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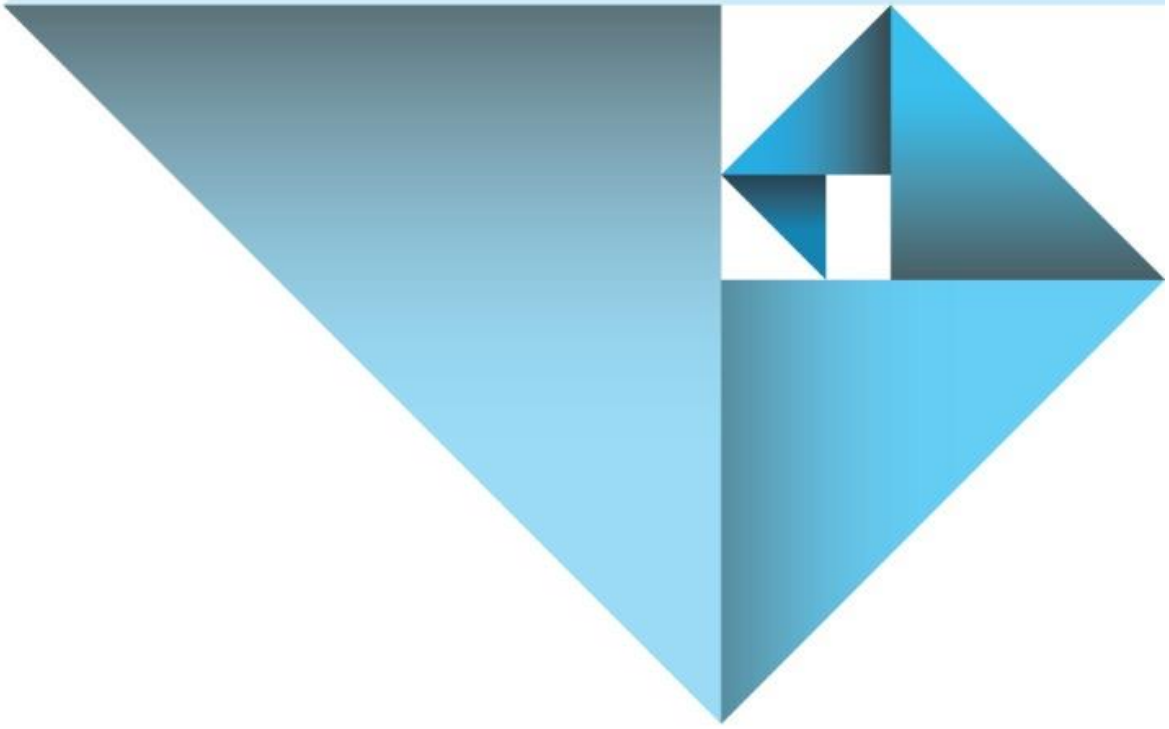

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Journal of Information Technology and Its Utilization is a journal published by the BBPSDMP Kominfo Makassar with the aim of disseminating information on scientific developments in information technology area and its utilization. The manuscript published in this journal is derived from research, scientific study conducted by researchers, academics and information technology expert. Publish with frequency of 2 times a year, namely in June and December.

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Journal of Information Technology and it's Utilization
Volume 2 Issued. 2, 2019

TABLE OF CONTENTS

Journal of Information Technology and it's Utilization
Volume 2 Issued. 2, 2019

PREFACE

Dear Readers,

Thank to Almighty God Allah SWT, we all pleased to present the latest issue of the Journal of Information Technology and Its Utilization. In the current issue, we publish the results of the latest research from the fields of Information Technology. The introductory article is entitled " Sentiment Analysis Using Random Forest Algorithm-Online Social Media Based". It is written by a researcher from BBPSDMP Kominfo Makassar specialist in big data, Artificial Intelligence and Signal and Image Processing – Bahrawi, The paper presents selected issues relating to the utilisation of information technology for rural erea in Indonesia. I hope the paper attractive to all our readers.

there are several other scientific articles in this issue, like Sentiment Analysis Using Random Forest Algorithm-Online Social Media Based, Implementation Of Augmented Reality Technology For Human Skeletons Learning Based On Android, Application Design Of The Medicines Usage Prediction Based On Backpropagation Neural Network Method and PHP, etc.

I would like to take this opportunity to encourage authors from around the world to publish their research results in the Scientific Journals of the BBPSDMP Kominfo Makassar. All readers are invited to visit our website. This link https://jurnal.kominfo.go.id/index.php/jitu/index will grant you access to electronic versions of the current and archival issues of this journal.

Finally, we hopes suggestions from the reader to be better in our issue in every edition. See you later in the next issue.

December 2019
Editorial Team

Journal of Information Technology and its Utilization

Volume 2 Issued. 2, 2019

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Bahrawi
Balai Besar Pengembangan Sumber daya Manusia dan Penelitian Komunikasi dan Informatika Makassar
SENTIMENT ANALYSIS USING RANDOM FOREST ALGORITHM-ONLINE SOCIAL MEDIA BASED
Journal of JITU Vol. 2 Issued 2, December 2019
page 29-33

Abstract-- *Every day billions of data in the form of text flood the internet be it sourced from forums, blogs, social media, or review sites. With the help of sentiment analysis, previously unstructured data can be transformed into more structured data and make this data important information. The data can describe opinions/sentiments from the public, about products, brands, community services, services, politics, or other topics. Sentiment analysis is one of the fields of Natural Language Processing (NLP) that builds systems for recognizing and extracting opinions in text form. At the most basic level, the goal is to get emotions or 'feelings' from a collection of texts or sentences. The field of sentiment analysis, or also called 'opinion mining', always involves some form of the data mining process to get the text that will later be carried out the learning process in the machine learning that will be built. this study conducts a sentimental analysis with data sources from Twitter using the Random Forest algorithm approach, we will measure the evaluation results of the algorithm we use in this study. The accuracy of measurements in this study, around 75%. the model is good enough. but we suggest trying other algorithms in further research*

Keywords: *sentiment analysis; random forest algorithm; classification; machine learnings.*

Alders Paliling
Department of Computer Science, Sembilanbelas November Kolaka University, Indonesia
IMPLEMENTATION OF AUGMENTED REALITY TECHNOLOGY FOR HUMAN SKELETONS LEARNING BASED ON ANDROID
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page 34-39

Abstract-- *One of the materials taught in the science lessons is about human skeletons. In the learning process of the human skeletal, teachers use props in the form of human skeletal models. With the development of technology, the use of human skeletal models can be replaced with digital models. Human skeletal models can be damaged either by deliberate or accidentally by age. The correct method for replacing the model of a human skeleton into a digital form is by using Augmented Reality technology, where Augmented Reality technology is capable of projecting 3-dimensional objects into the real world directly. The use of augmented reality technology is increasingly prevalent in the world of education, health, sales, and tourism. The results obtained in this study was the application could project 3-dimensional objects from the human skeleton that was divided into 4 parts of the skull, spine, and ribs, the bone of the upper tool and the bone of the motion of the bottom of the marker. Based on the tests that have been done, it was concluded that a good distance in identifying markers between smartphones with markers is at a distance between 2-6 inches and the marker slope of the smartphone is 00-600.*

Keywords*: Augmented Reality; Human Skeletons; Science.*

I Putu Arya Dharmaadi, Gusti Made Arya Sasmita
Udayana University, Bali, Indonesia
APPLICATION DESIGN OF THE MEDICINES USAGE PREDICTION BASED ON BACKPROPAGATION NEURAL NETWORK METHOD AND PHP
Journal of JITU Vol. 2 Issued 2, December 2019
page 40-43

Abstract*—The development of information technology makes many organizations utilizing it in their business process. For example, hospitals use certain information systems in medicine management. We observe that most medicines applications do not provide the drug usage prediction feature so that this situation causes the hospital staff being difficult in providing enough medicines. Therefore, in this experimental research, we developed an application in the form of a simple design for helping the hospitals in predicting daily medicine usage. This application also provides medicines stock management and doctor diagnosis features. The Brainy library is used to facilitate implementing the backpropagation neural network method in PHP programming language. We choose PHP because this server script is widely used in information system development. We demonstrated that the mock-up as the result of this development is able to work properly. For further study, we suggest expanding this mock-up become a full hospital information system that covers many functions in medical centers.*

Keywords: Medicine usage prediction; Neural network; PHP.

M Dede[1], M A Widiawaty[2], G P Pramulatsih[2], A Ismail[2], A Ati3, H Murtianto2
Udayana University, Bali, Indonesia
[1]Master Program on Environmental Science, Graduate School, Universitas Padjadjaran, Indonesia
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INTEGRATION OF PARTICIPATORY MAPPING, CROWDSOURCING AND GEOGRAPHIC INFORMATION SYSTEM IN FLOOD DISASTER MANAGEMENT
(CASE STUDY CILEDUG LOR, CIREBON)
Journal of JITU Vol. 2 Issued 2, December 2019
page 44-47

Abstract-- *Ciledug Lor is a flood-prone area in Cirebon Regency. Flood disaster management can empower the community through participatory mapping and crowdsourcing activities. This study aims to analyze the level of floods, threats, vulnerabilities, capacities, risks and refuge locations in Ciledug Lor Village based on participatory mapping, crowdsourcing, and GIS. Various indicators of threat, vulnerability, and flood capacity are obtained from field surveys, open data and official data that have been given a value and weight which are then processed using overlay analysis to obtain flood risk parameters. Determination of refuge locations used network analysis to find out the route, distance, and effective time. The results analysis and modeling showed the average flood level in Ciledug Lor reached 2.27 meters. The refugee location for Dusun Pamosongan and Dusun Kampung Baru are to the north close to the railway tracks. Meanwhile, Dusun Karanganyar and Dusun Genggong are in the Ciledug Bus Terminal. In the future, participatory mapping, crowdsourcing, and GIS are expected to build awareness and resilience of disaster.*

Keywords: *Crowdsourcing; Flood disaster management; GIS; Participatory mapping*

Darman Fauzan Dhahir
Balai Besar Pengembangan Sumber daya Manusia dan Penelitian Komunikasi dan Informatika Makassar
UTILIZATION OF USER GUIDE OF ONLINE SHOPPING APPLICATIONS BY CUSTOMERS IN MAKASSAR CITY
Journal of JITU Vol. 2 Issued 2, December 2019
page 48-52

Abstract— *The rapid growth of e-commerce is accompanied by an increase in the number of customers of application-based online store. The use of online shopping applications that are not appropriate may cause problems that result in customer losses. This quantitative research is intended to describe the utilization of online shopping application's user guides by the customers in Makassar City. The research uses a descriptive statistic analysis. Data is displayed in the form of graphics and tables and interpreted descriptively. The results showed that the users of online shopping applications in Makassar City were less in using the user guide provided by the online shopping application provider. They preferred to do trial & error, even though they advised other users to read the tutorial. They were more concerned about convenience and simplicity than security issues. Besides, it was also found that those using the out-application-tutorials were more risked experienced problems than those did not use the tutorial at all and/or those used the in-application-tutorials.*

Keywords: *application, online shopping, online security, user guide, utilization.*

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SENTIMENT ANALYSIS USING RANDOM FOREST ALGORITHM-ONLINE SOCIAL MEDIA BASED

Bahrawi

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***Abstract*-- Every day billions of data in the form of text flood the internet be it sourced from forums, blogs, social media, or review sites. With the help of sentiment analysis, previously unstructured data can be transformed into more structured data and make this data important information. The data can describe opinions/sentiments from the public, about products, brands, community services, services, politics, or other topics. Sentiment analysis is one of the fields of Natural Language Processing (NLP) that builds systems for recognizing and extracting opinions in text form. At the most basic level, the goal is to get emotions or 'feelings' from a collection of texts or sentences. The field of sentiment analysis, or also called 'opinion mining', always involves some form of the data mining process to get the text that will later be carried out the learning process in the machine learning that will be built. this study conducts a sentimental analysis with data sources from Twitter using the Random Forest algorithm approach, we will measure the evaluation results of the algorithm we use in this study. The accuracy of measurements in this study, around 75%. the model is good enough. but we suggest trying other algorithms in further research**

***Keywords*: sentiment analysis; random forest algorithm; classification; machine learnings.**

I. INTRODUCTION

Sentiment analysis is part of text mining, the dataset that will be analyzed later can be sourced from the comments column, netizens tweets on Twitter, and various sources of uploads from people related to their opinions or sentiment on a matter. For people who work as data science, they may often hear the term about sentiment analysis. Sentiment analysis it's also processed from analyzing various data in the form of views or opinions so as to produce conclusions from various existing opinions. The result of sentiment analysis can be a percentage of positive, negative, or neutral sentiment

Sentiment analysis is useful for various problems of interest to human-computer interaction practitioners and researchers, as well as those from fields such as sociology, marketing and advertising, psychology, economics, and political science [1].

