and the results will be displayed on the map in the application. Study results show that this application successfully displays changes in the user's position with the tourist location in real-time

This study aimed to implement a firebase realtime database in an application that requires two applications that access the same database. Every time there is a data change in the database, the database will store it and synchronize the newest data for each client that is connected. So the user doesn't have to reload or refresh the application.

II. OVERVIEW OF FIREBASE REALTIME DATABASE AND CLIENT-SERVER

In this section, we will explain about the firebase real-time database and client-server that will be used in this application.

2.1 Firebase Realtime Database

Firebase realtime database is a non-structural or NoSQL database that has a difference when compared to SQL databases. Firebase is compiled and displayed using JSON language [3]. Firebase realtime database uses data synchronization every time there is a data change and every client that is connected will receive the change in milliseconds. The database security system is regulated in the rules section which executes data when it is read or written. This database

can also be accessed by multiple applications with the same Firebase project and the same database.



Figure 1. JSON Tree

2.2 Client-Server

Figure 2 explains the architecture used in this application. Firebase realtime database is accessed by two applications, one is an admin application that works as a server that can do data processing (create, update, delete) and the other is called a client whose job is to display data from the server without manipulating data [9].

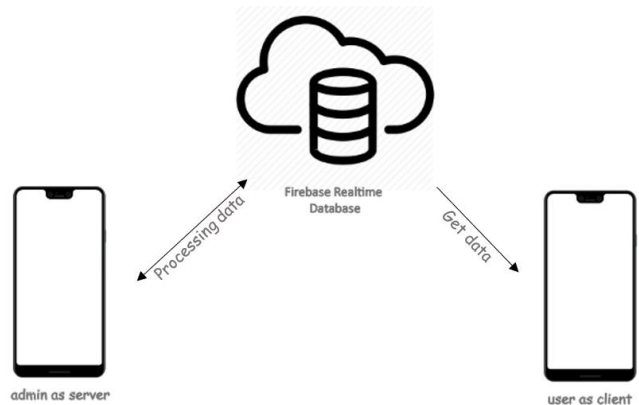


Figure 2. Client-Server

III. SYSTEM DESIGN

The firebase realtime database is accessed by two applications that use the same database. Figure 3. shows the whole system design from this application.

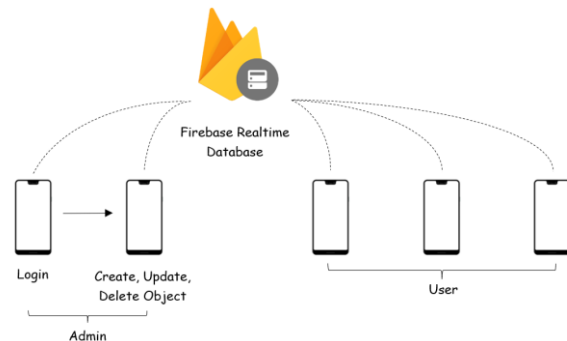


Figure 3. System Design

3.1 Admin

Admin has to register first. If admin has registered, admin has to log in. successfully logged in, admin can do data processing such as create, update, and delete tourism object.

3.2 Firebase Realtime Database

When admin adds data to the database, firebase realtime database will store it in the database. at the same time, the data that was added earlier will be displayed in the recycler view in the application interface. the same thing applies when the admin updates the data. If the admin wants to delete data, the deleted data will not appear in the application or the database.

In the database, this application has six tables. First is "Alam" table that contains lists of natural and artificial tourism objects. Second is "Sejarah" table that contains lists of historical tourism objects. The third is "Religi" table that contains lists of religious tourism objects. Fourth is "Kuliner" table that contains lists of culinary tourism objects. The fifth is "Pasar" table that contains lists of market and mall objects. and the last is "Cafe" table that contains lists of cafe objects.

3.2.1.1 User

In this part, the user can only see the information about tourism object. Users can not do processing data. In the application interface, it just retrieves data from the database. Of course, if data has changed from the database, in the application it will change too.

IV. PERFORMANCE EVALUATION

In this section, we will do the testing process to find out if the application is running as expected and see how to implement a firebase realtime database into this application. this test will divide into 3 parts, namely admin application, user application, and system analysis.

4.1 Admin Application

To use firebase realtime database as a database, we have to connect the firebase realtime database into Admin project. Go to firebase console, click add project, then follow the on-screen instruction. On the android studio project we have to connect our firebase project and android studio project, click on Tools>Firebase>Realtime Database>Save and retrieve data than click "Connect to Firebase". A list of your project that you have created will be shown. Choose the project and click "Connect to Firebase". Then click "Add Firebase Realtime Database to your

app" button and then "Accept changes", this will add the dependency that needed in Admin project automatically. Figure 4. Shows that we have done adding the firebase realtime database into our project.

