Developing Android Based Emergency Call Application

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Abstract: This research is motivated by the high number of accidents in Indonesia caused by several factors, including difficulty in contacting emergency services, ignorance of the public to contact emergency services, and not knowing the location of emergency services. For this reason, this research has carried out the design and development of mobile applications for the public to contact Android-based emergency services. The application development method used is Rapid Application Development (RAD), which is suitable for short development times and according to needs. In this RAD method consists of four stages, namely the stages of planning needs, designing, construction and also implementation. This study produces a mobile application for community service based on android which aims to enable the public to contact community services quickly and accurately.

Keywords: Community Services, Rapid Application Development, Mobile Applications, Application Development, Android.

1. INTRODUCTION
1.1 BACKGROUND
In this era, life in the world cannot be separated from technology. Technology has a very important role in every aspect. In the future life, information technology and telecommunication are the most dominant sectors. The development of information technology spurs new ways of life, from life beginning to ending. [1]

With the development of technology, nowadays many information technologies are used to support and solve a problem. There have been many conveniences provided by information technology, especially for smartphone users.

In an increasingly modern era, many people are already using smartphones, because they are more advanced than ordinary cell phones. According to the International Data Corporation, smartphone shipments to Indonesia continued to grow in the fourth quarter of 2011. This is due to lower prices for cellphones but demand remains strong [2].

The crime rate in Indonesia still requires hard work to reduce it. In the context of crime in Indonesia, based on the available data, the crime rate has not shown any signs of decreasing numbers. In the 2018 nombeo.com report, BPS Indonesia shows data that Indonesia is ranked 52 out of 115 countries with a safety index of 55.28 and a crime rate of 44.72. Also, according to data from the Indonesian Police Traffic Corps, 28,000 - 38,000 people died from traffic accidents in Indonesia. As well as accidents due to fire accounts for 15 percent of the total disasters in Indonesia. (kompas.com, 2017).

In today's digital era, the rapid development of information technology has a significant role in all activities, including seeking help. Therefore, information technology is also expected help solve problems due to the high crime and accidents in Indonesia. With a variety
of technologies today, Android devices are used as building tools and the use of designed applications. Developers choose to use Android devices because according to a report by the Consumer Intelligence Research Partner (CIRP) firm in 2018 Android users are increasing, reaching 91 percent (kompas.com, 2018). From the relative number of devices running Android, the most widely used version of the platform is version 4.4 (Kitkat) with API 19 and a distribution number of 24%. Distribution data above 15% are Kitkat, Lollipop, and Marshmallow [3]. Therefore, by continually updating the Android version continuously and periodically, the design of this application will be built on a minimum Android Studio version 4.4, namely Kitkat with the largest number of distributions and users.

Based on these things, this study designed an application to provide telephone information and location of emergency services using the official IDE (Integrated Development Environment), namely Android Studio. This application can help in dealing with emergencies so that you did not have difficulties when you want to find contact information for agencies that provide assistance services during an emergency.

Emergency telephone numbers and important places around us are important information to know. Forms of difficulty that often occur are not knowing and difficulty in finding information about emergency telephone numbers and the location of several aid places such as hospitals and police stations. Therefore, a mobile application was created for all Indonesians with the aim of reducing the crime rate and helping people seek assistance from agencies that provide emergency aid services more easily and quickly.

1.2 PROBLEM STATEMENTS
Based on the background of the problems described above, the problems to be discussed in this study are as follows:

1. How can this application be a tool to speed up users to find out the location and contact emergency phones?
2. How to design an emergency telephone application system that can make it easier for users to find out the location and call emergency telephone numbers?

1.3 RESEARCH OBJECTIVES
The goal of this research was:

1. Create an application that can be a tool to speed up users to get help.
2. So that the application made can provide location information such as the nearest hospital and police station specifically, and can provide the right emergency telephone number.

1.4 SCOPE OF PROBLEMS
Based on these problems, it is necessary to limit the analysis of application development plans so that the design can be designed effectively and efficiently as follows:

1. The features made in this application design are display of emergency telephone numbers, maps of important locations around the user with a dropdown list, and settings to add or delete any emergency telephone numbers that the user wants to display.
2. For user requirements, users of this application are addressed to all Android smartphone users.
3. The software requirements of this application are made in Android Studio with the Android operating system, at least version 4.4, KitKat, is used. The operating system uses the Java programming language.
4. While the hardware requirements in making this application are running on an Android-based mobile smartphone platform. This application does not discuss network security that is used for application needs.

