Augmented Reality as A Display Information Using Quick Sort

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ABSTRACT

Information media of technology nowadays becomes a very easy means to convey information, and one of the recent technologies that still develop is augmented reality, which is used as information media. Augmented reality can integrate an image target and can be implemented easily. This technology utilizes an object tracing and uses detail feature from every camera object, after that it can be applied to all smartphones. By taking advantage of this technology, the augmented reality, and using logo marker and animation video, Faculty of Information and Communication Technology Semarang University can share information of its activities and can attract many people's attention to know further about activities held by this faculty. This research focuses on the augmented reality which will show the activities ranking, the activities held by the Faculty of Information and Communication Technology. The activities are shown by animation video using quick sort method to display them based on the most number of activities held by each study program. The result of this research finds out that study program of communication technology holding the first ranking. This study program holds the most often activities so the number of activities is the highest. The application can be displayed virtually using a smartphone and developed using Unity 3D and Vuforia.

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1. Introduction

Today, the development of augmented reality technology uses the marker as a trigger. The marker will be captured by the camera, and it will detect the existence of a 3D object or animation video. With its development, this technology creates real state marker augmented reality technology. It is a plus technology, which is not using the marker as a trigger, but it uses other objects such as image, image target and multi-target with augmented reality marker technology in order to overcome the lack of marker which is being enlarged. Reality technology applies the image target in which this technology uses tracing object and utilizes detail feature of object camera which can be implemented in a cell phone [1]. By using the augmented reality technology in the logo model, and animation video, which is displayed using two Android cell phone, blackberry and iPhone, people will be easily drawing and knowing the 3D visual about the general background of activities in Semarang University very well, especially the activities in Faculty of Information and Communication Technology. The faculty has three study programs; they are Information Technology, Information System, and Communication Technology. Those study programs have various activities for example seminar, workshop, festival, training, and many more. One program of those activities from each study program is prepared as a media campaign. Unfortunately, it is sometimes difficult to determine which study program conducts the activities or holds the events very often since those come from three different study programs. So, giving the ranking to determine which study program making the activities or events the most often is very useful. To solve that problem, the quicksort method is needed to give ranking to the most often study program which holds the activities very often. This research develops based on the previous research conducted by Wang Xiang in 2011, and the theme of the research is *"Analysis of the Time Complexity of Quick Sort Algorithm"* [2]. It can be concluded that to can diminish the frequency of push-down stack procedure when the algorithm is implemented into an application, the method makes the algorithm require a large stack so as to enhance the time complexity and space complexity. Therefore, the authors propose to use quicksort algorithm because this method can help to sort the most number of activities which comes from each study program holding the activities. Augmented reality will be used as an information media and this application will be developed using Unity 3D and Vuforia.

2. Literature Review

2.1. Augmented Reality 3D

In *"Handbook of Augmented Reality"*, written by Barko Furht, in 2011 it explained that augmented reality aims to simplify the user life by bringing cyberspace information, which comes not only from surrounding environment but also from real life environment. We can see real-life environment directly through live-streaming video. Augmented reality can increase user perception and interaction with the real-life world. The following is a general illustration of the way the augmented reality works using webcam and computer as its media [3].

2.2. Quick Method (Quick Sort)

A quick method is often called partition exchange sort. This method was first introduced by C.A.R. Hoare in 1962. To elevate the effectiveness of this method,

exchanging two elements in the quite significant distance is used. The exchange process with the quick method can be explained as follows [4].

1. First, a certain data called pivot is chosen, for example, x.
2. Pivot is chosen to organize the data on the left so that it will be smaller than the pivot, and the data on the right is bigger than the pivot.
3. Pivot is placed in the position j so that the data from 1 until j-1 is smaller than x.
4. Meanwhile, data in j+1 until N is bigger than x. How to get this is by exchanging the data from position 1 until j-1 which is bigger than x into the data from position j+1 until N which is smaller than x.

3. Research Method

3.1. Type of Data

The types of data used in this research are:

1. Primary data is the data gathered directly from the research object. In this research, the activities held by the Faculty of Information and Communication Technology, the number of participants, and the ranking which will be ranked are the primary data.
2. Secondary data is the data obtained from literature or books, other references or the internet.

