

**4th-2017**  
**International Conference on Control,  
Decision and Information Technologies**

**April 5-7, 2017**  
**Barcelona, Spain**



**CoDiT**  
**2017**

# Conference Digest



# 2017 4th International Conference on **Control, Decision and Information Technologies (CoDIT)**

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April 5-7, 2017  
Faculty of Mathematics (UPC), Barcelona, Spain

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# Natural Disaster Post Location Determination System Analysis and Design

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**Abstract**—The use of appropriate technology is one important aspect in improving the quality of human life. The common technology will be used in this study, is also one of the use of technology that is useful to increase the efficiency and effectiveness of the determination of the post when a disaster occurs. This is a second year of research that apply the algorithm of the first year into implementation. Expected result of performance is an information system that can be used together to search the best post when a disaster occurs. Implementation is expected to facilitate the distribution of aid and speed recovery following natural disasters.

**Keywords**— *natural disasters, post location, Information System*

## I. Introduction

The development of computer technology, both devices and hardware or software are growing rapidly. Computer technology now begin to became basic of human needs, from household appliances to robotic expeditions to outer space. The development of internet and multimedia technology that is growing exponentially, resulting in the vast amount of information managed by the computer [1]. The use of technology in disaster management is still not optimal, most of the technology used to anticipate the post-disaster occurs is a communication technology. Technology has been frequently used in the handling of the disaster, as an example, which is handling forest fires using weather modification technology [2].

Indonesia region geographically and geologically have more potential of natural disasters [3]. When a natural disaster occurs, many things are done spontaneously, which caused many errors in the distribution of aid. Errors that commonly occur is the uneven distribution of aid, where there are shelters

were flooded aid, and vice versa, by the mean, there are shelters that lack of support.

This study was conducted to address the problem of the distribution of disaster relief by finding the best algorithm for positioning post natural disaster recovery and create information system base on the selected algorithm. The location determination is based on many factors, including the location of the disaster with other locations nearby, the position of the donor, type of assistance provided, the mileage, the capacity of the room or building as well as the transport medium available in the region.

This Research begins with preliminary analysis for requesting need. After the result are gained, the observation of all attributes that need is beginning, therefore discussion and evaluation. The next step, researcher design the system base of the result. Furthermore, this design is used for the system development.

## II. Literature Review

### A. Information System

The information system consists of two words and information systems, according to Jerry FitzGerald, system is a network of procedures that are interconnected, gathered together to perform an activity or accomplish a certain goal [4]. While the information is data that has been processed into a form that has meaning for the recipient and may be a fact, or a value that has benefit.

System Characteristics:

#### 1. Component

A system consists of several components that interact with each other and work together to form a single unit. The components of the system can be a subsystem or the parts of the system. Each system even small, always contain components or subsystems. Each

subsystem has the properties of the system to perform a specific function and affect the overall system. A system can have a larger system called the super system, for example, a company may be called by a system and industry is a larger system can be called the super system. If the industry is seen as a system, the company can be referred to as a subsystem. Similarly, if the company is seen as a system, the accounting system are subsystems.

## 2. System boundary

Boundary is an area that limits the system between a system with other systems or with the outside environment. This system limit allows a system viewed as a whole. Limit of a system indicate the scope of the system.

- a. Outside the system environment (environment) is anything outside the limits of the system that affect system operation.
- b. Liaison system (interface), a media liaison between one subsystem with other subsystems.
- c. Input system is the energy put into the system. Feedback can be input treatment (maintenance input) and input signal (input signal). Maintenance input is entered data so that the system can operate. The data input signal is processed to obtain the output. For example in a computer system, program maintenance input is used to operate the computer and the data is input signal to be processed into information.
- d. Output System is the result of the data processed by the system.
- e. Processing System, a part that processes the inputs to be desired output.
- f. Target system, if the system does not have a target, then the operating system will not do any good.

## B. Geographic Information Systems

Geographic Information System is a computerized system that enables users to collect, store, process, analyze and present spatial data [5]. Currently the system is already identifiable information through a variety of technologies that can be obtained free of charge such as Google Earth, this technology is extremely easy to operate and trigger a more specific utilization so that the information can be used for specific purposes [6].

