Jurnal E-KOMTEK (Elektro-Komputer-Teknik)
Vol. 5, No. 2 (2021) pp. 230-242
https://jurnal.politeknik-kebumen.ac.id/index.php/E-KOMTEK
p-ISSN : 2580-3719 e-ISSN : 2622-3066

Voice Over Internet Protocol (VoIP) User Location Detection Application

Elsa Sanjaya Putri, **Mohammad Fadhli**, **Martinus Mujur Rose**
Department of Telecommunication Engineering, Politeknik Negeri Sriwijaya, Indonesia, 30139

elsasanjayaputri.esp@gmail.com

https://doi.org/10.37339/e-komtek.v5i2.655

Published by Politeknik Dharma Patria Kebumen

Artikel Info
Submitted:
27-07-2021
Revised:
30-07-2021
Accepted:
30-07-2021
Online first :
30-12-2021

Abstract

This study aimed to build a Voice Over Internet Protocol (VoIP) User Location Detection Application and address information security for the public if they receive attention from unknown or undesired people. This application displays a map or location of people who communicate with others via mobile phones. The Application Development Methodology used the Iteration Method appeared in the database. Application testing used the black-box testing method, and the test results ran according to the expected function. The final result of this research was a telephone application that functioned by displaying a map on the phone screen of the call's receiver. Therefore, without being asked, when the recipient picks up the phone, they connect to the map -in case something unwanted happens or when the callers merely want to exchange information with each other.

Keywords: Voice over internet protocol (VoIP), Maps, Mobile, Applications

Abstrak

Penelitian ini bertujuan untuk membangun Aplikasi Deteksi Lokasi Pengguna Voice Over Internet Protocol (VoIP) dan mengatasi keamanan informasi bagi publik yang mendapat perhatian dari orang yang tidak dikenal atau diinginkan publik. Aplikasi ini menampilkan peta atau lokasi orang yang saling berkomunikasi melalui telepon genggam. Metodologi Pengembangan Aplikasi menggunakan Metode Iterasi yang ditampilkan dalam database. Pengujian aplikasi dilakukan dengan menggunakan metode black box dan hasil pengujian telah berjalan sesuai dengan fungsi yang diharapkan. Hasil akhir dari penelitian ini menghasilkan sebuah aplikasi telepon yang memiliki fungsi dengan menampilkan peta atau lokasi di layar ponsel kepada penerima telepon sehingga tanpa diminta jika penerima mengangkat telepon, mereka dapat terhubung ke peta jika terjadi sesuatu yang tidak diinginkan atau hanya sekedar saling memberi kabar.

Kata-kata kunci: *Voice over internet protocol (VoIP), Lokasi, Seluler, Aplikasi*

1. Introduction

With the advancement of information and communication technology comes many knowledge and social changes **[1].** Easy access to information and information exchange is available via communication **[2].** The rapid growth of technology and increased mobility of the general population make information available to anybody, anywhere, and anytime.

In terms of the development of the phone, initially, it had only a simple function that is to interact through audio, then was developed by the use of texts (SMS) and images (MMS), and now, smartphones arm with various applications that support its function as a medium of interaction **[3].** Smartphones are also more widely used than computers because they are more accessible to operators than PCs. Besides, smartphones are easier to use wherever the users are, with a wide range of operators. **[4]** In addition, smartphones are also used by various ages, from childhood to adulthood, all have applied them.

In this information age, smartphones have a vital role **[5]**. They have evolved into an essential communication tool and a personal assistant and also have additional purposes other than communication. Based on the latest data, internet usage on smartphones in 2017 has reached 3.4 billion users worldwide **[6]**. According to Endang Retnoningsih, Android-based apps may automatically integrate with other Google services such as Google Maps to look for addresses and estimate the distance between smartphone users and the destination. A location-based service may be used to search for location information based on position and time. The problem that arises is the accuracy of the location reading of the device in the mobile phone, namely the Global Positioning System (GPS). Therefore, this study measured the accuracy of readings from GPS installed in Android smartphone devices **[7]**.

