

## ANDROID-BASED NATURAL DISASTER EVACUATION APPLICATION

Eva Susilawati<sup>1</sup>, Lia Saniah<sup>2</sup>, Rysa Sahrial<sup>3</sup>, Buhori Muslim<sup>4</sup>.  
Putra Indonesia University, Faculty of Engineering, Informatics Engineering<sup>1</sup>

\*Correspondence: [evasusilawati9331@gmail.com](mailto:evasusilawati9331@gmail.com)

### *Abstract*

Cianjur Regency is an area that is in the crust of the Sunda plate, and is right above the very active Cimandiri fault and stretches from Palabuhan Ratu, Sukabumi, Cianjur, Bandung to Cirebon Regency. At any time a shift (earthquake) and other natural disasters can strike, this is very important because the vast area of Cianjur stretches from south to north bordering Bogor, Bandung, and Sukabumi so applications such as preparedness efforts need to be made so that evacuation and coordination run smoothly if the facilities are not supported, the application for natural disaster evacuation uses an application platform that is widely used. Research using the Scrum Process application development method which is part of the agile development method, based on Scrum this process has produced research products in the form of applications that can be used by the BPBD in coordinating and evacuating refugees caused by disasters. so that all possibilities such as assisting can be carried out on target, providing information on the loss of refugee family members can be minimized, and so on being able to help BPBD coordinate everything.

**Keywords:** Cianjur, Fault, Evacuation, Research, Scrum, Refugees.

### INTRODUCTION

A natural disaster is a natural phenomenon that occurs directly or indirectly and disrupts human life. In this case, natural disasters can cause losses to humans both materially, non-materially, and even souls. At least there is the interaction of four main factors that can cause these disasters to cause many victims and great losses, namely: (1) Lack of understanding of the characteristics of hazards (hazards), (2) Attitudes or behaviors that result in a decrease in natural resources (vulnerability), (3) Lack of information/early warning which causes unpreparedness and helplessness in dealing with threats of danger. (Bakornas PB, 2008).

In this day and age, the development of information technology is very fast and very influential for human survival. The benefits of current technological developments are that they can be a solution to problems in society, especially for natural disasters. as well as rescue teams to evacuate survivors.

This research aims to build an Android-based natural disaster evacuation application for BPBD Cianjur Regency, the application is named MADRES or Mobile applications disaster rescue to facilitate evacuation in the event of a natural disaster that may occur in Cianjur City.

### LITERATURE REVIEW

Until now, natural disaster events are very difficult to predict or detect early, so research to detect from the start continues to be carried out using various existing knowledge and understanding or through various studies that are continuously carried out by scientists, in this study, the following is the supporting literature:

**a. Application**

Application is a software (software) or computer program that operates on a particular system that was created and developed to perform certain commands. The term application itself is taken from the English "application" which can be interpreted as application or use. An application is an application of software or software developed to perform certain tasks.

**b. Information Systems**

The information system is the interaction between data, people, and procedures (which are supported by hardware and software) to take further decision actions for the short, medium, or long term within an organization. In other words, an information system is also a collection of interacting components to manage information in an organization to support the organization's business activities. (Yulianto, Ardhian Agung, et al. 2009: 2).

**c. Natural disasters**

A natural disaster is a natural phenomenon that occurs directly or indirectly and disrupts human life. In this case, natural disasters can cause losses to humans both materially, non-materially, and even souls.

**d. Androids**

Android is an operating system for Linux-based mobile phones. Android provides an open platform for developers to create their applications for use by a variety of mobile devices. Initially, Google Inc. buys Android Inc., a newcomer that makes software for cell phones.

**e. Scrums**

Scrum is a process framework used to manage the development of a complex product, useful for making products with the highest possible value productively and creatively (Schwaber & Jeff, 2013).