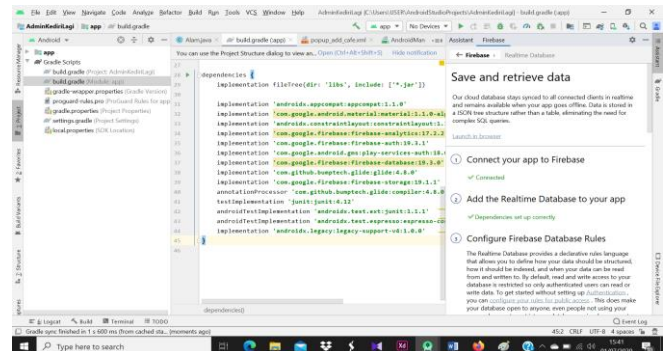
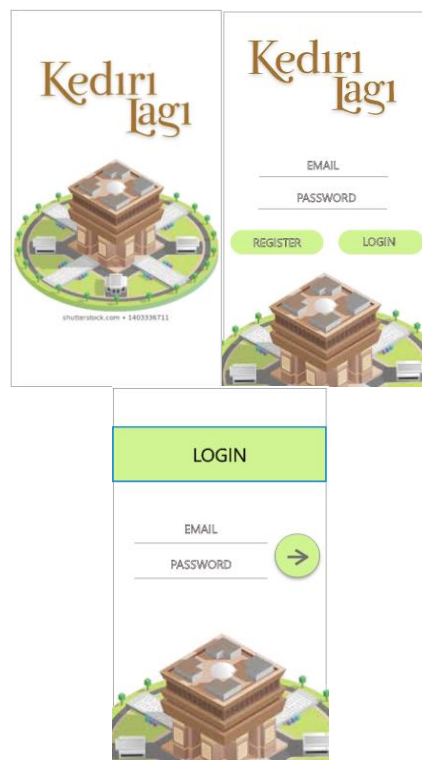


Figure 4. add firebase realtime database

After adding the firebase realtime database into our project, we start to make the program and layout for our application. We also create the database in this application [10]. Figure 5 (a). Shows the welcome screen page that shown for five seconds, after that, it will go to the registration page shown in Figure 5. (b). the admin has to register first if it doesn't have an account. If the admin already has an account it can go to the login page shown in Figure 5. (c). We use the firebase authentication for the login page using email and password from the admin.



(a) (b) (c)

Figure 5. (a) Welcome Screen Page (b) Register page (c) Login page

After admin successfully login, the application will show the home page. This page has six menus shown in Figure 6 (a). if one of the menus is clicked it will show the page of the list tourism object shown in Figure 6. (b). On this page, the process of creating/add and update tourism objects is done.



Figure 6. (a) Home page (b) list of tourism object

To create/add tourism object admin has to click the floating button in the right-button of the page of list tourism object. The display of creating/add tourism objects is shown in Figure 7. (a). To update data, Admin has to click long-press the tourism object that wants to be updated. The display of updating data tourism objects shown in Figure 7. (b).

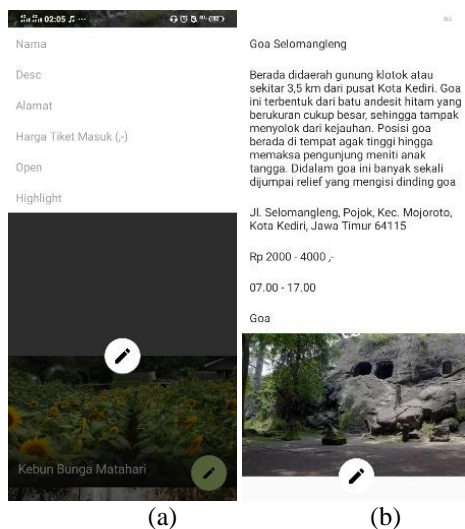


Figure 7. (a) create/add tourism object (b) updating tourism object

When admin has clicked the list of tourism objects, the application will show the description page of the tourism object shown in Figure 8. On this page, it has a delete button that used for deleting tourism objects.

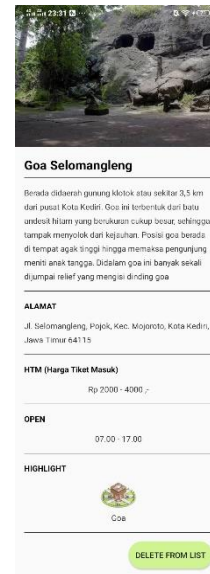


Figure 8. Description page

4.2 User Application

To use the same database that was created in the admin application, we have to connect the database into User project (new project to make user application). Go to the firebase console. Select home tab. Click on Add App. Select a platform, then follow the on-screen instruction. On the android studio click on Tools>Firebase>Realtime Database>save and retrieve data>Connect to Firebase, which will show a dialog to select an existing database. Click on Choose an existing Firebase Project, select the database, and click on the "Connect to Firebase". After that, click Add the realtime database to your app and then Accept Change. Figure 9. shows that we have chosen the database.