One from several social media which is widely used by society today is Twitter, Twitter has a simple and fast concept because the message is short [2]. Twitter as a social media is widely used by researchers in the field of natural language processing (NLP), in addition, concept simple text data and can be crawled, Twitter also provides an API facility that makes it easy for researchers to retrieve the data.

some previous research has been done with various classification algorithms. here are some of them :

An Ensemble Sentiment Classification System of Twitter Data for Airline Services Analysis [3], uses six methods for classification namely lexicon-based classifier, NB, Bayesian Network, SVM (Support Vector Machine), C4.5 (Decision Tree), Random Forest and one method called the Ensemble Classifier which combines five methods (NB, Bayesian Network, SVM, C4.5, and Random Forest) to get higher accuracy. This study uses four classes, namely positive class (4288 tweets), negative (35876 tweets), neutral (40987 tweets) and irrelevant (26715 tweets). The accuracy of each when not combined with a two-class dataset (eliminating neutral and irrelevant classes) is Lexicon Based 67.9%, Naïve Bayesian 90%, Bayesian Network 91.4%, SVM 84.6%, Random Forest 89.8%. The Lexicon Based Method did not participate in the combination because its accuracy was at least 67.9%, the acquisition of ensemble accuracy with a two-class dataset was 91.7% while the ensemble's accuracy for the three-class dataset was 84.2%.

Sentiment Analysis of Review Datasets Using Naïve Bayes' and K-NN Classifier [4], two supervised methods are used with two datasets namely film and hotel, the more training data that is entered the better the accuracy obtained in the NB algorithm with the dataset film but for the K-NN method, accuracy is obtained randomly.

Research on presidential candidates examined public opinion on the 2014 Indonesian presidential candidates [5], namely Prabowo-Hatta Rajasa and Joko Widodo-Jusuf Kalla. Research [5] uses NB for the classification of documents, the data in this study were taken in three periods, namely, before the legislative election, when the legislative election was held and after the declaration of the legislative election announcement then from the data the authors grouped public opinion whether positive, negative or neutral. The results are 90% accurate.

Text classification research with the Naïve Bayes algorithm for the Grouping of News Texts and Academic Abstracts [6]. Seven experiments were conducted for news documents and academic abstract documents, in the first experiment with the amount of training data and 9: 1 test data, the highest accuracy was compared with the smallest training data. The use of training data of 50% of the total data obtained an accuracy of

more than 75%.

Opinion Analysis Research on Smartphone Features on Indonesian Language Website Reviews [7]. Data collection is done by means of web scraping, which is taking data review from the target website. From the test results obtained an average value of recall and precision respectively of 0.63 and 0.72 while the accuracy of 81.76%.

Research from Faishol Nurhada, et al [5] dataset used is public timeline tweets taken by period. Using Twitter as a data source by utilizing the API features provided, retrieving data with retrieval techniques based on time periods.

Based on some of the previous studies that have been explained before, this research does the same thing, which is doing sentiment analysis of Twitter data using the Random Forest algorithm approach, we will measure the evaluation results of the algorithm that we use in this research.

II. METHODE

We will follow the typical machine learning pipeline. We will first import the dataset and we will then do exploratory data analysis to see if we can find any trends in the dataset. Next, we will perform text preprocessing to convert textual data to numeric data that can be used by a machine learning algorithm. Finally, we will use machine learning algorithms to train and test our sentiment analysis models.

Datasets

The dataset we used in this study taken from the website kaggle.com with CC BY-NC-SA 4.0 license. This data was originally posted by Crowdflower last February and includes tweets about 6 major US airlines. Additionally, Crowdflower had their workers extract the sentiment from the tweet as well as what the passenger was disappointed about if the tweet was negative. As the original source says, a sentiment analysis job about the problems of each major U.S. airline. Twitter data was scraped from February of 2015 and contributors were asked to first classify positive, negative, and neutral tweets, followed by categorizing negative reasons (such as "late flight" or "rude service").

Preprocessing

Preprocessing is very decisive in the process of determining sentiment, the classification model that is built will be more accurate. Preprocessing is also used to our dataset clean [8]. The preprocessing phase consists of several processes that will be discussed one by one in detail, including *Cleansing data*, Tweets contain many slang words and punctuation marks. We need to clean our tweets before they can be used for training the machine learning model. Cleansing data did reduce noise in the tweet data. Unimportant words will be removed such as URL, hashtag (#), username (@username), email, emoticons (: @,: *,: D), (,), dot (.) and also other punctuation [9].

Case folding, this stage serves to change letters character in the comments into all lowercase letters characters. In social media, especially Twitter, writing tweets, there must be differences in the shape of letters, case-folding stages is a changing process the shape to lowercase letters (lower case) or can also be called uniformity of letters. For example, folding case, input the sentence: "Disappointed with CS services", output the sentence: "disappointed with cs services".

Tokenizing, tokenizing or parsing stage is the cutting stage of the input string based on each word arrange [10]. In principle, this process is to separate every word that composes a document. In general, each word is identified or separated by another word by a space character, so the tokenizing process relies on the space character in the document to do word separations [5].

Stemming is the stage to make the word affixes into basic words. In stemming, conversion of morphological forms of a word to its stem is done assuming each one is semantically related. The stem need not be an existing word in the dictionary but all its variants should map to this form after the stemming has been completed. There are two points to be considered while using a stemmer [11]:

- Morphological forms of a word are assumed to have the same base meaning and hence should be mapped to the same stem.
- Words that do not have the same meaning should be kept separate.

These two rules are good enough as long as the resultant stems are useful for our text mining or language processing applications.

TF-IDF

As defined, TF is the term frequency in a single document. Terms can be words, phrases. For documents, the frequency for each term may vary greatly. Therefore, frequency is an important attribute of the term to discriminate itself from other terms. Sometimes, term frequency is directly used as the value of TF. That is, the TF value of term *i* is

$$TF_i = tf_{ik}$$

where tf_i denotes the frequency of term *i* in document *j*. Since the number of term frequency may be very large, the following formula is also often used to calculate TF value.

$$TF_i = log_2\ (tf_{ij}).$$

As for IDF, various formulas have been proposed. A basic formula was given by Robertson [12]. A later discussion between Spärck Jones[13] and Robertson resulted in the following formula of IDF:

$$IDF_i = log_2\left(\frac{N}{n_j}\right) + 1 = log_2(N) - log_2(n_j) + 1$$

where *N* is the total number of documents in the collection and n_j is the number of documents that contain at least one occurrence of the term *i*.

Random forest algorithm

Ensemble classification methods are learning algorithms that construct a set of classifiers instead of one classifier, and then classify new data points by taking a vote of their predictions. The most commonly used ensemble classifiers are Bagging, Boosting and Random Forest (RF) [14].

Random forest is a type of supervised machine learning algorithm based on ensemble learning. Ensemble learning is a

type of learning where you join different types of algorithms or the same algorithm multiple times to form a more powerful prediction model. The random forest algorithm combines multiple algorithms of the same type i.e. multiple decision trees, resulting in a forest of trees, hence the name "Random Forest". The random forest algorithm can be used for both regression and classification tasks.

RF classifier can be described as the collection of tree-structured classifiers. It is an advanced version of Bagging such that randomness is added to it [15]. Instead of splitting each node using the best split among all variables, RF splits each node using the best among a subset of predictors randomly chosen at that node.

A new training data set is created from the original data set with replacement. Then, a tree is grown using random feature selection. Grown trees are not pruned [15], [16]. This strategy makes RF unexcelled accuracy [17]. RF is also very fast, it is robust against overfitting, and it is possible to form as many trees as the user wants [15], [18].

The random forests algorithm (for both classification and regression) is as follows [19]:

1. Draw n_{tree} bootstrap samples from the original data

2. For each of the bootstrap samples, grow an *unpruned* classification or regression tree, with the following modification: at each node, rather than choosing the best split among all predictors, randomly sample m_{try} of the predictors and choose the best split from among those variables. (Bagging can be thought of as the special case of random forests obtained when $m_{try} = p$, the number of predictors.)

3. Predict new data by aggregating the predictions of the n_{tree} trees (i.e., majority votes for classification, the average for regression).

III. Result and Discussion

Before carrying out a series of analysis processes on the dataset, a little exploration was done on the dataset used in this study, to see how the distribution structure of the dataset used.

From the results of the description, the total amount of existing tweet data amounted to 14,640 with a total of 15 attributes. The data was divided into 6 airlines, each of which had been polarity labeled positive, negative and neutral sentiments. The following are the results of the description of tweet data based on each airline.

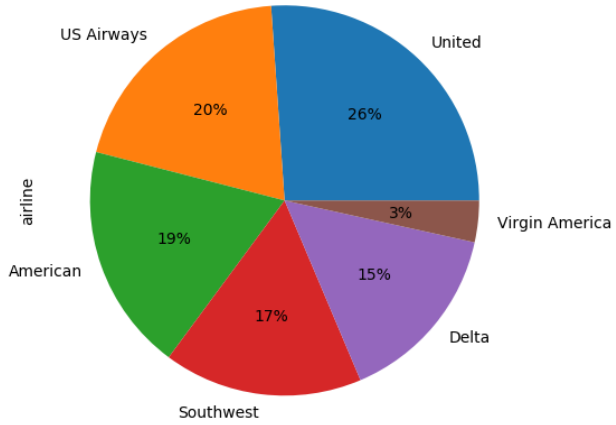

Fig. 1. Percentage of Public Tweet for Airlines

In the output, we can see the percentage of public tweets for each airline. United Airlines has the highest number of tweets i.e. 26%, followed by US Airways (20%), American (19%). For the next description, let's now see the distribution of sentiments across all the tweets.

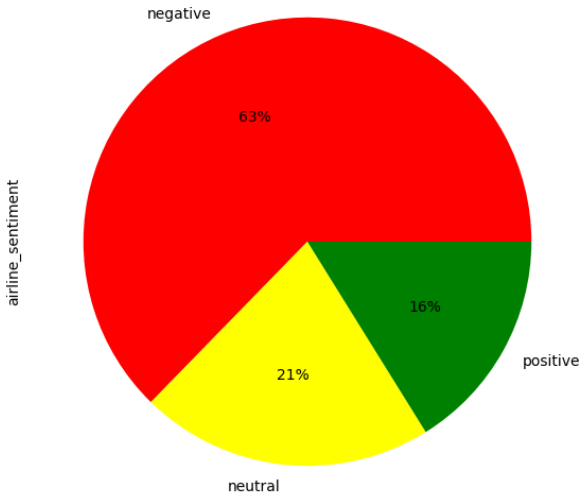

Fig. 2. Distribution of sentiments

From the output, we can see that the majority of the tweets are negative (63%), followed by neutral tweets (21%), and then the positive tweets (16%). To complete the data description, let's see the distribution of sentiment for each individual airline

It is evident from the output that for almost all the airlines, the majority of the tweets are negative, followed by neutral and positive tweets. Virgin America is probably the only airline where the ratio of the three sentiments is somewhat similar.

To see more detail about the dataset that we use in this paper, here following summary dataset table.

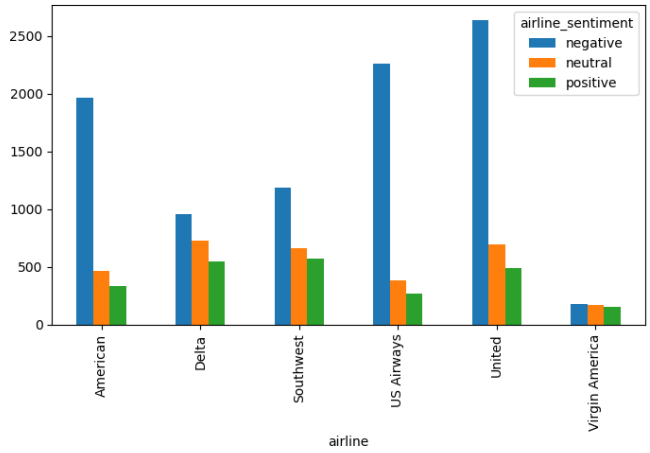

Fig. 3. Distribution of sentiment for each individual airline

TABLE 1.
Summary of datasets

Dataset (Airline)	***Number of Tweets***	***Percentage of***		
		Positive	*Negative*	*Neutral*
Virgin America	504	30%	35%	33%
US Airways	2913	13%	77%	10%
United	2434	12%	68%	18%
Southwest	4841	23%	48%	27%
Delta	2222	24%	43%	32%
American	2760	12%	71%	16%

Setelah kita melihat lebih dalam hasil deskripsi data dataset yang kita gunakan, langkah selanjutnya yaitu melakukan proses cleaning data, lalu kemudian melakukan training model dan terakhir melakukan prediksi dan evaluasi terhadap model.