**f. Java**

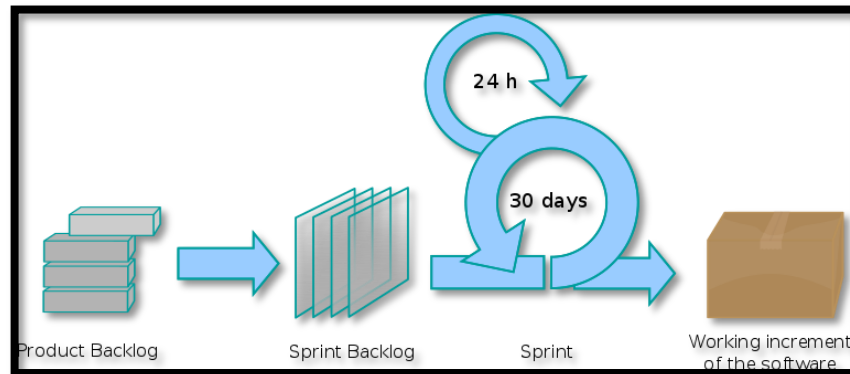
Java is a programming language compiled by James Gosling assisted by his colleagues at a software company called Sun Microsystems, in 1991. This programming language was initially initialized with the name "Oak", but in 1995 the name was changed to "Java". According to the definition of Sun Microsystems, in the book M. Salahuddin and Rosa A.S. (2010:1) Java is the name of a set of technologies for creating and running software on stand-alone computers or in network environments.

**g. Kotlin**

Kotlin is a programming language with static typing that runs on the Java Virtual Machine or uses the LLVM compiler which can also be compiled into JavaScript source code. Its main development comes from a team of programmers from JetBrains based in Russia.

## METHOD

Observations and interviews were the initial stages carried out by researchers at the BPBD (Regional Disaster Management Agency) in Cianjur Regency. The system design method used is the SCRUM method, which has a process as shown in Figure 1.



Picture 1. Conceptual SCRUM process

Scrum itself is part of Agile Development which has key scrum practices, namely:

1. Focus on the schedule
2. Work according to sprints consistently
3. All work must be marked as backlog products
4. The basic product backlog does the sprint and the team has to decide whether the product can be developed or not
5. The SCRUM master is responsible for receiving sprint results
6. Conduct meetings every day
7. Focus on sprints, meetings, product reviews, and work schedules
8. SCRUM allows the work of gathering requirements, designing architectures and interfaces

## RESULTS AND DISCUSSION

### Design.

Based on the development method followed, namely the scrum process, the implementation of this research was preceded by a needs analysis for all forms to be made, then an initial design was carried out for the application, then based on this, the order of implementation was as follows. For a system that is created to be a system that is truly following the needs of handling the evacuation of disaster victims and the implementation of good coordination, it is necessary to prepare an initial plan or design of the system, namely a use case design that describes the running system.

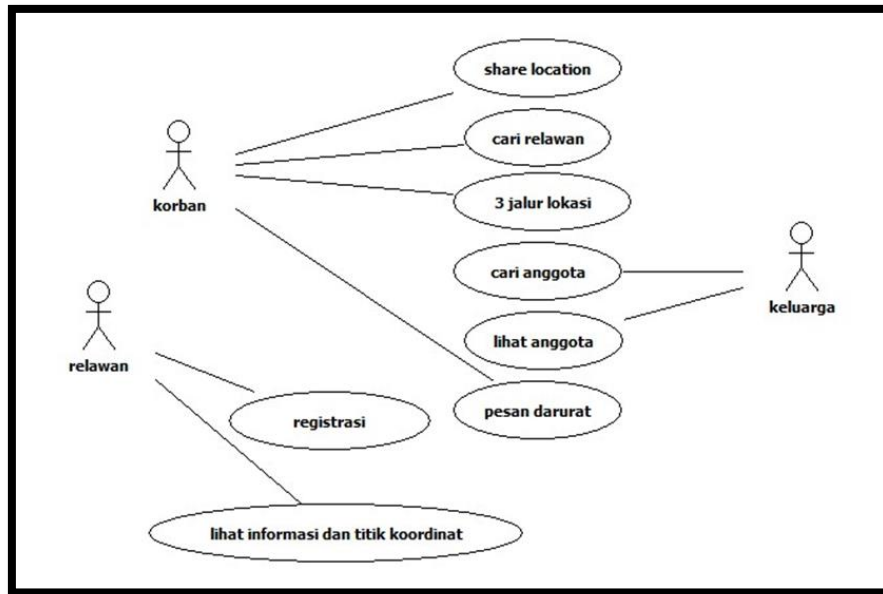


Figure 2. Use Case Diagram

### Implementation System.

Below is an implementation of the use case that was created, so based on the use case (Figure 2), the following form is in the application:

1. Login Display

Before logging in to the main menu the user is expected to create an account first to be able to log in, by clicking the create account button it will immediately be directed to the registration page to fill in the Email, Password, and NIK after that click registers and succeed, then log in using the Email and Password that have been entered registered.

