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Application of Retrieval Information on Android-Based Online Music Course Application

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ABSTRACT

This research was conducted to develop a basic design of an android-based online music course application, and to implement an Information Retrieval system to search and find data located on the online music course application. This application was designed using Android Studio software, and thus can only be used for Android-based platforms. In this application, there are 2 choices of musical instrument classes namely piano and guitar. Each class has some materials in the form of videos and images that can be accessed using the internet network and is equipped with Information Retrieval or search engine features that allow users to search for material in the form of the desired chord images. This information retrieval does index keywords (queries) into documents stored in the Firebase database and the query is processed to display data or information accordingly. The data displayed in the application is in the form of a chord image containing the name and position of the finger in playing the chord on each musical instrument. The accuracy test in this study got 100% results. The test was done by entering the name or title of the chord as a keyword and the results obtained in the form of a chord image from the title. This research is expected to help the general public to easily recognize and learn musical instruments, especially guitar and piano.

Keywords: Android Studio, Firebase, Information Retrieval, Query

1. INTRODUCTION

Industry 4.0 is an era of digital revolution where almost everyone utilizes internet connection or data service network in daily life. By utilizing this internet connection in daily activities, people are able work easily, quickly and practically.

Music is one of the fields that is quite popular in public. However, obstacles often encountered in music learning process, namely inflexible time, faraway location of music courses, the high cost music courses, the non-affordable cost of building music studios, and etc. Thus, an online music course application is necessary to overcome these obstacles.

According to the Mobile Operating system Market Share Indonesia, the percentage of android-based smartphone users in Indonesia dominate up to 92.3%, while IOS-based smartphone users only dominate by 7.5% in June 2019 to 2020. The data shows that the number of android-based smartphone users in Indonesia is greater than those of other Smartphone Operating System enthusiasts. Based on this, the author wants to design an Android-based online music course application

which consists various educational contents in the form of step-by-step videos in learning to play instruments. It is also equipped with information retrieval which is a system to query the desired materials. The query is done by entering keywords in the form of text that can be accessed through an Android smartphone wherever and whenever by using the internet connection. From the background above, the author conducted a research that aims to (1) develop a design of an Android-based online music course application. (2) get results of the accuracy of information retrieval on the Android-based online music course application. (3) get reviews from users of Android-based online music course application.

Android is an operating system. Android, Inc. is a company that first developed this operating system in October 2003. In 2005, this operating system was taken over by Google [1]. Android is generally designed and implemented on mobile devices such as mobile phones and tablets. The basis of the Android operating system is Linux and is an open source operating system [2]. In general, the interface display owned by Android is in the form of a direct manipulation, in which the users can perform movements such as touching the screen of the

device to select the icons contained in the device. It also has a design that can perform actions like in the real world, such as sliding to change the display on screen, pinching to zoom in or out on the object image, knocking, and so on [2].

One IDE (Integrated Development Environment) or a program that can be used to develop android software is Android Studio. In 2013, this program was introduced by Google in its program [3] According to [4] Android studio development was made similar to Eclipse and was based on IntelliJ IDEA. Android studio has an ADT (Android Development Tools) plugin, equipped with various features such as Gradle Build which functions to manage projects in making android applications automatically including an android sdk version that is desirable, and various additional tools needed. Furthermore, Android studio also has various advantages including a GUI that is easier to develop application views. It is claimed to be fast in fixing bugs, and supported by Google Cloud Platform in every application development. To design the appearance of the application interface on Android Studio, the author used the XML language. On the other hand, in developing functions and running applications in Android Studio, the author used the Java programming language, Kotlin, and so forth. In designing an application, a database is needed to help store and send data. One of the databases that can be used in Android Studio is Firebase

Firebase is a platform or database that is very good to support the development of mobile applications. In Firebase, there are also various features that will help developers to achieve their desired goals [5]. Some features of firebase include firebase authentication, which can be used for storing data such as accounts in the form of emails, passwords, etc. that can be connected to an android application. In addition, Firebase also has other additional features such as

Firebase Storage which can be used to store files in the form of videos, images, documents and so on that are required to be displayed in the application. One other supporting feature is the real-time database firebase feature, where this feature can help to connect in real-time with application users. In this real-time firebase, application developers can set the rules for the application. They can also change, delete, or add data which are synchronized directly in the application.

According to a study conducted by [6] Information Retrieval is the main activity of an information provider. The information retrieval system itself does not change the data or information requested by the users. This system only provides the existence or absence of data, and displays documents or data that is relevant to what the user is looking for.

2. METHOD

2.1. Data

The approach used in this research was a quantitative approach with a descriptive format. It is due to the fact that this study is presented with numbers, and aims to summarize various conditions, situations and variables that arise in the community that are the object of research based on what happened [7]. The data obtained in this research was data from a field survey namely a Music Course. Aksara Music Course is one of the music courses in Surabaya. This survey aims to retrieve data in the form of video material needed to complete the application design.