Perhitungan evaluasi *metrics* klasifikasi yang kita gunakan adalah *confution metrix, F1 measure and accuracy.*

Berikut hasil evaluasi kinerja mesin learning yang kita bangun.

TABEL 2.
Confution matrix

		Aktual		
		Negatif	Neutral	Positif
Prediksi	Negatif	1723	108	39
	Neutral	326	248	40
	Positif	132	58	254

TABEL 3.
Precission, recall and f1-score

	Precision	Recall	F1-score
Negative	0.79	0.92	0.85
Neutral	0.60	0.40	0.48
Positif	0.76	0.57	0.65

From the output, the algorithm achieved an accuracy of around 75.99%. For information, testing is done with Python 3.6 programming language tools with several libraries, mainly sci-kit-learn. library commonly used for sentiment analysis.

IV. Conclusion

Sentiment analysis or opinion mining is a field of study that analyzes people's sentiments, attitudes, or emotions towards certain entities. This paper tackles a fundamental problem of sentiment analysis, sentiment polarity categorization. Tweets about six airline data from kaggle.com are selected as data used for this study. We performed sentiment analysis using the random forest algorithm and achieved an accuracy of around 75%. I would recommend you try and use some other machine learning algorithms such as logistic regression, SVM, or KNN and see if you can get better results.

V. Acknowledgment

My gratitude to the institution where *i* work, which has provided the opportunity to always do research. to my research friends in the BBPSDMP Kominfo Makassar Homebase, and other friends who have contributed to this research that *i* did not have time to mention one by one.

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IMPLEMENTATION OF AUGMENTED REALITY TECHNOLOGY FOR HUMAN SKELETONS LEARNING BASED ON ANDROID

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***Abstract*-- One of the materials taught in the science lessons is about human skeletons. In the learning process of the human skeletal, teachers use props in the form of human skeletal models. With the development of technology, the use of human skeletal models can be replaced with digital models. Human skeletal models can be damaged either by deliberate or accidentally by age. The correct method for replacing the model of a human skeleton into a digital form is by using Augmented Reality technology, where Augmented Reality technology is capable of projecting 3-dimensional objects into the real world directly. The use of augmented reality technology is increasingly prevalent in the world of education, health, sales, and tourism. The results obtained in this study was the application could project 3-dimensional objects from the human skeleton that was divided into 4 parts of the skull, spine, and ribs, the bone of the upper tool and the bone of the motion of the bottom of the marker. Based on the tests that have been done, it was concluded that a good distance in identifying markers between smartphones with markers is at a distance between 2-6 inches and the marker slope of the smartphone is 0^0-60^0.**

***Keywords*: Augmented Reality; Human Skeletons; Science.**

I. INTRODUCTION

One of the main subjects in the Biology lesson is the introduction of human skeletons. In the learning process, the teacher explains using props. The props that are used certainly have drawbacks that can be damaged either because of the old age, falls and so on. Students can only learn by using props at the school, and cannot use at the home. This problem can be overcome by replacing props with an android based application that uses augmented reality technology.

Augmented reality technology is a technology that combines two-dimensional or three-dimensional worlds with the real world directly [1]. There are two types of augmented reality methods, namely marker-based and markerless. The fundamental difference between these two types is that marker-based requires a marker as a location to place virtual assets, while markerless does not require markers but requires GPS or Compas [2].

The use of augmented reality technology in the field of education has been widely developed, including the use of augmented reality technology as a dinosaur learning medium for early childhood [3]. In the study, the application built was able to project three-dimensional objects from animals or dinosaurs into the real world until the three-dimensional objects appeared to be real in the real world. In the field of chemistry research that has been done was about molecules. Users can convert two-dimensional molecular models into three-dimensional molecular models that can be manipulated [4]. Another research that has been carried out in the field of chemistry was to investigate how students interact with augmented reality and physical models and evaluate students' perceptions of two representations in learning about amino acids [5].

In the world of commerce, augmented reality is also often used as a sales promotion medium such as research that has been done before where the application can project three-dimensional objects of the house being marketed, so users can see the shape of the house from various sides [6].

Research on the development of human skeletal learning media is carried out by Reynoldus Andrias Sahulata et al, where a 3D model of human skeletal is displayed on a smartphone [7]. The study uses Virtual Reality technology, where users are brought into the virtual world. Chien-Huan Chien et al uses augmented reality technology to create interactive learning systems, which help medical students to understand and memorize the anatomical systems of the human body [8].

Multimedia-based learning media can affect the level of students' understanding of the material, can increase activity, creativity for students and teacher [9].

The development of Macromedia Flash learning media in the physics lesson of heat transfer has a positive influence on student achievement that means this media has good criteria [10].

This study aimed to build software that operates on a smartphone with an Android operating system. The application built requires a camera on the smartphone to identify markers. Users simply direct the camera towards the marker and the application will identify the marker, if the marker is identified, then a three-dimensional object from the human skeleton will be displayed

II. METHODE

There were several stages that conducted in this study including system analysis, system design, and Implementation.

A. System Analysis

In the analysis process, some supporting data were collected, the data were in the form of a human skeleton model later formed in a 3D model which was later displayed above the marker, and formed in a 2D model that was used as a marker. The human skeleton used were, skull, sternum, bone of upper motion tool, bone of lower motion tool

B. System design

System design is done to facilitate the process of making the system, where the flow of system creation, the system architecture is explained in the system design.

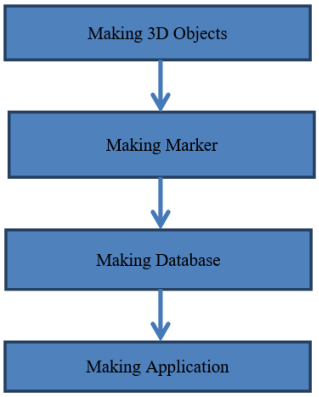

Fig. 1. System Design

Making 3D objects is done using Blender Software, making markers done using Adobe Photoshop Software, making the database done at www.vuforia.com, making the application using Unity 3D software.

Furthermore is making a system architecture where the architecture explained how the system worked to be designed.

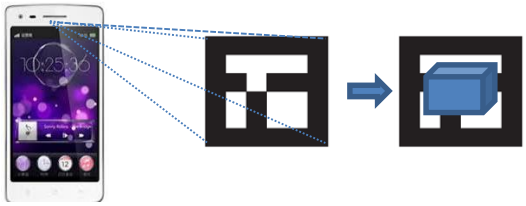

Fig.2. System Architecture

The Fig.2 above shows that the application that is designed requires a camera on the smartphone when the camera is directed towards the marker and marker successfully identified, the 3D object will be displayed above the marker

C. System Implementation

At this stage is the implementation stage of the system design which starts from making 3D objects. The following is the result of making a 3D human skeleton object

1. Skull 3D Object

The Skull 3D objects created later are displayed above the marker when the application successfully identifies marker_a. The following is a 3D skull object figure

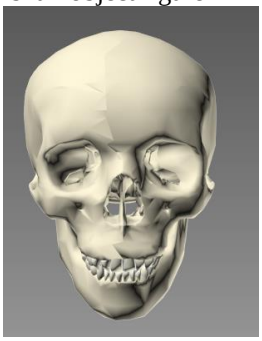

Fig. 3. Skull 3D Object

2. Sternum 3D Object

The Sternum 3D Object created later is shown above the marker when the application successfully identifies marker_b. The following is a 3D object figure of the sternum

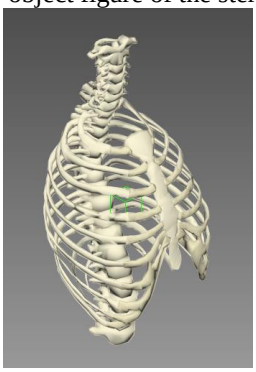

Fig. 4. Sternum 3D Object

3. 3D Object bone of upper motion

The 3D Object bone of upper motion created later is displayed above the marker when the application successfully identifies marker_c. The following is a 3D object figure of 3D Object of upper motion

Fig. 5. 3D Object bone of upper motion

4. 3D Object bone of lower motion

The 3D object of the lower motion tool created later is displayed above the marker when the application successfully identifies marker_d. The following is a figure of 3D object bone of lower motion

Fig. 6. 3D Object bone of lower motion

After making a 3D object, the marker was then made. This study used 4 markers where the marker represented four parts. The marker used was marker_a which functioned as a three-dimensional object marker for Skull, marker_b which functioned as a three-dimensional object marker of the spine and ribs, marker_c which functioned as a marker for the three-dimensional object of the bone of upper motion, and marker_d as a three-dimensional object marker for the bone of lower motion. Here are the marker figures used.

5. Marker_a

When marker_a was identified by the application, the application projected a three-dimensional object from the skull above the marker and if marker_a is removed from the camera's range, the three-dimensional object of the skull would disappear from the marker.

Fig. 7. marker_a

6. Marker_b

When marker_b was identified by the application, the application projected a three-dimensional object from the spine and ribs above the marker and if marker_b was removed from the camera's range, the three-dimensional object of the spine and ribs will disappear from the marker

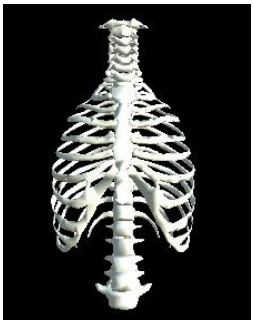

Fig. 8. marker_b

7. Marker_c

When marker_c was identified by the application, the application projected a three-dimensional object from the bone of the upper motion tool above the marker and if marker_c was removed from the camera's range, the three-dimensional object of the upper bone motion tool would disappear from the marker

Fig. 9. marker_c

8. Marker_d

When marker_d was identified by the application, the application projected a three-dimensional object from the upper lower tool bone above the marker and if marker_d was removed from the camera's range, the three-dimensional object of the lower bone would disappear from the marker

Fig. 10. marker_d

III. Result and Discussion

This study produced an Android-based software that utilized augmented reality technology with marker-based methods. In this study, unity tools were used as editors, C # as a programming language, and Vuforia SDK as an augmented reality library. The results of this study were:

A. Display marker_a scan result

When the application successfully recognized the marker_a pattern, the application projected a three-dimensional object of the skull above the marker. The following is a display image when a three-dimensional skull object was projected above marker_a.

Fig. 11. Display marker_a scan result

B. Display marker_b scan result

When the application successfully recognized the marker_b pattern, the application projected a three-dimensional object of the spine and ribs above the marker. The following is a display image when a three-dimensional object of the spine and ribs was projected above marker_b.

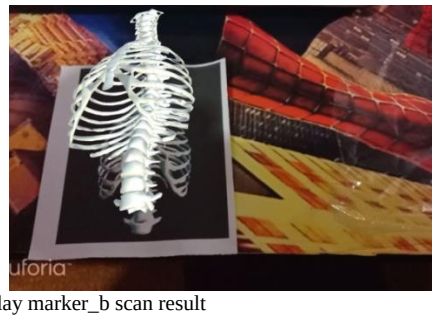

Fig. 12. Display marker_b scan result

C. Display marker_c scan result

When the application successfully recognized the marker_c pattern, the application projected the three-dimensional object of the upper motion tool above the marker. The following is a display image when the three-dimensional object of the upper motion tool was projected above marker_c.

Fig. 13. Display marker_c scan result

D. Display marker_d scan result

When the application managed to recognize the marker_d pattern, the application projected the three-dimensional object of the lower tool bone above the marker. Following is the display image when the three-dimensional object of the lower motion tool was projected above marker_d.