Russ Johnson did a study that stated that the GIS is the backbone of a natural disaster management, this is because most of these involve the management of spatial data, spatial data it is represented in the form of a map [7]. In addition, as one example use was, GIS is also used as one of the tools for disaster management at the farm are DIVA [8]. In the disaster, DIVA is used as a tool to support disaster mapping to agriculture in Africa. In the introduction it is stated that even this GIS, GIS is a system that has many uses and benefits in disaster management.

## C. Disaster Information System

The World Health Organization (WHO) defines a disaster as “a sudden ecological phenomenon of sufficient magnitude to require external assistance”[9]. The word disaster also means a sudden overwhelming and unpredicted event[10]. A disaster is a serious disruption of the functioning of a society, causing widespread loss of human life in terms of material, economic or environmental and community that goes beyond the ability to cope using their own resources [11]. ISDR 2004 disaster explains that basically is divided into several phases (phase), namely:

- a. Emergency response phase (phase response),
- b. Reconstruction and rehabilitation phase,
- c. The level of preventive and mitigation, and
- d. The level of preparedness (preparedness).

The other way to divide the disaster phase are also like the following phase : (a) Preparedness; (b) Mitigation; (c) Response; and (d) Recovery[12].

Identify appropriate logistics management system is how to get the reconstruction of disaster recovery back towards a comprehensive [13]. This can be done through several phases, namely:

- a. Phase I : Identification of logistical problems of natural disasters,
- b. Phase II : Preparing system and administrative data that are accurate,
- c. Phase III: Defining Key Performance Indicators (KPI) management of natural disasters in terms of logistics,
- d. Phase IV: Finding information about the conditions of possible disaster and the needs of the victims,
- e. Phase V : Specifies procurement assistance,
- f. Phase VI : Determining the main warehouse, warehouse and warehouse support recipients,
- g. Phase VII: Determining the means of transport and the time required,
- h. Phase VIII: Form Disaster Team Logistic Indonesia
- i. Phase IX : Follow-up of disaster management

Now is the best time to develop a strategy so that Indonesia will have a standard handling raw natural disasters, especially in the logistics handling of natural disasters.

## III. Research Methods and Result

This research target are to create a system of post position laying best information based on the result of the first year.

The steps are as follows:

1. determination algorithm position laying elected posts.
2. The pattern recognition algorithms.
3. Incorporate the results into the information system are made.
4. Analyzing the results of the information system.
5. Take a conclusion.

The Information System that produce have spesification as :

### a. Product perspective

SIPO (The name of the system) is a software developed to help the management of information systems post on a web environment. These systems help organizations and charities

to manage data and post information that can support the data collection process and the search command post. This system can also be used by the GENERAL USER and used by consumers of the general user and the system is a web-based system that uses CodeIgniter framework.

For a web application management post, the system can use a common user. Through this system the user can search the nearest command post in accordance with the user's position. Users can also search posts information that already exists in the data post that has been entered by the administrator.

SIPO's desktop software runs on any web browser, and is created using the programming language PHP. As for the use Notepad ++ programming environment. Average for the database, will be used MySQL Server, and web applications will refer to the database.

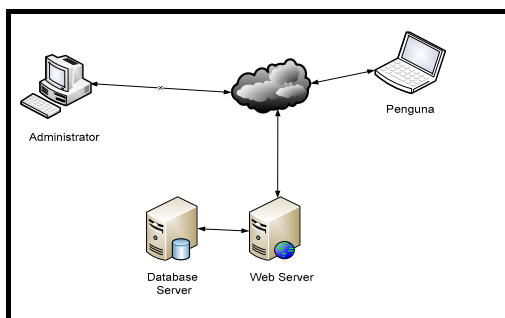


Figure 1 Software Architecture SIPO

#### b. Product functions

SIPO function software products are as follows:  
WEB APPLICATIONS

##### 1. Function Login.

Is a function that is used by admin to be entered in the system to be used.

##### 2. Data Management Functionality description.

Administrator is a function that is used to manage data description. Description Data Management functionality includes:

###### a. Data Entry Function Description.

Is a function that is used to add data description.

###### b. Change Function Data.

Is a function that is used to change the data description.

###### b. Shown Function Data Description.

Is a function that is used to display the data description.

###### c. Search Function Data

Is a function that is used to find the data descriptions based on the description or date changes.