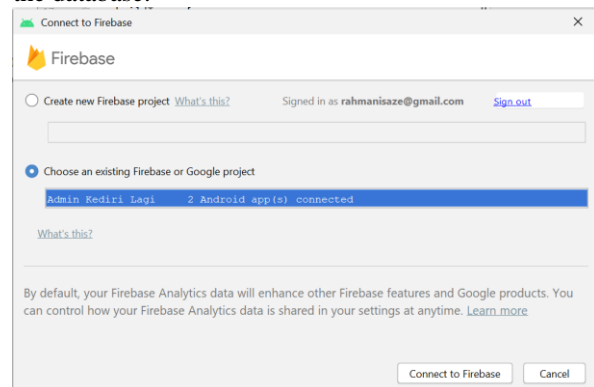


Figure 9. Chose database

Therefore, our user application has been connected to the same database with admin application. We start to

make the layout and program to this application. Figure 10. Shows the intro screen of this application. This intro shows a glimpse of information about this application, load several slides that can be shifted and if the user already at the end of slides, the “GET STARTED” button will appear. This intro screen just showed once.

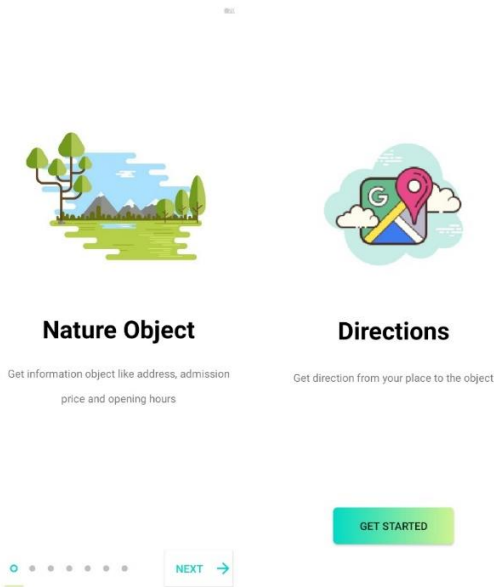


Figure 10. Intro Screen

After the intro screen, it will show the welcome screen that appears for three seconds. After three seconds, it will show the home page of this application that has six menus. The welcome screen and home page for this application are same as the design from the admin application. Figure 11. (a) shows the list of tourism objects depend on the menu that has clicked. This page informs the name of the tourism object and opening hours of the tourism object. In each object, it has a button that if it clicked, it will show the description page shown in Figure 11. (b). On this page, there are two buttons, one is the home button and another is directions button. Home button works for home page. Directions button will show the route to go to the location of the tourism object through google maps application.

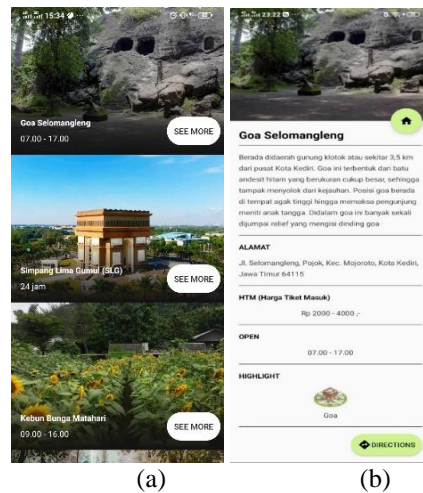


Figure 11. (a) List of tourism object (b) Description page

4.3 System Analysis

The system analysis is intended to analyze the performance of the system that has been made whether following what is expected using the USE Questionnaire and Task Scenario method. Table 1. and Table 2. show some tasks that will be given to respondents to assess how well the performance is running and whether it is following the given task description.

TABLE 1. EXAMPLE OF SOME TASK FOR RESPONDENTS FROM ADMIN APPLICATION

No	Task	Task Description
1.	Welcome screen and home page	Admin see the welcome screen which will then switch the home page
2.	Create/add a tourism object	Admin create/add a tourism object
3.	Update the tourism object	Admin updating data the tourism object
4.	Delete the tourism object	Admin deleting the tourism object

TABLE 2. EXAMPLE OF SOME TASK FOR RESPONDENTS FROM USER APPLICATION

No	Task	Task Description
1.	Intro screen and home page	Users see the intro screen which will switch to the home page
2.	Display the list of tourism object	Users see the list of tourism object
3.	Display the description page	Users see the description of the selected tourism object
4.	Display direction through the google maps	Users see the route to the location of tourism object

Table 3. shows the results of the USE Questionnaire. We distributed this questionnaire to several users to

find out their assessment of this application. It can be concluded that this application is very useful and easy to use for every user.

TABLE 3. THE RESULT OF USE QUESTIONNAIRE

No	Aspect	Average Value
1.	Usefulness	95,3%
2.	Ease of use	92,7%
3.	Ease of learning	95%
4.	Satisfaction	91,6%

V. CONCLUSION

Kediri city has many interesting tourism objects in it but unfortunately, these tourism objects are still not widely known by many people. This study aims to introduce tourism objects in Kediri City. Implementation of firebase realtime database into kediri city tourism object application is the easy way to use with its superiority in making updated data in real-time and with the programing language that easy to understand because using JSON object. We apply a firebase realtime database to our application with client-server concept.. This method is tested using unit testing and questionnaires are sent out to multiple respondents. And with 93.65 per cent presentations, respondents' responses to this application are very good. The future is expected to add features that are not yet available in our system like provides reviews and ratings of every tourism object.

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