Fig. 14. Display marker_d scan result

E. Testing

After designing and making the application, then the testing of the application that has been built was conducted. The first test was done by testing the marker level with a smartphone. The results of the tests that have been done can be seen in the table below:

Table 1
The result of marker_a distance

No	Distance(Inc)	Result
1	1	Three-dimensional object disappear
2	2	Three-dimensional object disappear
3	3	Three-dimensional object appears
4	4	Three-dimensional object appears
5	5	Three-dimensional object appears
6	6	Three-dimensional object disappear
7	7	Three-dimensional object disappear
8	8	Three-dimensional object disappear
9	9	Three-dimensional object disappear
10	10	Three-dimensional object disappear

In marker_a distance testing, it was found that at distances 1 and 2 Inc three-dimensional objects was disappeared which means that the application cannot identify marker_a. at a distance of 3.4.5 Inc a three-dimensional object appears which means that the application successfully identifies marker_a. at a distance of 6,7,8,9,10 three-dimensional objects was disappear which meant the application could not identify markers

Tabel 2
The resulting testing marker_b distance

No	Distance(Inc)	Result
1	1	Three-dimensional object disappear
2	2	Three-dimensional object appears
3	3	Three-dimensional object appears
4	4	Three-dimensional object appears
5	5	Three-dimensional object appears
6	6	Three-dimensional object appears
7	7	Three-dimensional object appears
8	8	Three-dimensional object disappear
9	9	Three-dimensional object disappear
10	10	Three-dimensional object disappear

In marker_b distance testing, it was found that at a distance of 1 Inc a three-dimensional object disappeared which means that the application cannot identify marker_b. at a distance of 2,3,4,5,6,7 Inc a three-dimensional object appears which means that the application successfully identifies marker_b. at a distance of 8,9,10 three-dimensional objects was disappear which meant the application could not identify markers.

Tabel 3
The result of marker_c distance

No	Distance(Inc)	Result
1	1	Three-dimensional object disappear
2	2	Three-dimensional object appears
3	3	Three-dimensional object appears
4	4	Three-dimensional object appears
5	5	Three-dimensional object appears
6	6	Three-dimensional object disappear
7	7	Three-dimensional object disappear
8	8	Three-dimensional object disappear
9	9	Three-dimensional object disappear
10	10	Three-dimensional object disappear

In marker_c distance testing, it was found that at a distance of 1 Inc a three-dimensional object disappeared which means that the application cannot identify marker_c. at a distance of 2,3,4,5 Inc a three-dimensional object appears which meant that the application successfully identifies marker_c. at a distance of 6,7,8,9,10 three-dimensional objects was disappear which means the application could not identify markers.

Tabel 4
The result of marker_d distance

No	Distance(Inc)	Result
1	1	Three-dimensional object disappear
2	2	Three-dimensional object appears
3	3	Three-dimensional object appears
4	4	Three-dimensional object appears
5	5	Three-dimensional object appears
6	6	Three-dimensional object appears
7	7	Three-dimensional object disappear
8	8	Three-dimensional object disappear
9	9	Three-dimensional object disappear
10	10	Three-dimensional object disappear

In marker_d distance testing, it was found that at a distance of 1 Inc a three-dimensional object disappeared which means that the application cannot identify marker_d. at a

distance of 2,3,4,5,6 Inc a three-dimensional object appears which means that the application successfully identifies marker_d. at a distance of 7,8,9,10 three-dimensional objects was disappear which meant the application cannot identify markers.

The next is testing the marker tilt toward smartphones. Testing was carried out to determine the ability of the application in identifying markers in a tilted position. The distance between the marker and the camera is 6 inc. The following are the results of the marker tilt test.

Tabel 5
The result of marker_a slope test

No	Slope(^{0})	Slope
1	5	Three-dimensional object appears
2	10	Three-dimensional object appears
3	20	Three-dimensional object appears
4	30	Three-dimensional object appears
5	40	Three-dimensional object appears
6	50	Three-dimensional object appears
7	60	Three-dimensional object appears
8	70	Three-dimensional object disappear
9	80	Three-dimensional object disappear
10	90	Three-dimensional object disappear

In the marker_a Slope test, it was found that on the surface 5^0-60^0 three-dimensional objects appeared which meant that the application could identify marker_a. on the slope of 70^0-90^0 three-dimensional objects was disappear which meant that the application did not succeed in identifying marker_a.

Tabel 6
The result of marker_b slope test

No	Slope(^{0})	Result
1	5	Three-dimensional object appears
2	10	Three-dimensional object appears
3	20	Three-dimensional object appears
4	30	Three-dimensional object appears
5	40	Three-dimensional object appears
6	50	Three-dimensional object appears
7	60	Three-dimensional object appears
8	70	Three-dimensional object disappear
9	80	Three-dimensional object disappear
10	90	Three-dimensional object disappear

In the marker_b Slope test, it was found that on the slope of 50-600 three-dimensional objects appeared which meant that the application could identify marker_b. on the slope of 700-900 three-dimensional objects was disappear which meant that the application did not succeed in identifying marker_b.

Tabel 7
The result of marker_c slope test

No	Slope(^{0})	Result
1	5	Three-dimensional object appears
2	10	Three-dimensional object appears
3	20	Three-dimensional object appears
4	30	Three-dimensional object appears
5	40	Three-dimensional object appears
6	50	Three-dimensional object disappear
7	60	Three-dimensional object disappear
8	70	Three-dimensional object disappear
9	80	Three-dimensional object disappear
10	90	Three-dimensional object disappear

In the marker_c Slope test, it was found that on the slope 50-400 three-dimensional objects appeared which meant that the application could identify marker_a. on the slope of 500-900 three-dimensional objects was disappear which meant that the application failed to identify marker_c.

Tabel 8
The result of marker_d slope test

No	Slope(^{0})	Result
1	5	Three-dimensional object appears
2	10	Three-dimensional object appears
3	20	Three-dimensional object appears
4	30	Three-dimensional object appears
5	40	Three-dimensional object appears
6	50	Three-dimensional object appears
7	60	Three-dimensional object disappear
8	70	Three-dimensional object disappear
9	80	Three-dimensional object disappear
10	90	Three-dimensional object disappear

In the marker_d Slope test, it was found that in the slope of 50-500 three-dimensional objects appeared which meant that the application could identify marker_a. on the slope of 600-900 three-dimensional objects was disappear which meant that the application failed in identifying marker_c.

IV. CONCLUSION

In this study, the application could project 3-dimensional objects from human skeletons which were divided into 4 parts according to their respective markers. Based on the results of the tests, it was concluded that the good distance between markers and smartphones in the process of identifying markers was at a distance between 2 to 6 Inc. If the distance of camera to the marker was too close or too far, the marker could not be identified.

V. ACKNOWLEDGMENT

thank you to the lecturers and students who have helped in this research starting from the process of making the application to the application testing process.

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APPLICATION DESIGN OF THE MEDICINES USAGE PREDICTION BASED ON BACKPROPAGATION NEURAL NETWORK METHOD AND PHP

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***Abstract*—The development of information technology makes many organizations utilizing it in their business process. For example, hospitals use certain information systems in medicine management. We observe that most medicines applications do not provide the drug usage prediction feature so that this situation causes the hospital staff being difficult in providing enough medicines. Therefore, in this experimental research, we developed an application in the form of a simple design for helping the hospitals in predicting daily medicine usage. This application also provides medicines stock management and doctor diagnosis features. The Brainy library is used to facilitate implementing the backpropagation neural network method in PHP programming language. We choose PHP because this server script is widely used in information system development. We demonstrated that the mock-up as the result of this development is able to work properly. For further study, we suggest expanding this mock-up become a full hospital information system that covers many functions in medical centers.**

***Keywords*: Medicine usage prediction; Neural network; PHP.**

I. INTRODUCTION

In this decade, most hospitals use certain information systems in managing their resources, such as finance, medicines, and staff [1]. Medicines management is one of the most critical sectors in the medical center because it is directly related to the patient's recovery. If it is out of stock, definitely the treatment of the patients will be chaotic. To avoid the risk of running out of stock of medicines and consumables, hospitals generally make simple predictions themselves about their usage for medical materials for the next few days. In addition to being inaccurate, this method is very troublesome because there are so many types of drugs and medical materials in which the needs of each type of drug are certainly different. Thus, a complete information system is needed with a system that is able to predict the usage of drugs and medical materials.

At present several studies have developed prediction systems to be applied in numerous cases with various method approaches or algorithms. From several well-known artificial intelligence methods, Backpropagation Neural Network is the best because it has been proven to have a high degree of accuracy. This method must be trained repeatedly with the appropriate input and output examples so that it can recognize patterns and obtain the weight and bias of each node with the smallest error [2]. Several studies have successfully applied the Backpropagation Neural Network model to produce an accurate prediction system. For instance, [3] researched the car sales forecasting system using artificial neural networks and certainty factor which will be utilized as an effective way to increase company profits. From the test results, the error results obtained from the accuracy of the prediction system built by 4.205%. Another example, [4] developed a system that predicts foreign tourist arrivals using recurrent neural network backpropagation through time method.

Because of its accuracy, this research will propose a medicine usage prediction system using Backpropagation Neural Network that is implemented in PHP programming language. By utilizing this prediction system, institutions providing health facilities will receive a warning when the stock of drugs and medical materials will run out the next few days so that examination and treatment of patients will not be disrupted.

II. BACKPROPAGATION NEURAL NETWORK

Neural Network is a mathematical model that works following the way of the brain where the model must be trained with certain patterns before it can be used [5]. The main purpose of the neural network computing is to develop mathematical algorithms that enable to learn by imitating information processing and knowledge acquisition in the human brain. The simple model of the neural network is as follows.

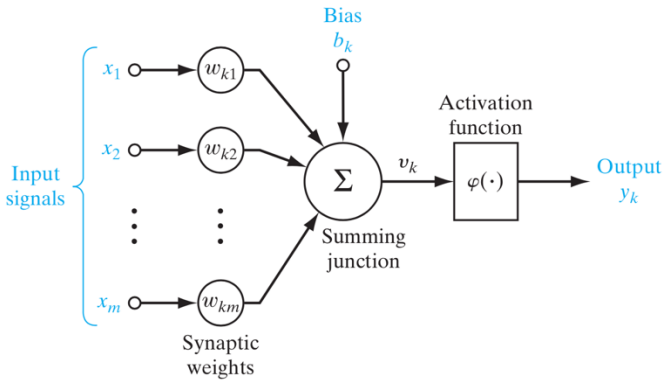


Fig. 1. The illustration of the neural network that captured from [6]

In the figure above, we can see that the neural network model consists of several input signals that will be multiplied with their respective weights. Then the multiplication results and the bias value are added up and calculated based on the activation function. For more detail, the illustration in figure 1 can be formulated as follow.

$$y_k = \varphi\left(\sum_{i=0}^{m} w_{ki} x_i\right) \quad (1)$$

Generally, in order to give an accurate prediction, the weight values in the neural network must be trained with a training algorithm, such as the Backpropagation algorithm. In this algorithm, there are two steps in training the model, namely [7]:

1. The forward phase is the step when the output value is calculated based on the formulation (1) above with previous weight values. The weight values are set to random when initializing step.
2. The backward phase is the step when the weight values are adjusted based on how much difference (error) between the training value and the output value from the forward phase.

III. System Design

In this chapter, we design the medicine usage prediction system that consists of two applications that are connected through a cloud server.

A. System Overview

The system to be designed is a combination of 2 applications, namely medical record application and prediction application. The medical record application is filled in by the doctor to store data on patient complaints, disease diagnoses, and prescription drugs and medical materials provided. The patient data is stored and then will be processed by the application of prediction of drug needs and medical materials to predict drug needs for the next day based on its prior week usage.

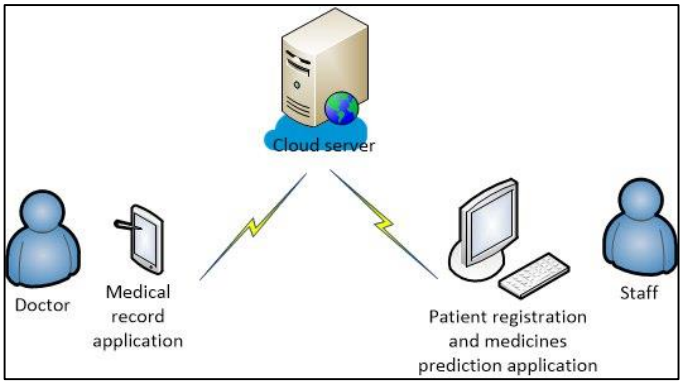


Fig. 2. The system overview

Applications built in the form of a combination of web-based applications and android-based applications. The web application is used by hospital employees or operators to record new patients and see predictions of drug needs. While the android application is used by doctors to record the results of medical recordings. Before use, employees and doctors must register with the administrator and log in to enter the system.

B. System Workflow

The flow of using this system is as follows. When the patient arrives at the restaurant, the operator of the hospital or clinic will receive him and record the patient's identity. Furthermore, the system will store personal data and complaints to the cloud server, and will automatically send notifications to the doctor's application using Firebase push notification technology. The doctor who receives the notification will then examine the patient and enter the examination results into an Android application that has been connected to the system. Finally, patients take the drug at the pharmacy in accordance with the prescription written by the doctor. With all the data that has been recorded, the operator can see the number of drug transactions and the status of drug requirements for tomorrow.