3.2. Method of Data Collection

Method of data collections in this research are:

1. Observation: data is collected through observing and interviewing each of the Head of Study Program directly, the Information Technology, Information System, and the Communication Technology. The interview aims to find out what kinds of events and activities held by each study program.
2. Literature Review: data is collected through gathering the literature, references, or books that support the research.

3.3. Calculation of Quick Sorting Method Analysis

1. First of all, choosing a certain data called pivot, for example, X. It is a kind of events or activities. Table 1 is events in Faculty of Information and Communication Technology Semarang University taken from accreditation book called Borang in 2016.

Table 1 Events in Faculty of Information and Communication Technology Semarang University (FTIK USM) [5]

No	Study Program	Events or activities
1	Information Technology	Workshop of Ubuntu Release Party 11.04 Installation
2	Information Technology	Workshop of Framework PHP
3	Information Technology	Workshop of Linux
4	Information Technology	Workshop of Sensor System
5	Information System	Workshop of Website
6	Information System	IT Fest Festival
7	Information System	Workshop of Mikrotik
8	Communication Technology	TV Laboratory Training

No	Study Program	Events or activities
9	Communication Technology	Charity Festival
10	Communication Technology	Komukino Festival
11	Communication Technology	Rhetoric Program Training
12	Communication Technology	Review TV Festival
13	Communication Technology	Public Relation Festival

2. Pivot is selected to organize the data on the left so that it will be smaller than the pivot, and the data on the right is bigger than the pivot by calculating the number of N in the Figure 1.
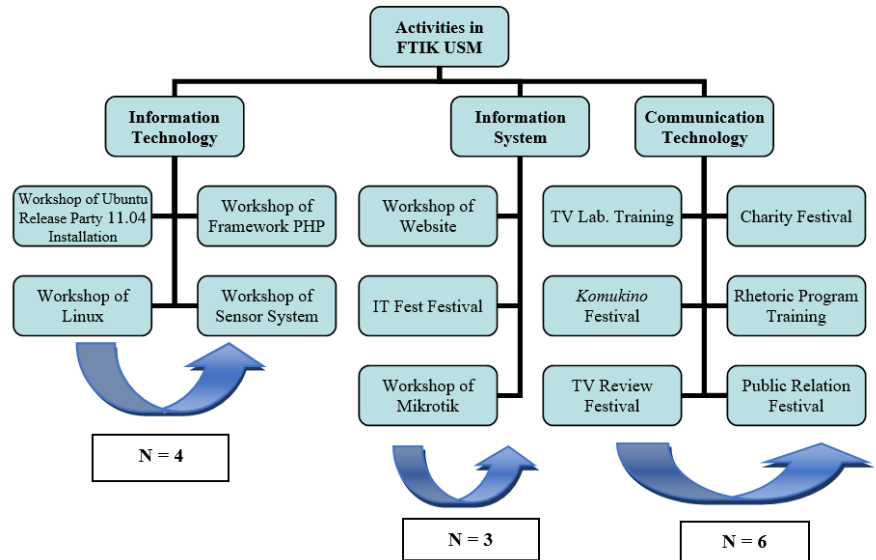
Figure 1 Organizing 1 Using Quick Sort Method