The working system in this application is that the application users can access through their respective Android Smartphone, by registering e-mail along with a password for the login process. After entering the application, the application user can choose the desired music classes. In this application, there are 2 classes of musical instruments namely guitar and piano. Each guitar and piano class has 2 class levels, namely elementary and middle class which contains videos in the form of guitar and piano playing techniques. In each guitar and piano class, there is a choice of theory class and discussion class. The theory class contains chord drawings for a basic introduction to learning the instrument. It is equipped with an information retrieval or search engine where application users can easily and quickly search for the desired chord materials by entering a keyword (query). In the discussion class, application users can ask questions about the material connected to the Whatsapp application on each user's smartphone.

Every user of this application requires an internet connection to be able to access it via a smartphone whether it is in the login process, or video streaming.

The database and server used in this application are firebase. Each user ID will be stored in firebase authentication. In this application, the design uses the Firebase cloud storage feature to store videos and images needed in the application and the real-time database feature in storing data in the form of chord images in a theory class that contains information retrieval or search engine. To reach the destination, in this case the user will get it.

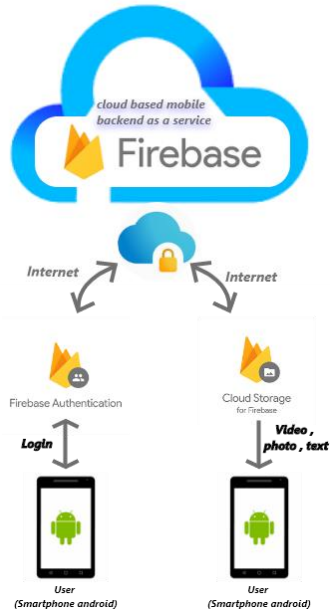The overall system design can be seen in Figure 1 as follows:

Figure 1 Basic Principles of System Work

Application users can create their own personal accounts by registering an email and password. After the user log in, the account data will be processed / synchronized into the database. After entering the application, the users can access materials in the form of videos, discuss with the instructors in the application, and utilize information retrieval to facilitate finding material in the form of images. Application users need an internet network to be able to access every feature in the application.

How the program works in the application design is displayed in the flowchart in Figure 2 until 4 as follows:
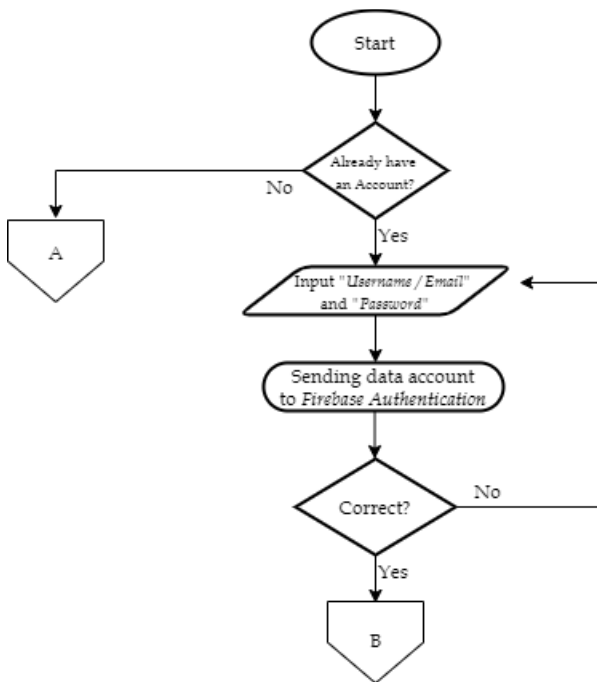

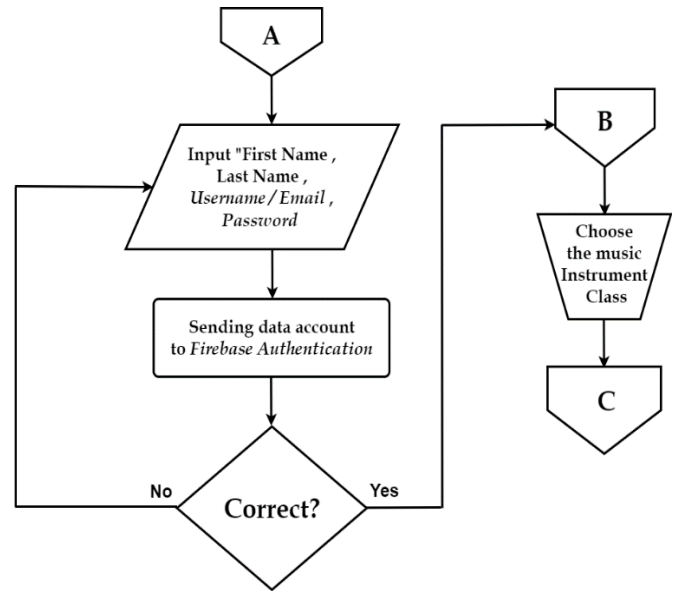**Figure 2** The Flowchart of Application Design