The Internet creates new opportunities for crime **[8]**. In this globalization era, technology is advancing and the internet needs in everyday life is increasing too **[9]**. Soerjono Soekanto explained that advances in technology had brought changes in people's daily communication **[10]**. On the other hand, it is clear from the situation in society that because of the advancement of the industry, the development of technology for telecommunication, and based on a Google survey with Trust and Safety Research, that 42% of parents in Indonesia claim that information insecurity for children like scams and hacking are their primary concern **[11]**. In this sense, communication media plays its role in building a community. In addition, communication media can only present social reality **[12]**. It is also part of social relations such as friends,

wives, and others closest to others. This research is related to previous research on smartphones, Android-based applications, and Google services such as Google Maps.

Based on this background, the author attempted to find a solution, ease each of these problems, and make the security level in the telecommunication world and our group of trust in the people around us better. The author also had the idea to take the title "Voice Over Internet Protocol (VoIP) User Location Detection Application."

2. Method

a. Research Framework

The research framework for the final task is discussing voice over internet protocol (VoIP) with location detection and is a series of ideas managed systematically, logically, clearly, structured, and orderly. **Figure 1** is the flow of the research method.

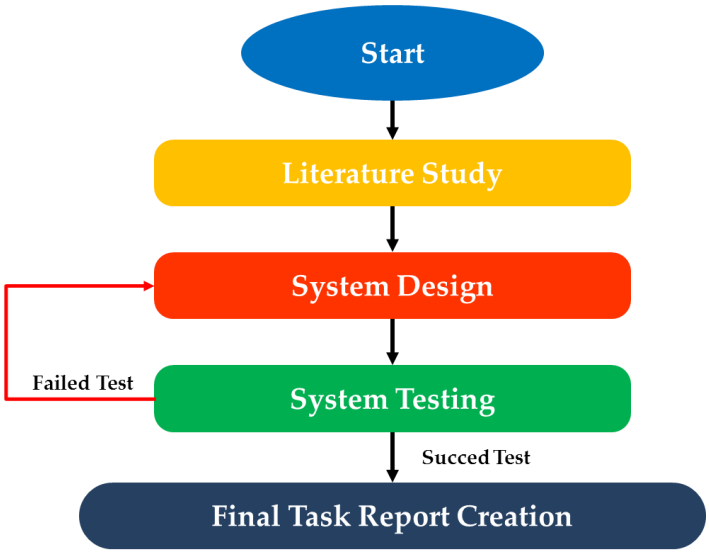

Figure 1. Methodology Stages

1) Literature Study

Literature Study is a way to solve problems by tracing the existed written sources. Therefore, the term of literature study is also widely known as “library study”. Conducting a study, a researcher must have a broad insight regarding the object studied.

Literature studies are also the basis that determines success in a study. A literature study is conducted after researchers choose a research topic and formulate the research’s problems. This study aims to communicate with the addition of maps/location features.

2) System Design

System design is the stage after analysis of the system development cycle. An application system design provides a physical description of the product made [13]. System Design is a creative activity of planning and designing something generally functional and has not existed to solve a particular problem for the product to have more value and become more efficient for its users. In addition, system design is needed for the research to achieve the objectives of making the product [14]. Here is the System Design flowchart of this research (Figure 2):