IV. Result

Based on the system design, we succeed to build two applications as below. We use PHP programming language [8], Brainy library [9], and MySQL database [10] for the server implementation. Please note, because they are aimed at Indonesian users, the applications use Indonesian in the entire user interface.

A. Patient Registration

When the user successfully enters the system as an operator, the application will load the homepage that displays the main information in the form of a patient waiting list and a list of patients that have been handled by the doctor. Patients who are still on the waiting list can make a change of doctor. To add a patient, either a new patient or a patient who has been treated before, the operator presses the green '+ Rekam Medis' button.

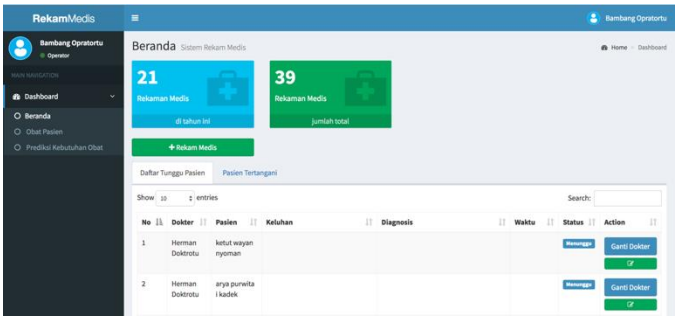
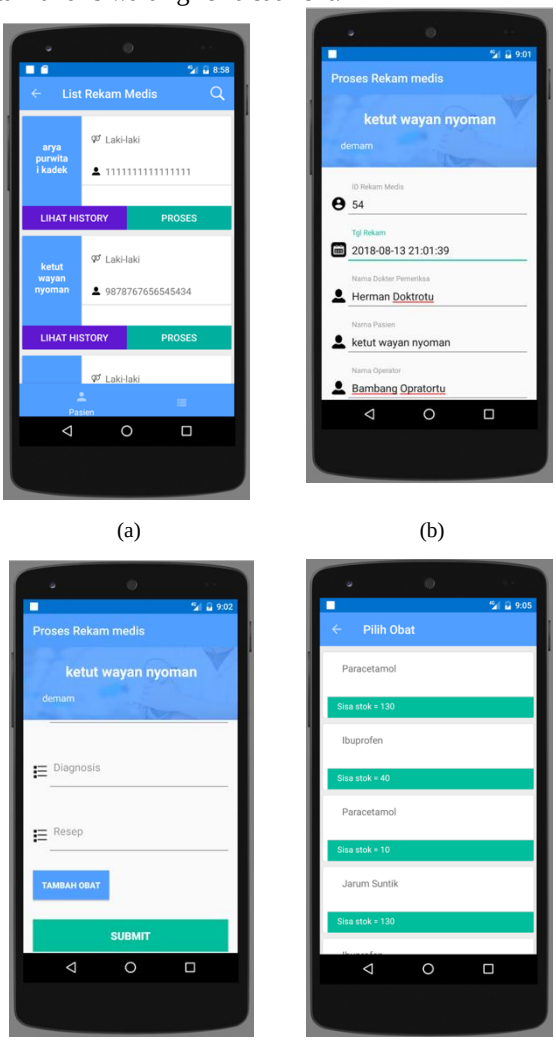


Fig. 3. The homepage

B. Medical Record

Doctors in this system have a role to conduct examinations, diagnose diseases, and prescribe medication for patients. To begin using this application, the doctor logs in to the Android application. If successful in logging in, the doctor will see a

page that contains a list of patients he must handle. The doctor also will get a notification when a new patient is registered by the staff and is waiting for treatment.



(a) (b)

(c) (d)

Fig. 4. The doctor page

From the patient's waiting list (figure 4.a), the doctor presses the 'Proses' button to begin the examination of the patient. The doctor examines the patient and fills in temperature, weight, height, blood pressure, diagnosis of disease, and prescription medication. To enter details of the drug to be given, the doctor presses the 'Tambah Obat' button and selects what medication to be given, along with the amount of the drug.

C. Usage Prediction

To see how the prediction of drug needs and medical materials tomorrow at the health center, the operator can select the 'Prediksi Kebutuhan Obat' menu located on the left side of the screen. Then a list of drugs and medical materials will appear which is owned by the health center, but the prediction shown is still empty. To run the prediction calculation process, the operator presses the 'Jalankan Perhitungan Prediksi' button in blue. This process only needs to be run once a day, so when the operator opens this page again, the prediction data will already be filled. However, when the day changes, the data will again be displayed blank so the operator needs to press the button again so that the calculation process runs to predict the need for the next day.

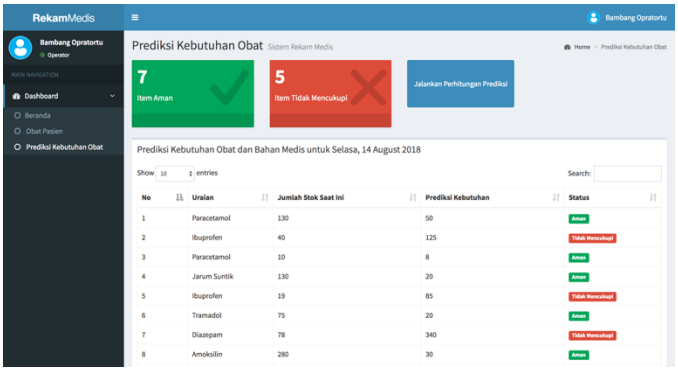


Fig. 5. The usage prediction page

D. System Testing

System testing is a stage to find errors or bugs in software that has been built before the system is widely used [11]. At this stage, the prediction system will be evaluated by means of a functionality test. This test aims to check whether the overall functionality or menus on the system can work well or not. The following are the results of system testing on a 2015 MacBook Pro laptop with the macOS High Sierra operating system, a 2.9 GHz Intel Core i5 processor, and 8 GB of 1867 MHz DDR3 memory.

TABLE I
Test results for functionality

No	Function	Result
1	Login	Running
2	Logout	Running
3	Patient registration	Running
4	Sending notification into Medical Record Application	Running
5	Saving patient diagnosis	Running
6	Medicines Need Prediction	Running

V. Conclusion

Based on the results and discussion that has been presented in section IV above, we conclude that this study succeeded in developing a prediction system in a hospital that is able to integrate the several business processes at the hospital or clinic, starting from the patient registration process, the process of recording disease diagnoses and until the process of predicting drug needs. For further study, we recommend expanding this mock-up application become a full hospital information system that covers entire functions in the medical center.

VI. ACKNOWLEDGMENT

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INTEGRATION OF PARTICIPATORY MAPPING, CROWDSOURCING AND GEOGRAPHIC INFORMATION SYSTEM IN FLOOD DISASTER MANAGEMENT (CASE STUDY CILEDUG LOR, CIREBON)

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***Abstract*-- Ciledug Lor is a flood-prone area in Cirebon Regency. Flood disaster management can empower the community through participatory mapping and crowdsourcing activities. This study aims to analyze the level of floods, threats, vulnerabilities, capacities, risks and refuge locations in Ciledug Lor Village based on participatory mapping, crowdsourcing, and GIS. Various indicators of threat, vulnerability, and flood capacity are obtained from field surveys, open data and official data that have been given a value and weight which are then processed using overlay analysis to obtain flood risk parameters. Determination of refuge locations used network analysis to find out the route, distance, and effective time. The results analysis and modeling showed the average flood level in Ciledug Lor reached 2.27 meters. The refugee location for *Dusun* Pamosongan and *Dusun* Kampung Baru are to the north close to the railway tracks. Meanwhile, *Dusun* Karanganyar and *Dusun* Genggong are in the Ciledug Bus Terminal. In the future, participatory mapping, crowdsourcing, and GIS are expected to build awareness and resilience of disaster.**

***Keywords*: Crowdsourcing; Flood disaster management; GIS; Participatory mapping**

I. INTRODUCTION

Disasters are natural phenomena that cause and have potential harm to humans. Lack of preparedness in handling and mitigating contributes to the potential economic loss after a disaster [1]. The top-bottom perspective of disaster management triggers an apathetic community, even though the increasing trend of potential disasters by anthropogenic activities that require sustainable environmental management. Disasters are learning tools for the community and related parties to shape awareness and resilience by involving available resources and technology [2].

Productive human resources need to be empowered in participatory disaster management efforts. Today, the productive age group has the provision of knowledge and responsiveness to the development of mobile smartphone-based information technology in the community [3]. Mobile smartphone ownership has become a basic need of the productive age group and will continue to increase every year [4]. Many government agencies such as BNPB, BPBD, and BMKG provide disaster information through social media networks in a short time because supported by telecommunications networks, and able to strengthen resilience for the community forward in a positive direction [5] [6]. This phenomenon indicates that disaster communication and community empowerment to respond to disasters have bright prospects for development by following the development of digital technology.

As an archipelago country located in the equatorial zone and a meeting between the world's tectonic plates, Indonesia has high disaster potential and requires the active role of the community as the main agent of mitigation. Disaster locality was better identified through crowdsourcing between the local government community and stakeholders as driving agents [7] [8]. Smartphone has many sensors such as the Global Navigation Satellite System (GNSS), gyro-compass, motion sensors, geo-tagging cameras, and clinometer can be used to collect disaster data as part of decision making [9] [10]. Smartphone utilization produces spatial data and its attributes have better results when combined with open data from credible agencies [11]-[13]. State agencies in Indonesia namely BNPB, KLHK, KemenPUPR, LAPAN, and BMKG providing online spatial and free used to support disaster analysis [14]. If needed foreign agencies such as USGS (US), NOAA (US), and ESA (European Union) have open data with similar mechanisms of Indonesian agencies.

Requirements geospatial data through The Indonesian Law 04/2011of Geospatial Information causing several open data is unable to use – the detailed spatial analysis a village, *dusun*, or hamlet (RW) units need the spatial resolution of 8 to 30 square meters. Besides that, data procurement solutions through terrestrial surveys and aerial photographs based on UAV require skilled resources and costly, so participatory mapping and crowdsourcing are the best choices according to local needs and characteristics [15]. Participatory mapping is an interactive method of documenting spatial information by the community to regional development [16].

Participatory mapping needs support crowdsourcing because the affected community has resources, experiences and mental maps as valuable information [17] [18]. To keep

quality data for disaster analysis, participatory mapping and crowdsourcing require assistance-supervision from other parties. The participatory and crowdsourcing are efficient methods for flood disaster analysis because the observation is limited by meteorological factors. This condition common happens in the Cirebon Regency which has high annual rainfall and located downstream of several watersheds [19]. As a flood-prone area, spatial flood monitoring is limited to synthetic aperture radar (SAR) data. In terms of size and processing time, SAR data utilization requires large resources and unable to analyze flood disasters on a detailed scale.

As a flood-affected area in the Cirebon Regency, Ciledug Lor Village can conduct participatory and post-disaster mapping. The experience, space control, and community resources need to be empowered through local disaster management programs. Scientific collaborations between local governments, communities, NGOs, research institutions, and universities are able to produce data and information based smartphone technology to flood mitigation [20]. This activity can increase disaster understanding, sharing knowledge and strengthen public awareness of the environment while providing valuable data for policymaking and disaster management. Participatory mapping and crowdsourcing in flood disaster management are a collaboration between the Ciledug Lor community, NGOs, and UPI-UNY students (KKN Posdaya Program) in 2019. This activity produced geospatial data and information for flood prevention efforts after processing by the geographic information system (GIS). Therefore, this study aims to analyze flood level, disaster risk and refuge locations in Ciledug Lor Village.

II. METHODS

The research held in Ciledug Lor Village, Ciledug District, Cirebon Regency, West Java, Indonesia. Ciledug Lor known as a flood-prone area and located on the banks of Cisanggarung River. In the latest rainy season, flood disaster entire of the village and this study covered all blocks -four *dusun* and one area of Tanah Bengkok (Figure 1).