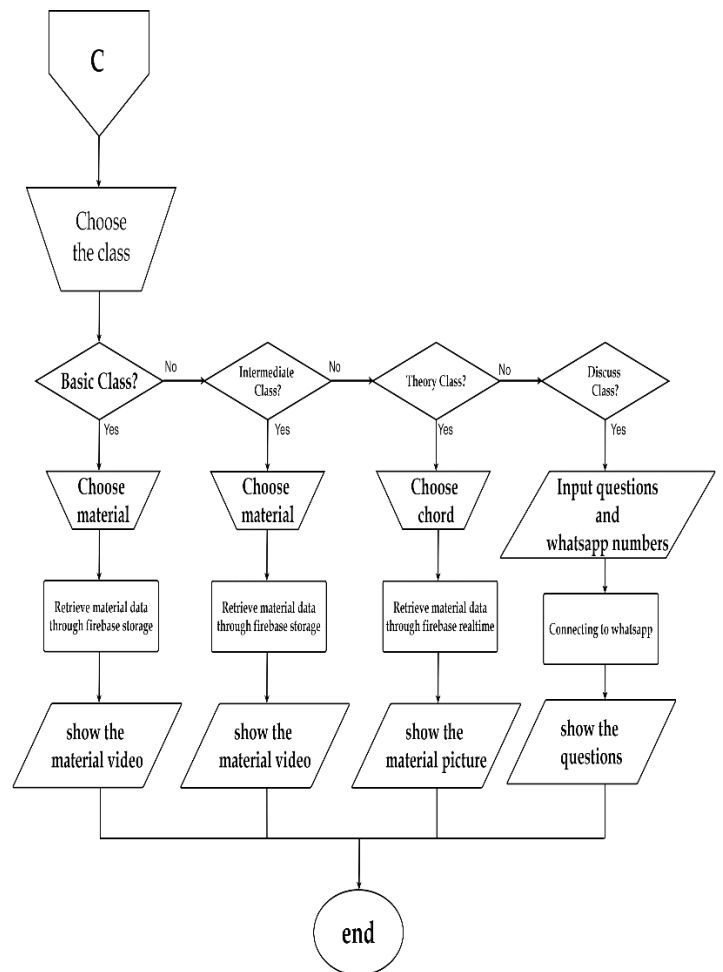**Figure 3** The Flowchart of Application Design

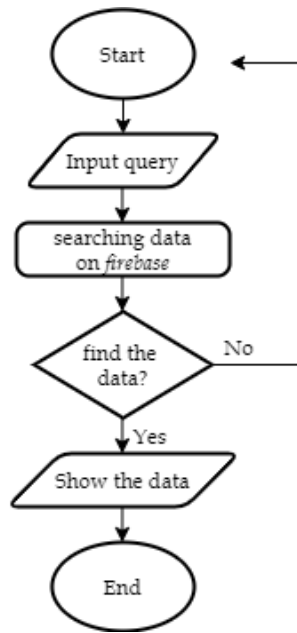**Figure 4** The Flowchart of Application Design

Figure 5 The Flowchart of Information Retrieval

The basic method in the conducted tests was to calculate the amount of suitability, data accuracy and accuracy obtained in the application. The suitability of the data included registered accounts in firebase authentication, information retrieval accuracy, and the video precision data displayed in the application. The calculations in application testing were carried out as follows:

- Data suitability:

$$\frac{Number\ of\ Suitability}{Number\ of\ Test} x100\% \qquad (1)$$

- Accuracy and Correctness:

$$\frac{Number\ of\ Correct}{Number\ of\ Test} x100\% \qquad (2)$$

- The feasibility of the application:

  The user response analysis refers to the assessment of respondents using a Likert scale with ratings as displayed in Table 1.

Table 1. Likert Scale

Quantitative Assessment	Interpretation (%)
Very Worthy	84-100
Worthy	68-83
Adequate	52-67
Indequate	36-51
Ineligible	20-35

Riduwan (2009), determining the highest value by using this formula:

$$Highest\ Value = n\ x\ i_{max} \qquad (3)$$

Information:

n = Number of respondent

i = weighted scores on quantitative assessments (1-4)

To get the results of the number of respondents' answers, the author multiplied the number of respondents in each quantitative assessment by the weight of the value, then the overall results were summed up, using the following formula:

$$\sum_{i=1}^{4} n_i x_i \qquad (4)$$

Information:

n_i = The number of respondent who chose i

i = The value's weight assessment (1-4)

The rating results were determined after adding the respondent's answers by applying the formula by Riduwan (2009) as follows.

$$Rating\ Result = \frac{Number\ of\ Answer}{The\ Highest\ Score} x100\% \qquad (5)$$

The results of data suitability tests is used in table I. The results of the accuracy and data accuracy tests is used in table II and table III. Whilst, the results of the application rating is explained in Figure 6.