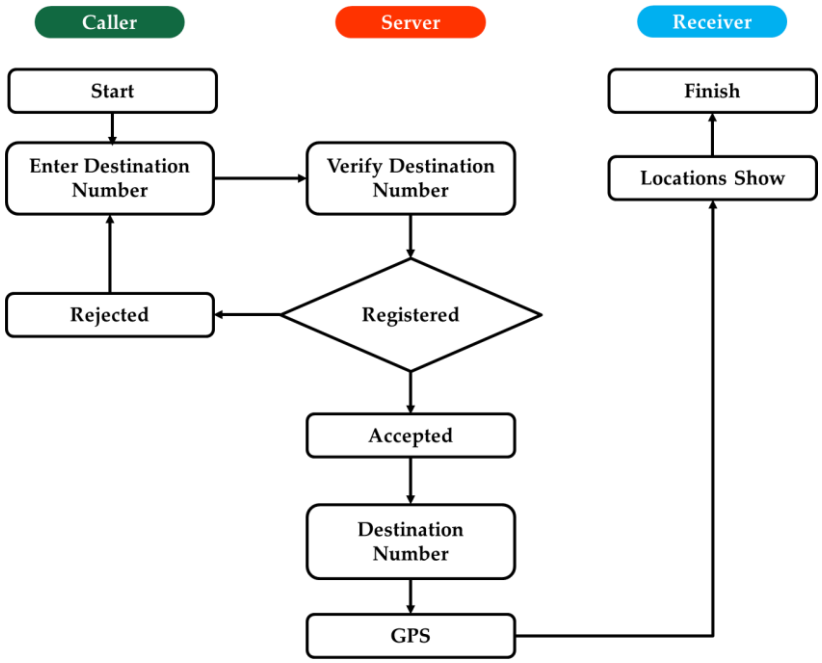

Figure 2. Flowchart System Design

The flowchart above is an application that processes the course of the phone. The stages of the above process are as follows.

a) The first process is the input of the destination number.

b) After that is the verification of the destination number.

c) If the number is registered, the receiver of the call has the right to reject or accept the call.

d) If the call is accepted, the location point and location are displayed.

e) If the call is rejected, the location point and location is not displayed.

And here is the Block Diagram Design System callers and receivers (Figure 3):

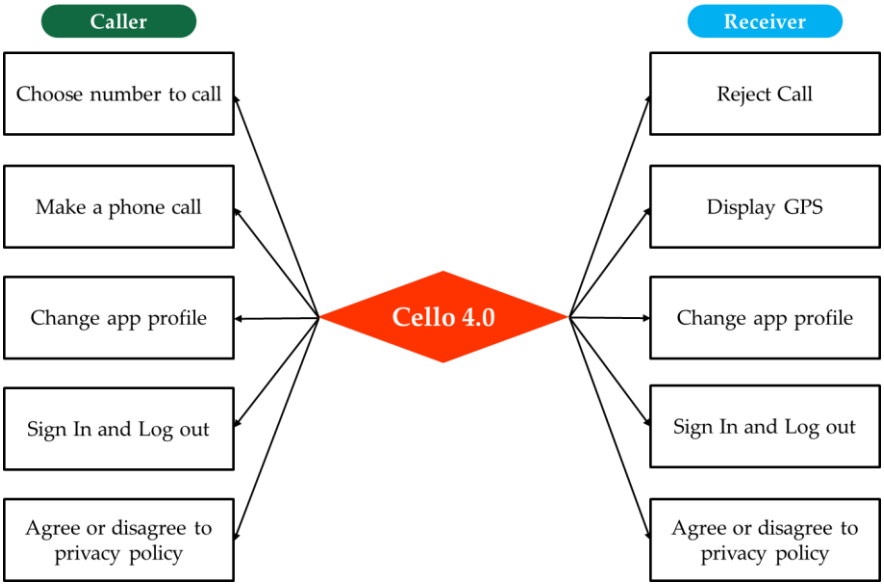

Figure 3. Block Diagram Design of the Caller and Receiver System

A block diagram is a diagram of a system in which the core parts or functions are represented by blocks connected by lines which indicate the relationship of the blocks. Block diagrams are popular in engineering: it is used in hardware design, electronic design, software design, and process flow diagrams.

Figure 3 of the Block Diagram Design of the Caller and Receiver System aboveindicates that Cello 4.0 has different functions and a similar concept applies to callers and receivers. What sets it apart is that only the receiver can display the GPS or its location, and, for the rest, this app has the same functionality.