##### 3. Data Management Functionality Command Post.

Administrator is a function that is used to manage data post. Post Data Management functionality includes:

###### a. Post Data Entry function

Is a function that is used to add data post.

###### b. Function Change Data Command Post.

Is a function that is used to change the data post.

###### c. Shown Function Data Command Post

Is a function that is used to display the data post.

###### d. Search Function Data Command Post

Is a function that is used to search the data post by Name command post, the person in charge, telephone, address, capacity, spacious, lots of volunteers or the date of the change.

#### 4. Organizational Data Management Functionality/ Social Foundation.

This is a function that is used to manage data Organization/Social Foundation. Data Management functionality Organizations/Social Foundation include:

##### a. Data Entry Function Organization/Social Foundation.

Is a function that is used to add data organization/charity.

##### b. Function Change Data Organization/Social Foundation.

Is a function that is used to change the data organization/charity.

##### c. Shown Function Data Organization/Social Foundation.

Is a function that is used to display data organization/charity.

##### d. Search Function Data Organization/Social Foundation.

Is a function that is used to search for data organization/charity based on the name of the organization/ charity or the date of the change.

#### 5. Data Management Functionality Marker/Markers

Administrator is a function that is used to manage data Marker/Markers. Data Management functionality Marker / Markers include:

##### a. Marker functions Data Entry / Social Bookmarks.

Is a function that is used to add data organization/charity.

##### b. Function Change Data Marker / Markers.

Is a function that is used to change the data organization /charity.

##### c. Shown Function Data Marker / Markers

Is a function that is used to display data organization / charity.

##### d. Search Function Data Marker / Markers

Is a function that is used to search for data organization /charity by post Name, address, phone, category, logitude, latitude or the date of the change.

#### 6. Global Functions General User

The user is a function used when visiting the post of information systems. Global Functions Common Users include:

##### a. Function Home / Home

Is a function that is used to obtain general information about the pages post information systems.

##### b. Nearest Post Function

Is a function that is used to find the nearest shelter is based on the user's location.

- c. Search Function Command Post  
Is a function that is used to display data post-data that has been entered by the administrator.

**c. Users Characteristics**

Characteristics of software users SIPO are as follows:

1. Understand the operation of Microsoft Windows.
2. Understand the internet and web.
3. Understand the SIPO application usage.

**d. Use Case Diagram and ERD**

In SIPO we construct our use case diagram as shown on Figure 2. Use Case Diagram SIPO. The data that we use in the system also shown on Figure 3. Entity Relationship Diagram SIPO.

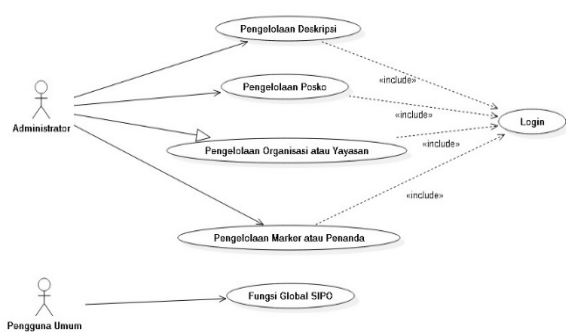


Figure 2 Use Case Diagram SIPO

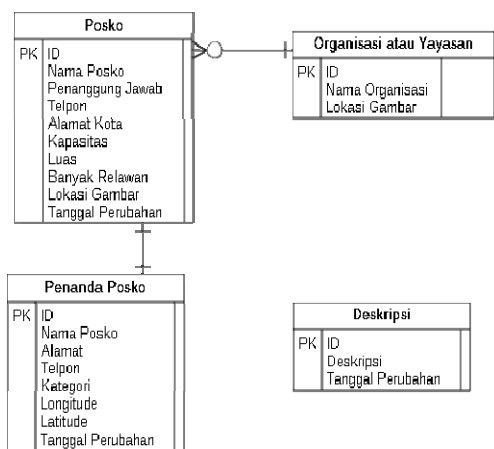


Figure 3 Entity Relationship Diagram SIPO

**e. Example of the screenshot of the SIPO**



Figure 4 SIPO Login

As shown in Figure 4. Sipo Login is a page that is provided to the administrator of Information Systems Command Post. By filling the username and password that has been provided, the system administrator can enter and manage data to be shown at public functions.