1.5 BENEFIT
Benefits of this research can be viewed from two perspectives. There are benefits...
from academic perspective and benefits from practical perspective:

1. **Academic Benefits**

From this research, it is expected to provide the following benefits:

- Adding and developing insights and information regarding the application of information systems regarding the application of Android operations in applications, planning designs that must be prepared in building an application and also implementing an application to target application users.
- As a reference and consideration for further research, especially those related to the design and development of an Android-based emergency mobile phone application.

2. **Practical Benefits**

- For researchers, it is hoped that they can apply the knowledge gained during the study where the output can be useful for the community
- For Users - Make it easier for the public to obtain important telephone information and the location of important places in the surrounding area. - Helping users to find out the location and contact emergency phones more easily and quickly.

2. **LITURATURE STUDIES**

2.1 **EMERGENCY SERVICES**

According to FEMA (Federal Emergency Management Agency), an emergency is an unplanned and unwanted event that can result in death or serious injury to employees, customers, or even the public, shutting down or disrupting work processes, causing physical or environmental damage, or threatening damage, building facilities, or damage the public image.

An emergency is a situation that requires an immediate response due to an unexpected, unexpected and unsatisfactory disaster that can cause major damage and other damage [4].

Some situations can be classified as emergencies, such as fire, hazardous material accidents, floods, storms, earthquakes, communication failures, radiation accidents, community disturbances / riots, loss of major suppliers / customers, explosions, and so on. Basically, emergencies occur because of natural disasters or man-made.

According to KBBI (Kamus Besar Bahasa Indonesia), service is an effort to help prepare or take care of what other people need. Emergency services means an attempt to help other people who are experiencing a disaster and need help. Emergency services means an activity to provide immediate assistance to others either in person or by call.

2.2 **RAPID APPLICATION DEVELOPMENT**

This research used Rapid Application Development in Designing and Implementing the application. Rapid Application Development (RAD) is a life cycle strategy aimed at providing much faster development and getting results of a higher quality than expected. 14 achieved through traditional cycles [5]. RAD is an object-oriented approach to system development that includes a development method and software [6].

2.3 **UNIFIED MODELLING LANGUAGE**

Modeling (modeling) is actually used to simplify complex problems in such a way that they are easier to learn and understand. The methodology most often used today is for system analysis and design with an object-oriented methodology [7]. In this study, a diagram is used to show the system modeling which is described based on the notation in the Unified Modeling Language (UML).

One of the diagram in UML used in this research is usecase diagram. Usecase diagrams are diagrams used to model all business processes based on the perspective of the system user [8]. Meanwhile, according to Eric Johnson,
the usecase diagram is the use of a system in general which is useful for seeing the relationship between processes and how to communicate non-technical system design [9]. So, it can be concluded that the usecase diagram is a visual representation that represents the interaction between the user and the system to show the roles of users and how those roles use the system. Usecase is very useful in documenting system activity.

The second diagram used in this study is the activity diagram. Activity diagrams are work flow diagrams depicting various user and system activities, people who carry out each activity and the sequential flow of each activity [10].

The third diagram of UML used in this study is the sequence diagram. Sequence diagrams are diagrams showing sequential messages between external and the system during the scenario in the usecase [10]. This diagram is arranged according to time. The objects related to the process of running the operation are sorted from left to right based on the time they occurred in the ordered message. Sequence diagrams are used to describe behavior in a scenario. Its purpose is to show the sequence of messages sent between objects as well as interactions between objects, something that happens at a certain point in the system's execution.

2.4 ANDROID STUDIO
The application is developed using Android Studio. Android Studio is a software development application which consists of a code editor, automation tools builder and a debugger as an Android application developer. Apart from that Android Studio is a powerful developer, Android Studio offers more features to increase productivity when creating Android applications [3].