3) System Design

After designing the application system, the next step was to test the app using the parameters [15]. At this stage, the black-box method was employed using the black-box testing by giving input from the user to the system that was running and then observing the output, from which then it revealed whether the system has been running as expected or not.

In the black-box testing, tests were conducted based on application details such as application display, functions in the application, and the compatibility of function flow with business processes desired by researchers. The test consisted only of reviewing the application functions, what they should do, without caring how to do so. A system testing was also carried out to check whether the resulting software ran by the predetermined standards or not. System testing is an essential thing that aims to find errors or

deficiencies in the software being tested. Black-box testing is also efficient for large code segments, unnecessary code access, and separation between user and developer perspectives. However, it has drawbacks due to limited coverage and inefficient testing due to the luck of the tester knowing the internal software.

In conclusion, this method aimed to check at the final stages of the research, whether the application worked appropriately and served the user efficiently or not. Each test followed a scenario, checking each function.

4) Final Task Report Creation

The Final Task is a scientific work to display the ability of a student in solving a problem or designing/developing a system, product, model, business startup, or combination, which is realized in the form of a paper.

b. Build an App

Design in the Application only performed software design in classification modeling on iteration method displayed in the database. The design is stated in diagram blocks to know how the overall research works to produce a classification model that can enable the application (Figure 4). Here's how the App Device will design (**Figure 4**):

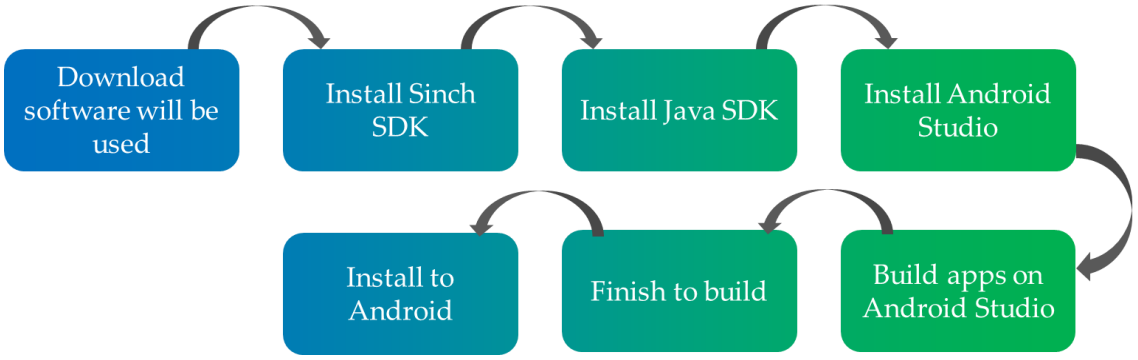

Figure 4. Application of Diagram Block

This application will create a new system with a third-party server that is Sinch SDK and using TCP/IP protocol. The following devices are used (**Figure 5**):

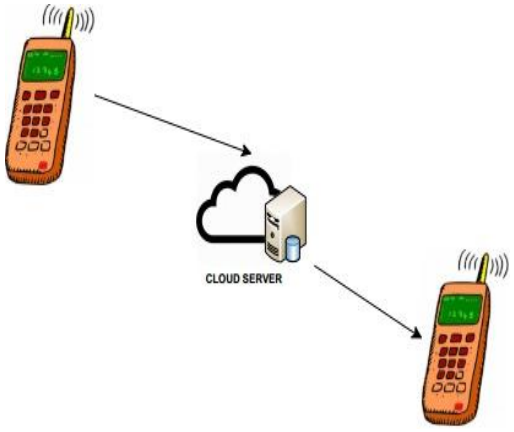

Figure 5. Hardware Implementation

c. Application Database Design

A database is a place to store a sentence or image on the web and applications. And grouped according to the group of needs. And in the creation of this android-based application, the author used the MySql database.