Figure 5 SIPO Data Master Management

The menu shown in Figure 5. SIPO Data Master Management are the menubar management that makes it easier for administrators to navigate management. Existing management on this menu are the management for data description, post data management, data management organization or foundation, and management of data marker or marker posts

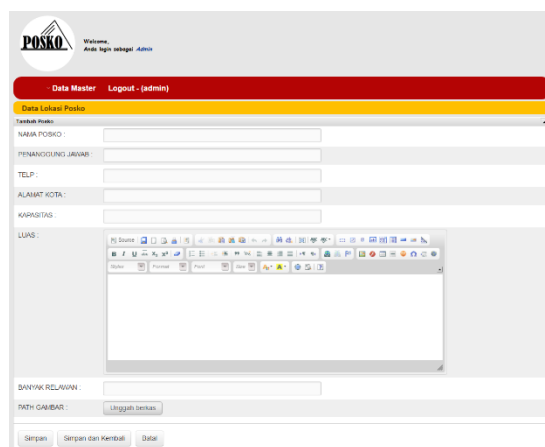


Figure 6. SIPO Data Master Posko Management

Form data input in Figure 6. SIPO Data Master Posko Management are used by administrator post in accordance with their respective labels. When finished entering data, the administrator can choose to save and stay on this menu, or review the first major undertaking for most functionality. Administrators can also cancel the operation of adding the data by pressing the cancel button.

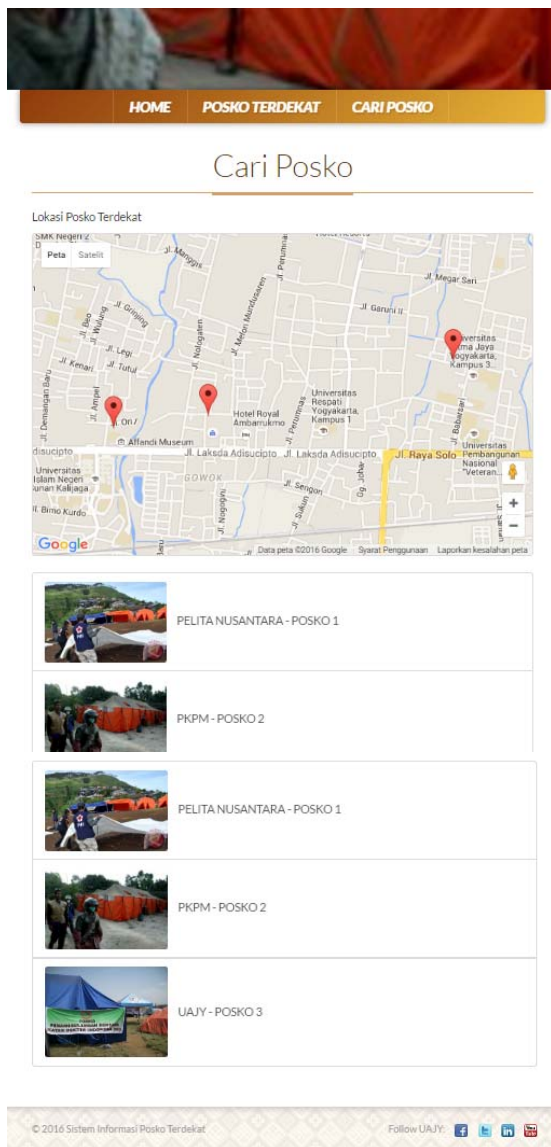


Figure 7. SIPO Nearest Posts Search

As shown in Figure 7. SIPO Nearest Posts Search This page is used to determine the nearest post information in accordance with the user current location.

#### IV. Conclusion

This study is the result of the analysis and design of a system based on the first year of study. SIPO system is one of implementation of which will be used in planning and data

collection of the posts. Basic development data and analysis tha used as the basis for the development of this information system is the data from the previous year's study.

In the second year of this study, the results of which will be used by the public contained in the Software Requirements Specification Document SIPO, and Software Design Description of SIPO. In the document contained all aspects of the needs to implement this system.

Results from the second study year is expected to facilitate the management of post and search the nearest post and can manage distribution of the aid. SIPO system that has been produced, is also expected to improve efficiency in command post data collection and command post data retrieval.

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