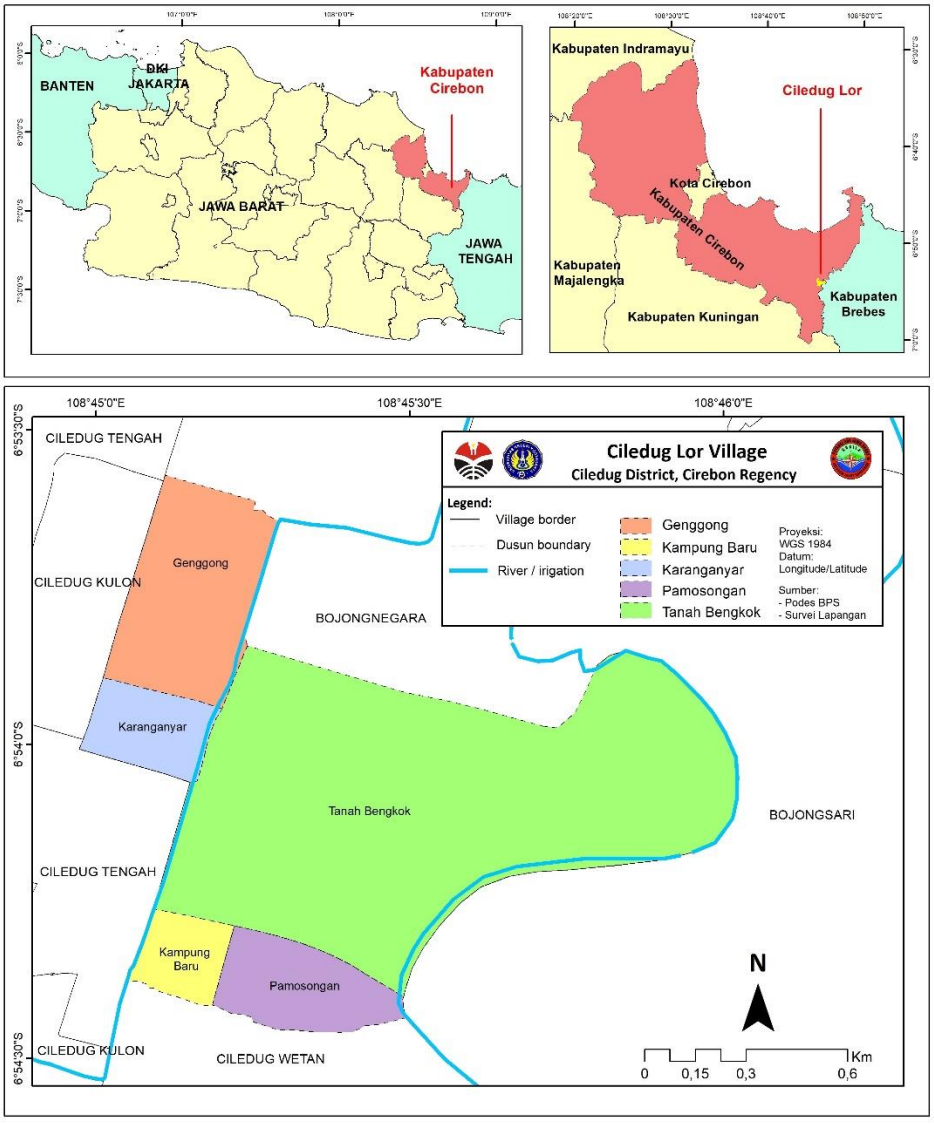

Fig. 1. Research location.

TABLE I
Data acquisition.

Data	Sources		Information
Flood level	1. Participatory mapping 2. Crowdsourcing		Using 44 points (purposive sampling) in Ciledug Lor
Flood risk	Threat	The distance of river/irrigation	*Multiple – buffering*
		Runoff coefficient	Land use map
		Land elevation	BIG DEMNas
		Land slope	*Slope analysis*
		Flood level	Kriging interpolation
	Vulnerability	Number of population and woman	Village monograph
		Road length	HOT OSM and CSRT CNES-Airbus
		Land use	*On-screen digitizing* CSRT
	Capacity	Jumlah sekolah	Village monograph
		Health facilities and workers	Field survey
		Preparedness	Structural interviews
Refuge locations	Participatory mapping		Addition to flood threat map data and structural interviews

A. Tool and Materials

Participatory and crowdsourcing requires several tools and materials such as smartphones, meters, bamboo sticks, instrument sheets, and stationery, whereas spatial analysis needed computers with GIS software (QGIS or ArcGIS) and an internet connection to access open data. Specifically for smartphones device must have a camera and GNNS sensor with an accuracy (spatial distortion) of six meters. Thus, a smartphone capable to capture a minimum of two navigation satellite systems signal namely GPS, GLONASS, Beidou, Galileo, QZSS or others [14]. Checking and calibration for a smartphone can use free software such as Polaris Navigator, Mobile Topographer or GPS Test for Android OS and GPS Maps for Apple IOS.

Data about the flood in Ciledug Lor was obtained through a structured interview. The data collection team consisted of elements of KKN Posdaya UPI-UNY, local community, disaster volunteer, and the village government. Participatory mapping begins with created *dusun* and hamlet boundaries based on the community's spatial knowledge and perceptions through digitizing high-resolution satellite imagery, while crowdsourcing is carried out information about the flood to determine disaster parameters. In addition, flood disaster management efforts also utilize several secondary data from CNES-Airbus high-resolution satellite imagery, Sentinel-1 SAR images, National DEM (BIG DEMNas), annual village monographs, OSM transportation networks, hydrographic chart, and PODES (see Table I). The various data were analyzed using GIS to produce geospatial information.

B. Analysis Methods

Flood level data is obtained through participatory mapping on 44 observation points. The measurement sets 10 points for each *dusun* and four points in crooked land block. Latest flood level data equipped with disaster photos from the community. The flood level data were interpolated using Kriging's geostatistical method because relatively better than others according to mean error (ME), root mean square error (RMSE), and r^2 [21]. The interpolation results set a pixel size of 0.5 x 0.5 meters. Flood level data is the main information to flood risk analysis.

Flood risk analysis using several aspects included threat, vulnerability, and disaster capacity (see Table II). The flood threat was obtained from several indicators such as elevation, slope, distance to river or irrigation, and run-off [22]. In this study, indicators of rainfall and soil texture (infiltration) are considered constant. For flood vulnerability, several indicators are anthropocentric and refer to human activities [23] [24]. Flood capacity analysis in used indicators of school number, health facilities or workers, and flood disaster preparedness, so the indicators can be adjusted to locality [25]. After that, flood disaster risk generated by a union and intersect overlay analysis based on Equation 1.

$$FR = \frac{T \times V}{C} \quad (1)$$

where FR is flood risk, T is a threat, V is vulnerability and C is capacity.

Meanwhile, the determination of refuge locations in Ciledug Lor considering the flood threat and evacuation route efficiency. Evacuation route determination utilizes network analysis based on disaster hazard criteria, road length and travel time [26]. This analysis also determines several temporary assembling points in each *dusun* to facilitate the community conducting the rescue.

III. RESULT AND DISCUSSION

A. Flood Level

Participatory flood level measurements are verified with photo data (geotagging) and SAR imageries to find out the footprint. Internal (*dusun* and RW) boundary of Ciledug Lor results of participatory mapping were used to facilitate flood disaster analysis. The food level average of the village reached 2.27 meters with a maximum level of up to 6.96 meters. Kriging interpolation has ME -2.67 cm, RMSE 20.58 cm, and r^2 0.95. The error value of the model was relatively lower than the IDW and Spline interpolation. The Kriging model also has a very high correlation between measured flood level and spatial estimation result.

TABLE II
Score and weight in flood disaster management of Ciledug Lor.

Flood risk aspect	Indicators	Information	Score	Weight
Threat	Distance of river / irrigation	0 – 50 m, > 50 – 100 m, > 100 – 250 m, > 250 – 500 m and > 500 m	1 – 5	25
	Runoff coefficient	0.10 – 0.30, 0.15 – 0.25; 0.20 – 0.40, 0.30 – 0.5 and 0.50 – 0.75	1 – 5	20
	Land elevation	0 – 2 m, > 2 – 6 m, > 6 – 11 m, > 11 – 13 m and > 13 m	1 – 5	15
	Land slope	0 – 8 %, > 8 – 15 %, > 15 – 25 %, > 25 – 40 % and > 40 %	1 – 5	10
	Flood level	0 - 25 cm, > 25 - 100 cm, > 100 - 200 cm, > 200 - 500 cm and > 500 cm	1 – 5	30
Vulnerability	Number of population	< 400, > 400 – 600, > 600 – 800, > 800 – 1000 and > 1000 persons	1 – 5	35
	Number of woman	< 200, > 200 – 300, > 300 – 400, > 400 – 500 and > 500 persons	1 – 5	30
	Road length each *dusun*	0 – 1500 m, > 1500 – 2000 m, > 2000 – 2500 m, > 2500 – 3000 m and > 3000 - 4500 m	1 – 5	15
	Land use	Water bodies, brushland, plantations, polyculture, cornland, onion land, paddy field, and built-up area	1 – 5	20
Capacity	Number of school	Not yet, 1 – 2 units, 3 – 4 units, 5 – 6 units and > 6 units	1 – 5	20
	Health facilities and workers	Not yet, 1 person, 2 – 3 persons, 4 – 5 persons and > 5 persons	1 – 5	30
	Preparedness	0 – 39 %, 40 – 54 %, 55 – 64 %, 65 – 79 % and 80 – 100 %	1 – 5	50

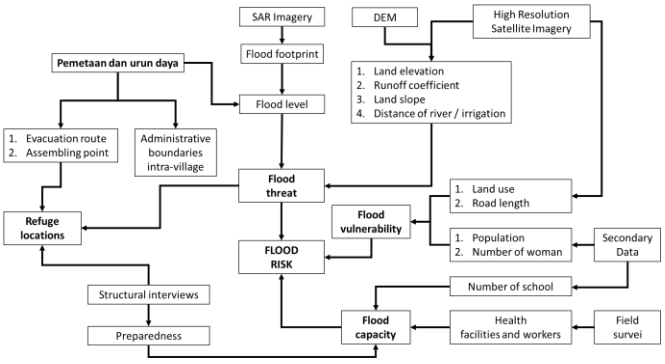

Fig. 2. Research schema.

In terms of distribution, the flood level of the village has a higher pattern in eastward approaching Cisanggarung River. The higher flood level located in *Dusun* Pamosongan and entirely inundated, although this area is known as settlement concentration. The different condition happens in *Dusun* Genggong dan *Dusun* Karanganyar got a benefit form railway. Thus, the elevations of these areas are relatively higher than the surrounding. Variations of floods exist in Tanah Bengkok with an average level of more than one meter. Referring data and information of flood (see Figure 3), *dusun* in the southern and eastern of Ciledug Lor have higher flood levels causing geographically conditions.

B. Flood Risk

Biophysical indicators of flood hazard adjusted by these characteristics, where land elevation and slope can strengthen the results of the flood analysis level which been obtained previously [19]. Land elevation from DEMNas reclassifies into five classes, DEMNas also used to determine the slope value (flood parameters can be accessed on https://bit.ly/2zwOWTg). The analysis showed that *Dusun* Kampung Baru and *Dusun* Pamosongan had the highest level of flood risk (Figure 4e). A Different condition happens in *Dusun* Genggong, it has the lowest risk because located in the northern of Ciledug Lor –Tanah Bengok is uninhabited.

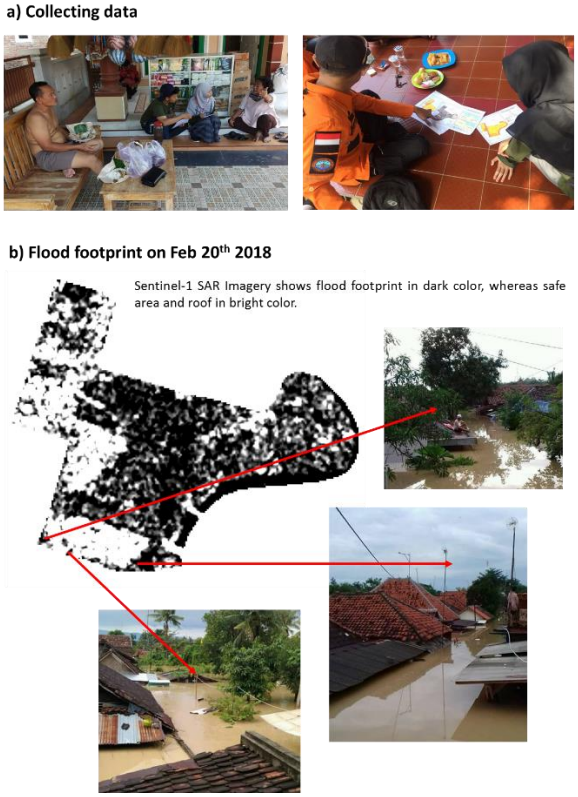

Fig. 3. Data collection and flood footprint.