The creation of this application used one database and 1 table. The database used named db_cello and the table named (**Table 1**). Table tbl_nama is a table used to store phone number data in the application. The application data based is presented in (**Table 1**):

Table 1. Application Database

Field Name	Type	Size	Primary Key
Id_Data	Integer	11	✓
No_Telepon	Varchar	15	-
Username	Varchar	50	-
Password	Varchar	50	-
Email	Varchar	50	-
Longitude	Varchar	50	-
Latitude	Varchar	50	-

The application database table has 7 attributes, namely id_data, no_telepon, username, password, email, longitude, and latitude. Id_data is an integer type and has a length of 11. Id_data is the primary key in this database table. The data type for No._Telepon, username, password, email, longitude, and latitude is varchar which means that this data type is a sentence input.

d. Application Database Design

The following are the Working Principles on Voice Over Internet Protocol (VoIP) with location detection:

a. The first view of the application is a forward from the party that will download this application.
b. Then it will go to the main menu or main activity.
c. In the main menu, there is a contact number to be contacted.
d. Once the phone number will be contacted, the liaison will wait for whether the phone is received or rejected. After the phone is received, the caller will automatically find the person who received the phone, and the GPS will be displayed on the phone data.
e. Note: GPS will appear when the caller and receiver are both have an app

3. Results and Discussion

a. Application Discussion

Discussing the implementation or realization of the created design, the application named Cello 4.0 runs on mobile devices with an Android operating system. However, this application can also be accessed by anyone and anywhere using another Android type; it does not have to match the android specifications used in this study. The specifications are as follows (**Table 2**).

Table 2. Mobile Device Specifications

No.	Elements	Descriptions
1.	Name	Xiaomi Redmi Note 8
2.	Memory	RAM 6GB
3.	Storage	16GB (microSD, up to 128GB)
4.	Battery	4000 mAh
5.	Android / OS Version	Android 10
6.	Camera	Front 48MP / Rear 13MP
7.	Screen	6.3 inch (1080 x 2340 pixel)

This is the android specification used by the researchers. The use of the Cello 4.0 application does not limit to anyone, and any android can be used.

b. Application Layout

1) Splash Screen Page

The Splash screen page is the initial view to be opened when the application is running. Many apps use a splash screen, but some do not. On this display, there is a logo image and the inscription CELLO 4.0, the application's name (**Figure 6**). If you want to go to the next page, wait until this view finishes in ±3 seconds and then go to the page for initial approval (**Figure 7**) if you are going to start the application.

Figure 6. Cello 4.0 Logo on The Splash Screen

Figure 7. Pre-approval Applications

2) Application Details Information Page

The App Details Information page is a view that contains information to support the application's running. The application has an information page that explains the functionality of this application itself.