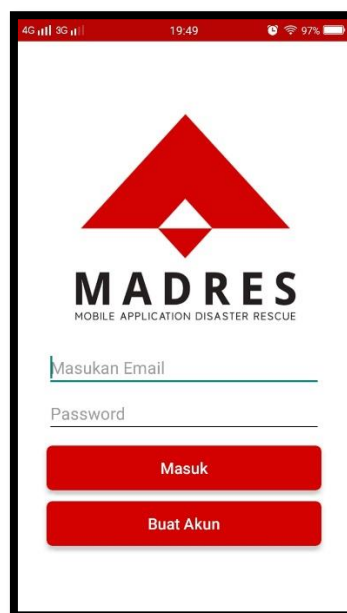


Figure 3. Login Display

2. Display registration for an account

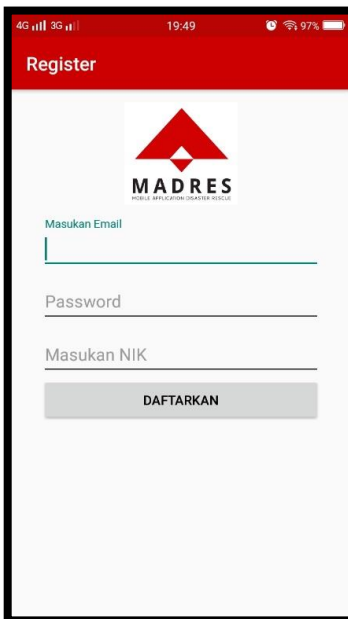


Figure 4. Registration View for an Account

3. Display Main Menu

This main menu page consists of 4 menu options, namely victims, families, volunteers, and about which have different functions.

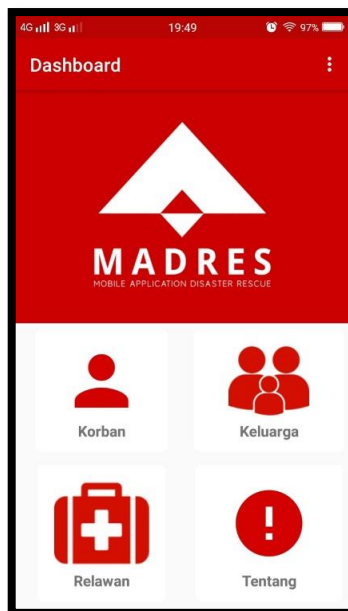


Figure 5. main menu display

4. Display as a Victim

The page display as the victim goes directly to maps, the victim can immediately click the share location button to make it easier to find the coordinates of the victim. The page displayed as a victim is equipped with features for the nearest hospital, police, and fire department, all you have to do is click on the one that is needed and dot 3

besides that, if the victim clicks, you can find volunteers and send emergency messages via WhatsApp easily and quickly.



Figure 6. Appearance as a victim

5. Display as a family

View as a family here, there are 2 options, namely to see family members and look for family members, which functions where the family makes it easier to find missing family members by selecting clicking to see family members and you can also select to search for family members. The image display is like this:

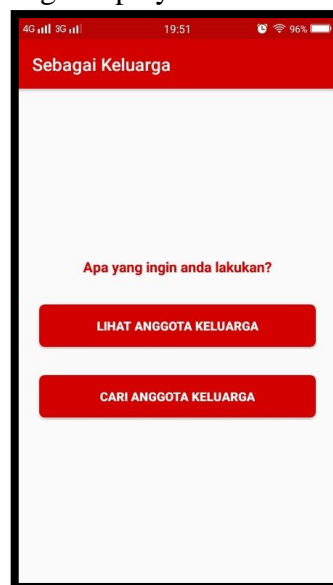


Figure 7. Display as a family

6. Find a family member

Before clicking see family members, first click on the search for family member menu with the input NIK of the victim/family member who is missing after that it will be redirected, and the option "add family member" will automatically appear. The image display is as follows.

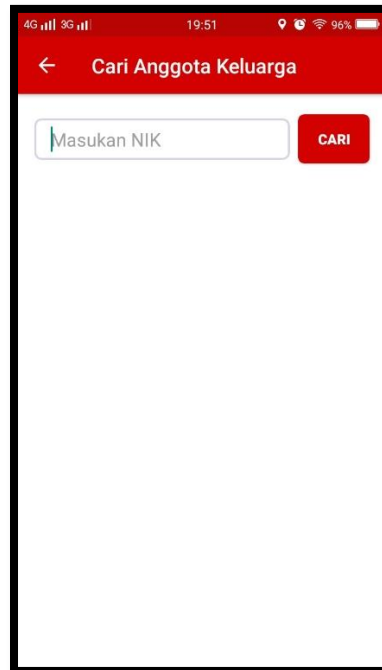


Figure 7. Search for Family Members

7. See family members

After searching for and adding family members, a member view menu will appear as shown below:

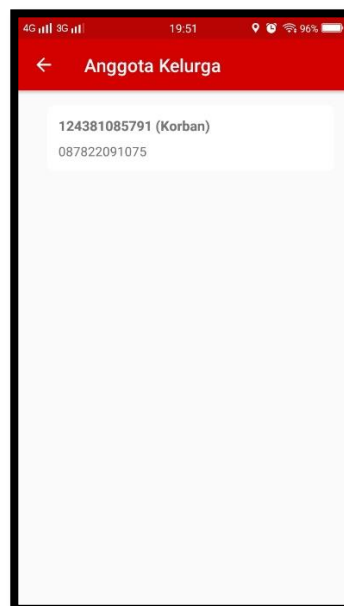


Figure 8. View Family members

8. Display as a volunteer

Below is registration as a volunteer before finding the location of the missing victim by filling in the name, cellphone number, and description. After it is filled out, you will immediately register and there will be a successful registration notification. After registration, a list of volunteers and a list of victims will immediately appear. If you have finished on the menu as a volunteer, there is a 3-point button beside that to log out/exit the page as a volunteer, which looks like the following image.

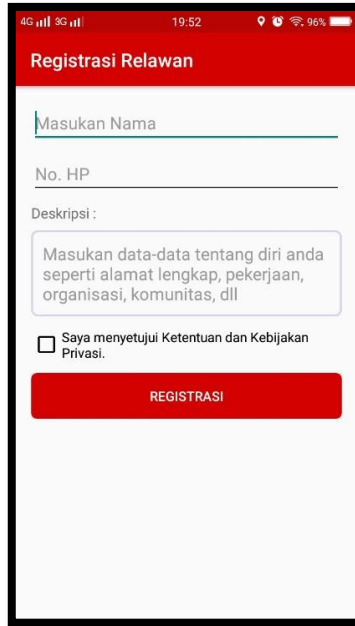


Figure 9. Volunteer Registration

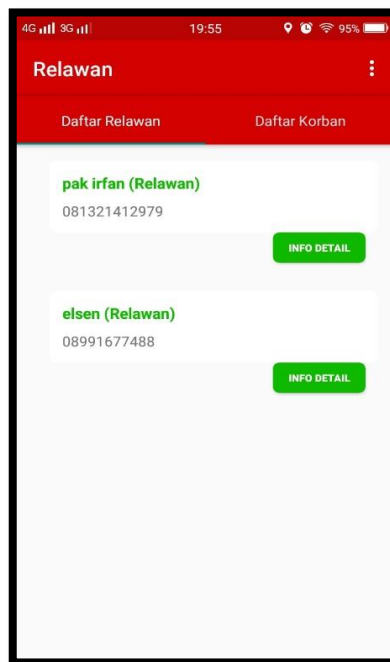


Figure 10. List of Volunteers

### System Testing

The following is a description of the test results with the black box testing technique based on the requirements in the test plan:

Requirement	Test Scenario	Expected results	Test results
Login Users	Input Data Login (Data Correct)	Enter according to your email and password	Accepted
	Input Login (Incorrect user data)	MessageBox appears	Rejected
Victim data	Click the share location button	Save data into the database	Accepted



	Find volunteers	Managed to find volunteers	Accepted
	Click the hospital/police/fire department icon	Appears the location of the hospital, police, and fire	Accepted
Family data	Find a family member	Finding and saving data on family members found was successful	Accepted
	View family members	Seeing the location point of a family member or the victim is successful	Accepted
	Click the delete data button	Delete data that has been entered	Accepted
Data Volunteer	Volunteer Registration	Save data into the database	Accepted
		Can change data	
	Volunteer data input	Enter your name, cellphone number and description then register	Accepted
	Click victim list	Find the location of the victim	Accepted
	Click the logout/exit button	Log out of the page as a volunteer	Accepted

Based on the test results with the sample test cases above, it can be concluded that the software is free from syntax errors and functionally produces results that are as expected.

### CLOSING

The research was conducted using the scrum process method, and has produced the following conclusions:

- a. With the MADRES application, it facilitates the process of evacuating disaster victims
- b. Helping Families and Volunteers when looking for disaster locations and disaster victims
- c. Users can easily search for related articles regarding the disaster location
- d. The MADRES application makes it easy for Victims, Families, and Volunteers to connect.

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