3. Pivot is placed in the position j so that the data from 1 until j-1 is smaller than x. Meanwhile, data in j+1 until N is bigger than x in Figure 2.
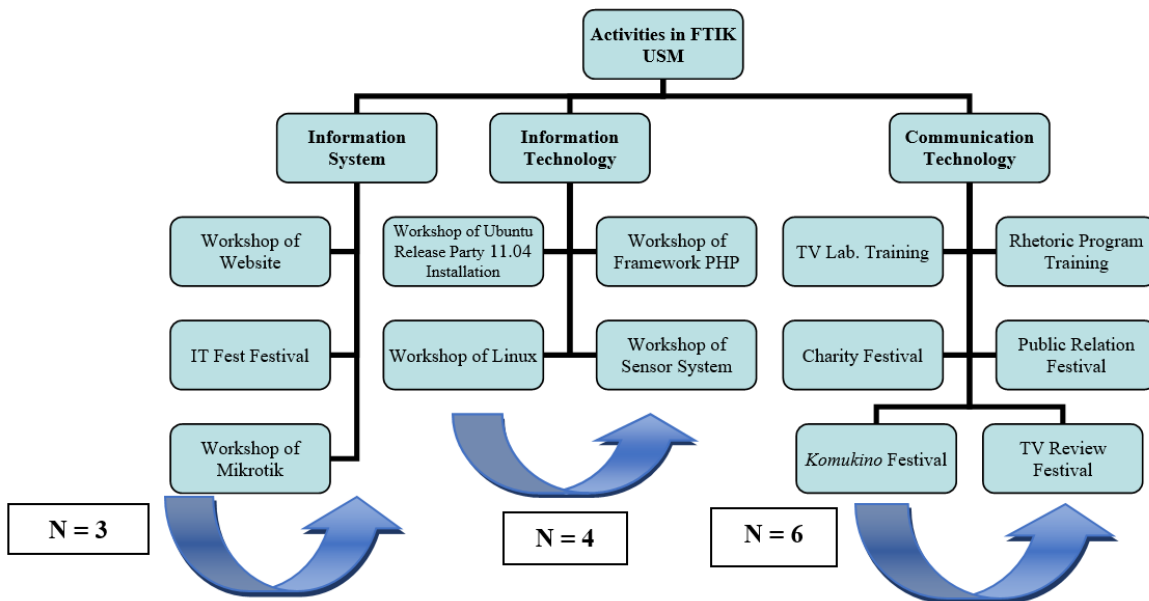
Figure 2 The Result of Using Quick Sort Method

It can be concluded that to give ranking using quick sort algorithm we need a sorting based on the number of the pivot (N) from the small one to the big one so

we can know which study program has a lot of activities. The result shows that the study program which has the highest number of activities is Communication Technology, and then the second rank is Information Technology, and the third rank is Information System.

4. Implementation

The implementation of the display of android augmented reality 3D application to identify logo and animation video and information media using marker less method is shown in Figure 3 below.

Figure 3 Displaying of Video Menu of Activities at FTIK USM

Figure 4 below shows when we select one of the videos then the screen will play the video of the activities.
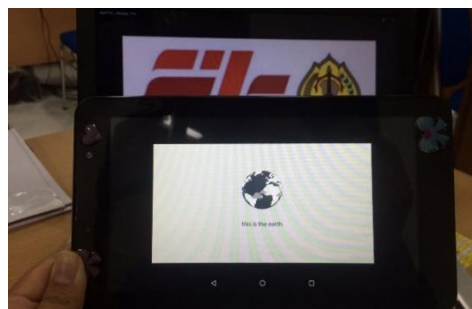

Figure 4 Playing Video of Activities at FTIK USM

In the menu of Quicksort method below, it will be sorting the ranking of activities, every activity in the faculty of Information and Communication Technology. The most number of activities will be in the first ranking and so on in Figure 5.

Figure 5 Sorting the Result of Quick Sort Method

5. Script Function Display

The following is the script function which is called "perhitungan.cs" and it will be used to sort the position randomly based on the group number of activities from each study program. If the study program makes a lot of activities then it will be in the first rank. If the number of activities is less than the first rank then the next study program will be in the second rank and so on in Figure 6.

```
void Update () {
        if (a == 0) {

                if (ik.Length >= it.Length && ik.Length >= si.Length)
                        ikCount ();
                else if (it.Length >= ik.Length && it.Length >= si.Length)
                        itCount ();
                else
                        siCount ();


                for (int i = 0; i < allVid.Length; i++) {
                        if(judul.Length != 0)
                                judul [i].text = allVid [i];
                }
                a = 1;
        }
}
```

Figure 6 Script Function Display

6. Conclusion

This research results Augmented Reality Product using the marker less method to get Video Tracking of activities held by the faculty of Information and Communication Technology. According to the result of the image scan, it resulted in the ranking which study program becomes the favorite. The implementation can be done marker less in the brochure or logo website. To calculate the ranking, Quick Sorting Method is used so that it will find out which study program makes the most number of activities by showing the information through augmented reality which is animation video.

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