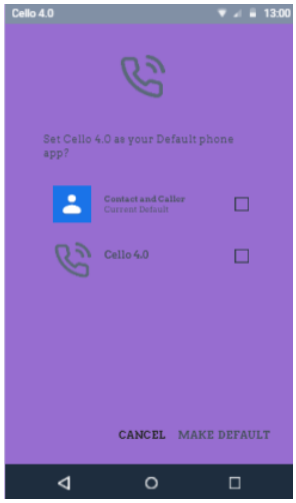

Figure 8. Phone App Default Settings

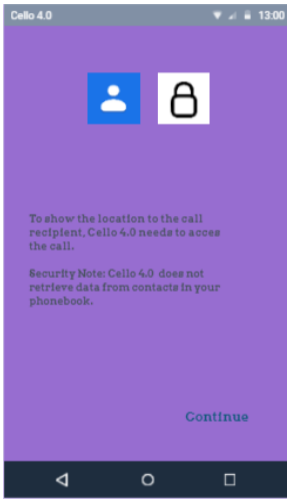

Figure 9. Phone App Default Confirm

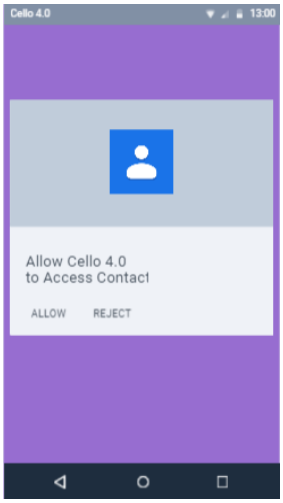

Figure 10. Contact Access Permission

After pre-approval, the next step is to set the phone's default contact options (**Figure 8**) and confirm the selection (**Figure 9**). Then the user will be directed to do permission to access contacts (**Figure 10**).

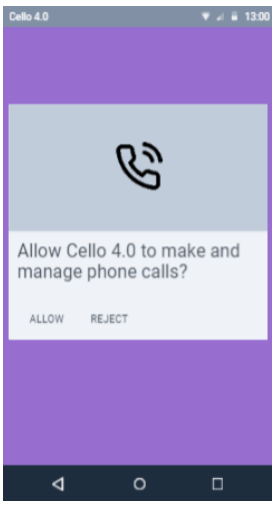

Figure 11. Contact Management Permissions

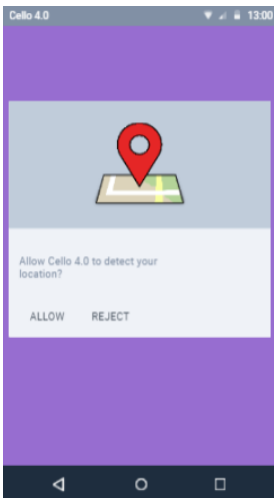

Figure 12. Location Access Permission

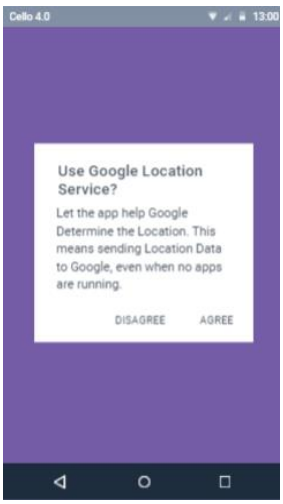

Figure 13. Google Location Usage Permission

Next, the user must perform contact management permissions on the Cello 4.0 application (**Figure 11**). To read the user's location, you must do location access permissions (**Figure 12**). In addition, the user is given the option to set a predefined location (**Figure 13**). There is a layout design for approval details in the Cello 4.0 application. In the consent of this application, the downloading party reserves the right to follow the created policies.

3) Application Details Information Page

Each application must have a login page to provide identity data of ourselves to have access to use the application that we will run.

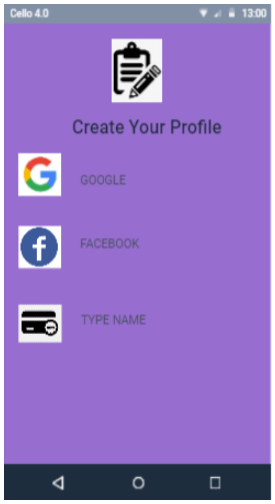

Figure 14. Profile Creation

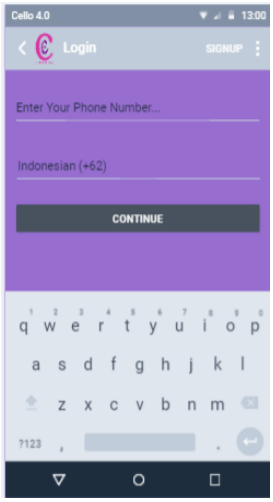

Figure 15. Login

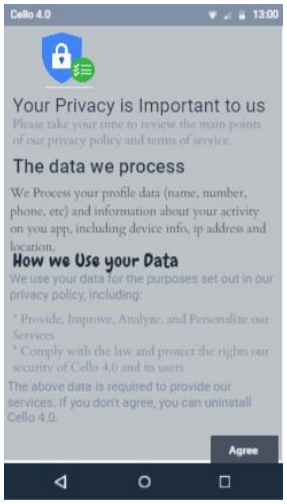

Figure 16. Registration confirmation

On the application login page there is a user profile creation menu (**Figure 14**). After creating a profile, the user can login to the application (**Figure 15**). Then after completion, the user will be given a login and security confirmation (**Figure 16**).