2.5 JAVASCRIPT LANGUAGE PROGRAMMING
In the development of this application, it was built using React Native tools. React Native is a javascript framework developed by Facebook and allows you to create Android mobile applications using web technology. React Native is a cross-platform framework created by Facebook to create mobile apps (Android and IOS) using the Javascript programming language.

Javascript is a browser-based programming language. The codes are written directly into HTML from web pages and translated and executed in response to activities on web pages [11]. The application built on the Android platform uses the Javascript programming language because in making Android applications using React Native so that it can be done easily.

3. RESEARCH METHODS
The goal of this research was to develop a web application prototype that helps its users to contact emergency services.

The approach used in this research was experimental research, developing a web application prototype that designed to reach its goals.

The first step of this research began with Preliminary Literature research. The second step was data collection. The third step was the development of the application using RAD which include Requirement Analysis, Design, Construction and Implementation. The complete steps for this research can be seen on Figure 1.
3.1 ANALYSIS
On the start of the development of the application, analysis was performed to identify the general flow of activities in when emergency occurs and contacting the emergency services. Figure 2 shows the general flow after emergency or accidents happens.

3.2 DESIGN
After identifying all the features to be developed in the previous phase, the next step was to design the solution for each identified features. The resulting design was categorized into 2 categories, which are user interface design and process design.

1. User Interface Design
The user interface for this research was designed as simple as possible, because the required features was not many. So there was no need for designing many application screens. Identified application screen to be designed are the main page, upload file page, upload file result page, list of files page, search page, and search result page. These user interface design can be viewed in Figure 4, 5, 6, 7, 8 and 9.
Figure 4. Main Screen User Interface Design

The main screen user interface design in figure 4 show the main screen of the application.

Figure 5. Add and Remove Contact Screen User Interface Design

The add and remove contact screen in figure 5 shows the design for adding, editing and removing emergency contact, so the user can quickly call in case of emergency.

Figure 6. Contact Screen User Interface Design

The emergency contact entered in Add and Edit Contact will be displayed in this screen shown in figure 6. Using this screen the user can quickly call the listed emergency contact.

Figure 7. Map User Interface Design

Figure 7 shows the Map User Interface Design, which will show the list of emergency services near the user current location. Two types of location will be displayed, nearest hospital and police station. With this screen, the user can get direction to the nearest hospitals and police stations.

2. Process Design

The process identified for this research is the detail scenario of the 3 identified use case in analysis. So the designed process
are the process design for Editing, Adding and Removing Emergency Contact, process design for Customizing Emergency Services, process design for Open Maps, process design for Call. The process design can be viewed in Figure 10, 11 and 12.

![Figure 10. Edit Contact Process Design](image1)

In figure 10, the process Edit Contact when user chose the edit contact feature of the system.

![Figure 11. Add Contact Process Design](image2)

According to the figure 11, After user choose Adding new contact feature, then user can enter new information for the selected contact to update the contact information.

![Figure 12. Remove Contact Process Design](image3)

The remove contact process shown in figure 12 will be triggered if user select the remove contact feature of the application.

![Figure 13. Customize Emergency Service Process Design](image4)

The activity diagram in figure 13 describes the process flow for customizing emergency services. The process starts with the user selecting the edit button on the emergency services page and the system will display all emergency services that can be selected. The user will choose what services to display on the application. After that, the system will display all emergency services as selected by the user.
4. CONCLUSION AND FURTHER DEVELOPMENT SUGGESTION

4.1 CONCLUSION

After going through the each steps of the research, the things that can be concluded are:

1. This application for emergency services has been completed using the Rapid Application Development system development method and the system design using the Unified Modeling Language.
2. With this application, it makes it easier for the public to contact emergency services.
3. With the maps feature in this application, it can make it easier to find the location of emergency services around the user.

4.2 FUTURE DEVELOPMENT

In the future, this research can be improved by doing more research:

1. It is recommended that in the future this application can be developed into an even more interesting application by presenting animations or images in the application.
2. This Emergency Service Application can be developed on other platforms such as IOS.
3. Features needed by the community for emergency services can be added to this application.
4. Security and network aspects have not been discussed in this program so it is recommended to conduct research for further development because this is an important aspect because it is a reference for the good maintenance of the program.
5. It is necessary to conduct further research on the readiness of emergency services in Indonesia.

REFERENCES


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