3. RESULT AND DISCUSSION

To get the results of the application and information retrieval, various tests were conducted. Tests in this research includes as follows:

3.1. Application Login Test

Login Test was conducted to test the suitability of account data contained in firebase authentication. The desired conformity result is the success of entering the application when the account data in the form of e-mail and password have been registered in firebase authentication. On the other hand failure to enter the application is when the account data in the form of e-mail or password have not been registered in firebase authentication.

The result of the test is displayed in table 2 as follows:

Table 2. The Suitability Of Application Login

Test	Email	Password	Login	Suitability
1	Registered	Registered	Successful	Suitable
2	Not Registered	Registered	Failed	Suitable
3	Registered	Not Registered	Failed	Suitable

The result of login suitability obtained from this application is 100%, with calculation method Number 1, namely:

$$\frac{Number\ of\ Suitability}{Number\ of\ Test}\ x100\% = \frac{3}{3}x100\% = 100\%$$

on quantitative

3.2. Video Precision Test

The video precision test was done by testing the accuracy of the data video materials sent by firebase into the application. The results of the accuracy is illustrated in the following table 3:

Table 3. Video Precision

Test	Video Title	Obtain Result	Result
1	Introduction of guitar	Introduction of guitar	Correct
2	Tuning	Tuning	Correct
3	Triad	Triad	Correct
4	Arpeggio	Arpeggio	Correct
5	Introduction of Piano	Introduction of Piano	Correct
6	Finger Position	Finger Position	Correct
7	7 Modes	7 Modes	Correct
8	Triad Piano	Triad Piano	Correct

The result of video precision obtained from this application is 100%, with calculation method Number 2, namely:

$$\frac{Number\ of\ Correct}{Number\ of\ Test}\ x100\% = \frac{8}{8}x100\% = 100\%$$

3.3. The Information Retrieval Accuracy Test

The information retrieval accuracy test was done by entering a query in the search column for 10 times. The results of the test are explained in the following table 4:

Table 4. The Information of Retrivial Accuracy

Test	Query	Obtain Result	Result
1	A Major Guitar	A Major Guitar	Correct
2	A Minor Piano	A Minor Piano	Correct
3	B Major Guitar	B Major Guitar	Correct
4	B Major Piano	B Major Piano	Correct
5	B Minor Piano	B Minor Piano	Correct
6	C Major Guitar	C Major Guitar	Correct
7	C Major Piano	C Major Piano	Correct
8	D Major Guitar	D Major Guitar	Correct
9	D Major Piano	D Major Piano	Correct
10	D Minor Piano	D Minor Piano	Correct

The accuracy result of the obtained information retrieval from the application is 100%, with the calculation method Number 2, namely:

$$\frac{Number\ of\ Correct}{Number\ of\ Test}\ x100\% = \frac{10}{10}x100\% = 100\%$$

3.4. The Information Retrieval Accuracy Test

In testing the feasibility of the application, the data taken was the data from the application user respondents. Respondent data was conducted by giving questionnaires to students of Aksara Music Course. The number of respondents obtained was 20 students. The results of the feasibility is be explained in Figure 6 as follows:
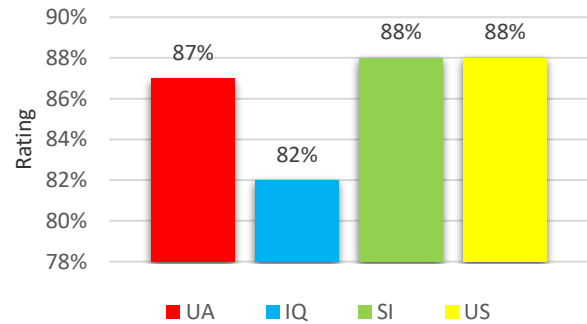

Figure 6 Rating Result

UA (Usability) obtained a rating value of 87%, IQ (information quality) 82%, SI (Service Interaction Quality) 88%, US (User Satisfaction) 88%, with an overall average of 85.58% which means the design of this application is very feasible to use on the Script Music Course.

4. CONCLUSION

The conclusion obtained in this study is that the Online Music Course Application can be designed using Android Studio and Firebase. The suitability of the data, the accuracy of information retrieval, and the accuracy of the data obtained in the application is 100%. In the feasibility test, this application got a rating of 85.58% which indicates that this application is very feasible to use on the Script Music Course.

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