4) Calling Mode Page

This App has a call mode page to get call options from Android devices.

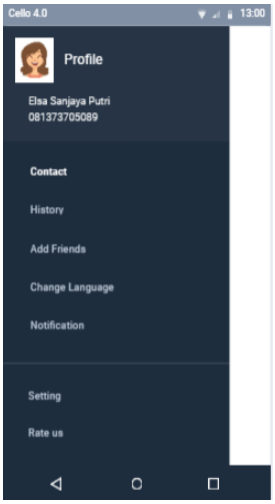

Figure 17. User Profile Display

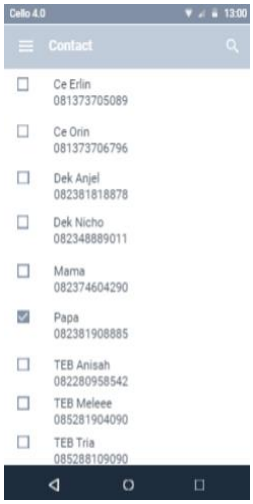

Figure 18. Contact List

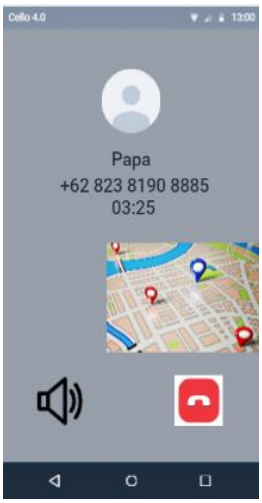

Figure 19. Application Output

In the call mode menu, there are contact profiles (**Figure 17**) and a list of contacts accessed by the application (**Figure 18**). After that, when you have made a call, the location of the recipient will appear (**Figure 19**).

c. Application Testing

Once the application is complete, the last thing to do is test to make sure all processes are running smoothly or working as intended. Testing this application using the black box testing method. This method prioritizes testing the functional requirements of the application. The goal is to find program malfunctions quickly. The following are the results of the functional requirements test for the Cello 4.0 application which are presented in (**Table 3**).

Table 3. Application Data Testing

Test Scenario	Test Case	Excpected Results	Test Result	Conclusion
Start App	Start App click the start button	User can enter App	Ok	Normal
Access the user's phone number	Click "Allow" on the "Allow cello 4.0 to make and manage phone cells"	The user's phone number can be accessed in the Cello 4.0 App	Ok	Normal
Access user location	Klik "Allow" pada peringatan "Allow cello 4.0 to detect your location"	The user's location can be accessed in the Cello 4.0 App	Ok	Normal

4. Conclusion

This Cello 4.0 application ran as smoothly as expected. Based on the testing, the information on the Android operating system tested with the Black-Box method indicated that the software was free from syntax errors. In the user interface testing system, the (1) application start access, (2) user's phone number access permissions, and (3) user's location access permissions ran normally and accordingly. Functionally, the resulting implementation is that planning has succeeded in building an application that provides complete information in the form of contacts and locations when making phone calls, and this application is accessed online. That means how the implementation works and the results match the design.

References

[1] A. T. Wibowo and T. Windarti, "Implementasi Teknologi Voip dan e-JABBER Memanfaatkan Infrastruktur Jaringan Komputer (WIFI)," J. Teknol., vol. 7, no. 1, pp. 1–5, 2014.