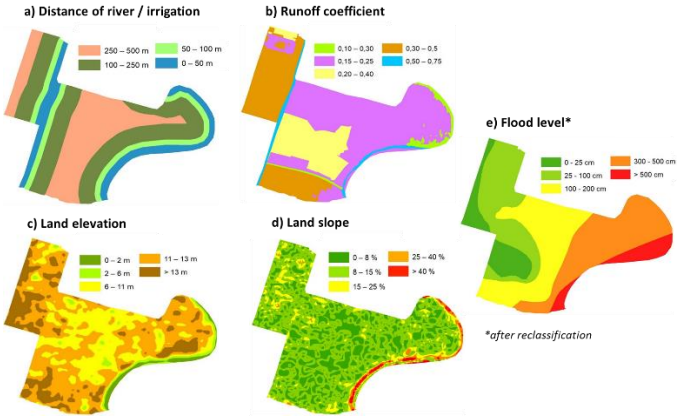

Fig. 4. Flood threat indicators.

In the flood risk parameters, vulnerability as conditions that determine hazard potentials for the community. In Ciledug Lor, it is composed of the total population, women number, road length, and land use, these indicators combined using overlay analysis to produce a flood vulnerability map (Figure 5b). The highest flood vulnerability occurred in *Dusun* Genggong and *Dusun* Pamosongan. Flood vulnerability has a centralized pattern following anthropocentric indicators, thus Tanah Bengkok has the lowest vulnerability to flooding. In addition, threat and vulnerability are directly proportional to disaster risk, capacity is an aspect to reduce the disaster risk levels [27]. Flood disaster capacity compiled on indicators of the number of schools, health facilities or workers, and community preparedness. The selection of indicators is based on consideration of its potential to reduce disaster risk (see Figure 5c).

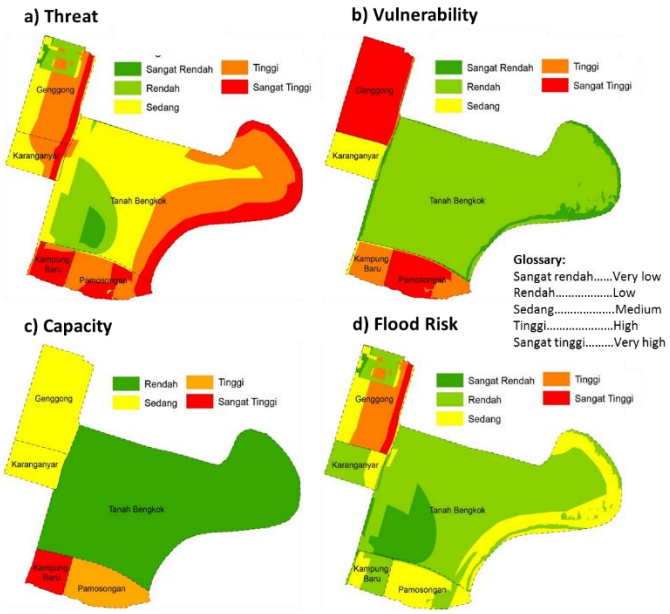

Fig. 5. Flood risk in Ciledug Lor.

Dusun Kampung Baru has the highest flood capacity in Ciledug Lor. High preparedness of them is caused by the learning from disaster experience [28]. This condition appeal related to the presence of formal educational institutions and access to health facilities or workers. If all aspects of the risk have been fulfilled, the flood disaster risk analysis results theoretically can be done. The highest risk of flood disaster occurred in *Dusun* Genggong (Figure 5d). Although located close to *Dusun* Genggong, *Dusun* Karanganyar has a different condition because of the area mostly safe from flood disaster risks. When considering land ratio, Tanah Bengkok relatively safer area than other areas because the threat and vulnerability are lower.

C. Refuge Locations

Participatory mapping and crowdsourcing also produced information about flood refuges in Ciledug Lor based on existing flood levels, land elevation, area capacities, and knowledge of the affected communities. The locations are safe and able to accommodate many refugees. Suitable locations at the north of *Dusun* Pamosongan and *Dusun* Karang Baru, precisely close to the railway. For *Dusun* Karang Anyar and *Dusun* Genggong, refuges location located in Ciledug Bus Terminal. Besides that, many temporary assembling points have been established at the houses of the hamlet (RW) leader, thus easily the community to move together towards the refugee locations (Figure 6).

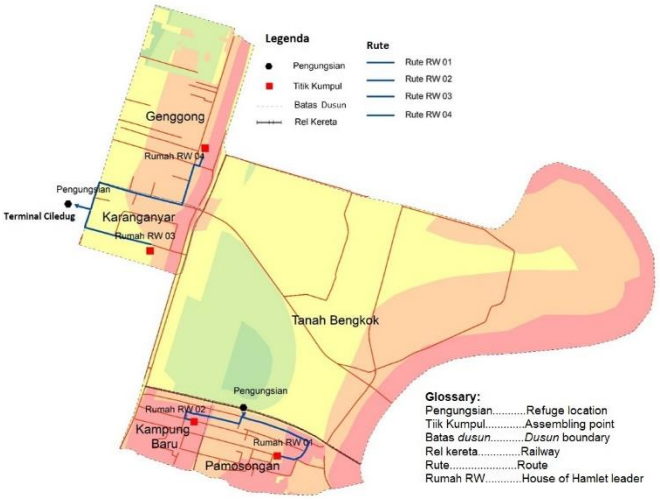

Fig. 6. Refuge locations and evacuation routes.

If assembling points and evacuation routes have been established, an evacuation route takes based on effective distance and time. The network analysis using GIS shows the effective route from *Dusun* Pamosongan to the refugee location is 387.48 m which can be taken in 48.43 seconds. Meanwhile, accessed from *Dusun* Kampung Baru reach 270.29 m and 33.78 seconds. Differences in refugee locations for the community in each *dusun* cause the route length and travel time varies. For *Dusun* Karanganyar designated refugee location has a distance of 296 m and takes 37 seconds from the assembling point, while for *Dusun* Genggong has a distance of 597.97 meters and travel time 74 seconds.

Ciledug Lor is strengthening resilience through the

dissemination of disaster information resulting from participatory mapping and crowdsourcing. Disaster information which includes flood levels, threats, vulnerability, capacity, risk, and refuge location in each *dusun* and hamlet is needed (Figure 7). In addition, six pieces of water level observation instruments (TMA) were also placed to carry out better data and information collection about floods through crowdsourcing. Participatory mapping and crowdsourcing are practical learning from disaster utilizing smartphone technology as an effort to form awareness and active participation because flood triggers large potential losses, especially socio-economic.

Fig. 7. Dissemination of disaster information with TMA installation as part of flood disaster management in Ciledug Lor.

IV. Conclusion

Participatory and crowdsourcing in Ciledug Lor produced many useful data and information for flood disaster management. These activities generate information about flood level, threats, vulnerability, capacities, risks, and refuge locations that involve active participation. Utilize smartphone technology and geographic information system (GIS) produces the latest data and information to decision making. Participatory mapping and crowdsourcing have to be developed as an alternative in flood management efforts in Indonesia. Widespread smartphone ownership in the community which supported by telecommunications networks (Kominfo RI) and adequate education is a resource to strengthen disaster resilience.

V. Acknowledgment

This research was supported by the Ciledug Lor community, the local government, POTSAR Gurila, and KKN Posdaya UPI-UNY for actively participation, ideas, and financial contributions. Many meaningful things to succeed in the program and can not be expressed by words.

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UTILIZATION OF USER GUIDE OF ONLINE SHOPPING APPLICATIONS BY CUSTOMERS IN MAKASSAR CITY

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***Abstract*— The rapid growth of e-commerce is accompanied by an increase in the number of customers of application-based online store. The use of online shopping applications that are not appropriate may cause problems that result in customer losses. This quantitative research is intended to describe the utilization of online shopping application's user guides by the customers in Makassar City. The research uses a descriptive statistic analysis. Data is displayed in the form of graphics and tables and interpreted descriptively. The results showed that the users of online shopping applications in Makassar City were less in using the user guide provided by the online shopping application provider. They preferred to do trial & error, even though they advised other users to read the tutorial. They were more concerned about convenience and simplicity than security issues. Besides, it was also found that those using the out-application-tutorials were more risked experienced problems than those did not use the tutorial at all and/or those used the in-application-tutorials.**

***Keywords*: application; online security; online shopping; user guide; utilization.**

I. INTRODUCTION

In this digital era, the online trading system has been adopted by the people of Indonesia [1], even from year to year, the number of e-commerce users is increasing. In 2006, the number of individual customers reached 19.5 million [2]–[4]. This phenomenon is also accompanied by the growth of online stores in various formats. These shops compete with each other to become the customer's top choice in shopping.

One healthy way to compete is to guarantee the quality of the website, which is attractive design, user-friendly, and information that is useful for educating customers. These things can also encourage customer loyalty [5]–[7] because customers will be happy if they can make transactions well, smoothly and safely [8]. From the customer side, they need the understanding to use these applications, because basically humans who interact with a system, both related to hardware and software, require adequate knowledge to operate it [9].

The interdependence relationship between online stores and consumers can be bridged through good communication between the two parties. Communication can be established by providing customer contact services. Through these services, customers can communicate audio, audio-visual, or text, whether real-time or not. In such two-way communication practices, the discussion can be directly focused on the existing problems. Another method that can be applied is one-way communication, namely the presentation of user guides in the form of technical documents that aim to provide instructions for using the system to the user. These things are information obtained from the system. In addition, knowledge can also come from outside the system [10], [11], especially since the opening of the internet as a public facility, people are oriented towards the icon of information and communication technology advancements in terms of information search [12].

In Indonesia, specifically for electronic hardware, an obligation has been set for the industry to create a User Guide in Indonesian, in accordance with Decree of the Minister of Industry and Trade No. 547 / MPP / Kep / 7/2002. It is certainly intended that users can easily understand how to operate these products and to avoid errors in the procedure of using technical tools can cause losses, such as the non-operational use of the features provided [13], equipment damage, and/or users injured. Unlike software such as online applications, regulations have not yet been found to create User Guides, even though the use of non-physical applications can also cause material losses [14]. Fortunately, even if there is no regulation, every online application has been equipped with a help menu for users because it has become a habit of the application makers (see [15], [16]).

However, even if a User's Guide is available, with low interest in reading Indonesians [17], it is very likely that only a few people read it. The assumption was built from the conclusions, which stated that in terms of taking medication alone, people only skimmed about how to drink and the drug expiration date. Not all information presented is read and understood by consumers. Some people memorize and base their practice of taking medicine on certain tutorials, without always reading the instructions provided, so that if there are changes or corrections, they do not know [18].

Taking medicine that is related to life, people don't really care, especially just online transactions, of course, the risk is more neglected. This assumption has been supported by Hidayanto, et al. [1] which states that the trust of Indonesian

people to conduct online transactions is based on the desire to buy and mutual trust, not with consideration of risk. Another thing that makes it possible to not read the User's Guide online shopping application, is the character of internet users who prefer words of mouth [19]–[21].

To prove the truth of this assumption, this study will find out the selection of information sources that are used as references by online shopping customers in Indonesia. In addition, the discussion will be accompanied by a description of the availability, and the formats of the User's Guide.

This research has a link between what was done by Bota, Fourney, Dumais, Religa, & Rounthwaite [22] regarding scanning tutorial search behavior through Microsoft Office's In-application Search applications. They discussed the types of searches carried out, whether through Commands, Document Help or Web Results, while this study wanted to see the tendency of user choices in searching tutorials for using online shopping applications, whether in-application or out-application and seeing the variants.

This research was built in accordance with the assumptions of the Uses & Gratifications Theory, where each person has their own awareness, interests, and motives in choosing the media, so as to application users, they are active audiences [23, p. 104]. Based on its position, the source of information can be selected, classified into two groups, namely: inside and outside the system. Based on the type, sources of information can be grouped into sources in the form of humans, documents, and physical phenomena [10].

The construction of Information Search Theory proposed by Jansen and Rieh [24] also led this research. They argue that information retrieval can be seen from three points of view, namely: information (relating to multi-definitions, hierarchical relationships and relevance of information, as well as the principle of uncertainty), humans (relating to the benefits of information, the principle of least effort, and searching as a process iterative), and technology (relating to channel selection, information capabilities, queries, neutrality, and memex vision).

II. METHODS

To answer each of the problems in this study, a quantitative-descriptive method is used. Due to limited time and budget, this research was conducted from October to November 2019 in Makassar City. The city is considered representative to represent the life of e-commerce in Indonesia because the people's acceptance of the e-commerce system is at a 'high' level [25].