[2] A. F. Oklilas, S. D. Siswanti, and M. D. Rachman, "Akurasi Pembacaan GPS pada Android untuk Location Based Service (Studi Kasus: Informasi Lokasi SMA di Palembang)," J. Ilmu Komput. dan Agri-Informatika, vol. 4, no. 1, p. 1, 2017, doi: 10.29244/jika.4.1.1-5.

[3] Juwairiah, Ial Irwan Arahman, and Budi Santosa, "Aplikasi Mobile Gis Layanan Informasi Lokasi Penting Kota Surakarta Berbasis Android," vol. 2013, no. semnasIF, pp. 302–309, 2013.

[4] B. E. Purnama, "Pemanfaatan Teknologi WAP Telepon Seluler Untuk Media Pembelajaran Jarak Jauh," vol. 1, no. 3, pp. 22–28, 2009.

[5] H. Murti and H. Listiyono, "Aplikasi SMS Gateway," vol. XIV, no. 1, pp. 30–34, 2009.

[6] S. Octavianus, "Analisis Penggunaan Aplikasi 'yesHeis' Dalam Penginjilan Pribadi," Evang. J. Teol. Injili dan Pembin. Warga Jemaat, vol. 2, no. 1, pp. 68–74, 2018, doi: 10.46445/ejti.v2i1.92.

[7] E. Retnoningsih, "Aplikasi Informasi Telepon Darurat Menggunakan Android Berbasis Location Based Service (LBS)," J. Semin. Nas. Sains dan Teknol., vol. 1, no. 1, pp. 1–9, 2016.

[8] P. Angkupi, "Kejahatan Melalui Media Sosial Elektronik di Indonesia Bedasarkan Peraturan Perundang-Undangan Saat Ini," J. Mikrotik, vol. 2, no. 1, pp. 1–8, 2014.

[9] W. S. R. Putri, N. Nurwati, and M. B. S., "Pengaruh Media Sosial Terhadap Perilaku Remaja," Pros. Penelit. dan Pengabdi. Kpd. Masy., vol. 3, no. 1, 2016, doi: 10.24198/jppm.v3i1.13625.

[10] Y. R. Kurniawati, "Pertanggungjawaban Pidana Atas Penyebaran Berita Bohong (Hoax) di Media Sosial," Din. J. Ilm. Ilmu Huk., vol. 26, no. 4, pp. 422–437, 2020, [Online]. Available: http://oreilly.com/catalog/errata.csp?isbn=9781449340377.

[11] L. Jemadu and D. Prastya, "Ini 3 Kekhawatiran Orang Tua Indonesia saat Anak Mengakses Internet," 2021.

[12] D. Novianti and S. Fatonah, "Budaya Literasi Media Digital Pada Ibu-Ibu Rumah Tangga," J. Antropol. Isu-Isu Sos. Budaya, vol. 21, no. 2, p. 218, 2019, doi: 10.25077/jantro.v21.n2.p218-226.2019.

[13] F. Tampubolon, Y. Pratama, and I. G. E. Dirgayussa, "Perancangan, Implementasi Monitoring dan Kontrol Alat Pemanggang Kopi," Elkha, vol. 12, no. 2, p. 69, 2020, doi: 10.26418/elkha.v12i2.41188.

[14] J. Sardi, Habibullah, and Risfendra, "Rancang Bangun Sistem Monitoring Pertumbuhan Berat dan Tinggi Balita Berbasis Data pada Posyandu," J. Tek. Elektro, vol. 11, no. 2, pp. 53–59, 2019.

[15] M. A. Amanaf, S. Anggraeni, and F. T. Syifa, "Rancang Bangun Sistem Monitoring Angkutan Umum Menggunakan Metode GPS Tracking Area Purwokerto," ELKHA J. Tek. Elektro Untan, vol. 11, no. 2, pp. 128–135, 2019, [Online]. Available: http://jurnal.untan.ac.id/index.php/Elkha/article/download/33291/pdf.