Analysis of the data used is descriptive statistics. Descriptive statistics are statistics used to analyze data by describing collected data as it is, without intending to make generalized conclusions. Variables are allowed to be interconnected in descriptive analysis to determine the existence of a relationship, although it does not need to be tested for significance as in inferential statistics [26, pp. 147–148]. In this study, several variables will be calculated, then displayed in the form of graphs and/or tables, then interpreted according to the purpose of the study.

In the current research, what is meant by sources of information is everything that becomes a place to get the knowledge to run online shopping applications. An open questionnaire survey was conducted to collect data. Respondents were determined as many as 300 people by accidental sampling technique. The number of samples has made it possible for researchers to obtain data in accordance with the theorem [27]. Communication with respondents is done in person or online.

III. RESULT AND DISCUSSION

The survey respondents who successfully surveyed consisted of 60 men and 240 women. 67% of them have only used one online shopping application, while 25% use two applications, and 4% each use three or four applications, as shown in Fig 1. As shown in Fig 2, more users are running applications without a tutorial. As many as 154 (51%) respondents stated that without a tutorial, they immediately ran an online shopping application.

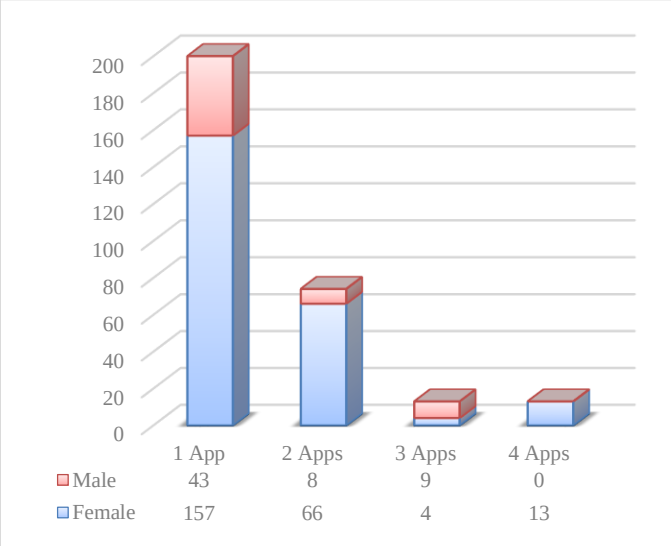

Fig 1. Gender and Amount of Online Shopping Applications Utilization

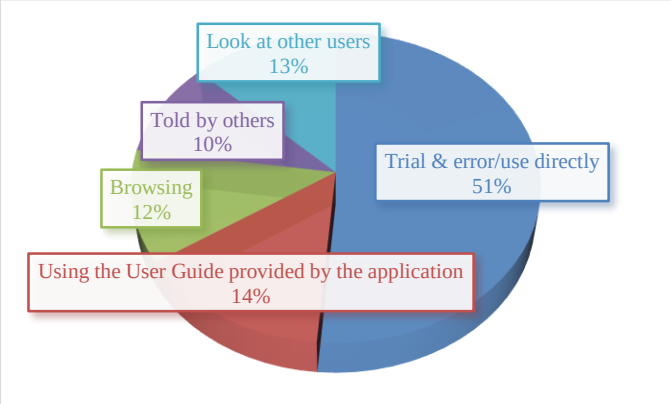

Fig 2. The first way users to find out how to run the online shopping application

In Fig 2 it also appears that for those who use tutorials, more choose out-application-tutorial than in-application-tutorial. Only 43 (14%) of the respondents used the in-application tutorial by reading the user guide provided by the provider. It seems that the character of Indonesian internet users who prefer words of mouth[19]–[21] is again proven. The rest, as many as 103 people (25%) use out-application tutorials by seeing and following or being taught by other users, as well as browsing on the internet.

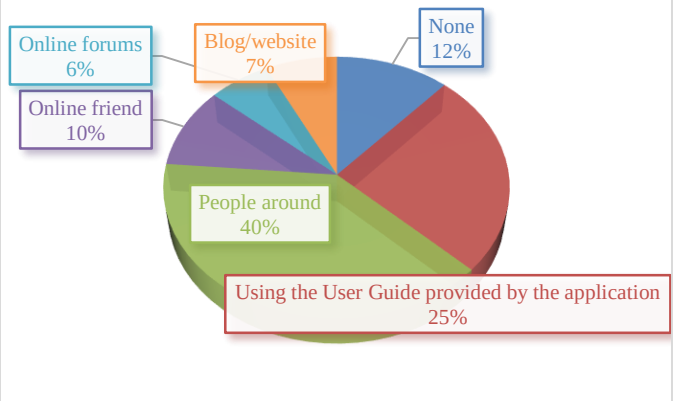

Fig 3. The recommended application's tutorial resource

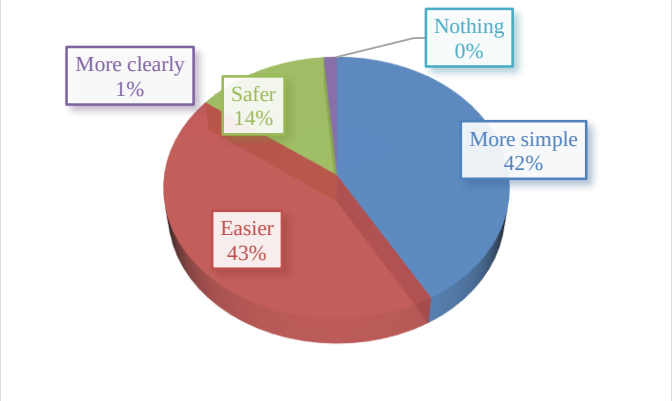

Fig 4. Reasons for recommending tutorial sources

Another spoken other was done. From Fig 3 it is known that although the user guide is only 14% of the total respondents, those who recommend other users to read the in-application tutorial are 25% of the total respondents. Those who suggested it said that in-application-tutorial was simpler (47%), easier (41%), and safer (12%).

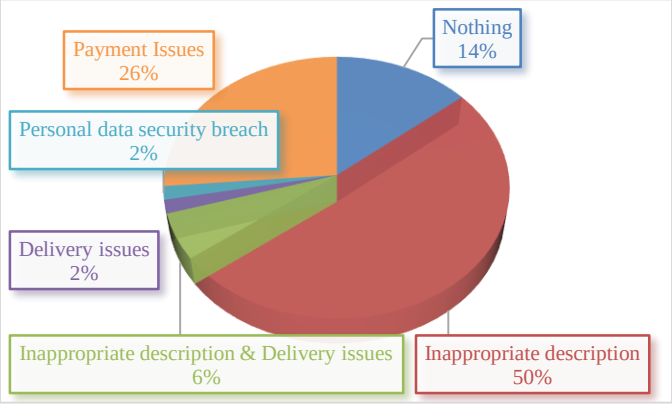

Fig 5. Problems that have occurred when shopping online

Meanwhile, 23% suggested finding out online. As many as 56% of them rated it easier and 32% thought it was simpler and not long-winded like in-application-tutorial. Another 12% say it is safer.

Which suggests asking people who are 50% known. Some of the reasons underlying their recommendations include: because it is easier (42%), simpler and not wordy (41%), safer (14%), and the information is clearer (3%).

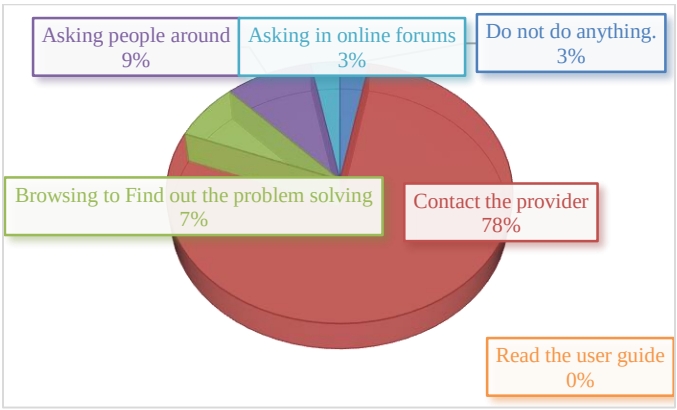

Fig 6. The first thing to do when a problem occurs when shopping online

From Fig 4 it is known that the recommendations submitted by users of online shopping applications to be used as a source of information on application usage guidelines are prioritized on the ease and simplicity factor. These two factors were chosen by 43% and 42% of users respectively. After that, then they consider the safety factor and information clarity.

TABLE 1
Cross Tabs of application usage basics and occurred problems

	Nothing	In-appropriate description	Delivery issues	Personal data security breach	Payment Issues
Trial & error/use directly	16,77%	50,90%	32,34%	0,00%	0,00%
Using the User Guide provided by the application	11,63%	48,84%	39,53%	0,00%	0,00%
Browsing	0,00%	74,29%	11,43%	14,29%	0,00%
Told by others	16,67%	40,00%	43,33%	0,00%	0,00%
Look at other users	9,52%	59,52%	19,05%	0,00%	11,90%

When asked about the experience of trouble when shopping online, as seen in Fig 5, 84% of respondents claimed to experience it. Most of the problems encountered are an inappropriate description (50%). A relative significant problem (26%) is related to payment problems. When problems occur, then users contact the provider for complaints, as shown in Fig 6.

Table 1 and Fig 7, which are descriptions of a cross between application usage (whether based on tutorials or not) and the problems that have occurred, show which the ways of

customers running applications causes which problems.

The results showed that only customers who made other users as tutorials had experienced problems related to payment issues, whereas other customers, never. Likewise, the only people who have experienced personal data security breach problems are those who use the application tutorial by browsing. From these results, it can be concluded that using an in-application tutorial or not using a tutorial at all (directly using the application) tends to be safer than using an out-application-tutorial.

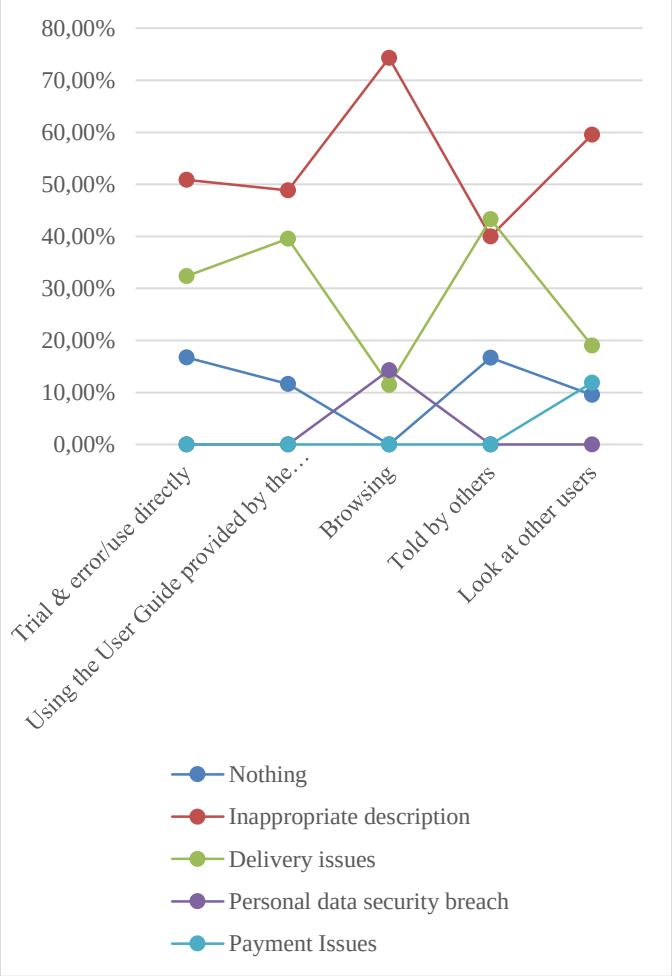

Fig 7. Occurred problems according to application usage basics

IV. Conclusion

Based on the results of this study, it can be concluded that most users of online shopping applications in Makassar City do not use the user guide provided by the application provider. In practice, they prefer to do trial & error, even though they advise other users to read the application usage tutorial, both in-application tutorial, and out-application tutorial. The reason for their choice of information sources is based more on convenience and simplicity than security. By the analysis of problems that occurred, it is also could be concluded that customers who used in-application tutorials or did not use a tutorial at all (directly using the application) tend to be safer than those who used an out-application-tutorial. They intended to contact the provider when then they get into trouble in a transaction, but they still don't read the user guide.

V. Acknowledgment

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