DEVELOPMENT OF INTERACTIVE MULTIMEDIA FOR EXTENSION OF FIRE PREVENTION AND CONTROL IN THE PREVENTION AND CONTROL FIRE DEPARTMENT BANDUNG

Hilda Puspa Salim

Teknik Informatika – Universitas Komputer Indonesia
Jl. Dipatiukur 112-114 Bandung
E-mail : puspa.hilda@gmail.com

ABSTRACK

Office of Fire Prevention and Control of Bandung has a fundamental duty: "Organizing partial authority fire prevention and suppression." It is also often carried out extension. The extension aims to stand by the people about dealing with fire and disasters. However, in carrying out the extension, there are several issues that matter giver feel difficulty in providing models of fire extinguishers and also a problem in conducting direct simulation because the place that does not support the extension.

Based on the problems that have been outlined, providers need the help of interactive multimedia materials, one of which is accompanied by an interactive multimedia simulation that can display information through sound, image, movement and color. Interactive multimedia development is expected to assist in explaining the material givers extension materials.

Based on the results of research and testing has been done, it can be concluded that this application can help providers in conducting outreach materials.

***Keywords**: Interactive Multimedia, Fire, Department of Prevention and Fire Fighting, Counseling*

1. INTRODUCTION

Office of Fire prevention and Supression of Bandung has a duty: "partially Organized authority fire prevention and mitigation". Fireman, Branwir FMD, or the officer or agency is damkar trained and tasked to tackle fires. In addition to trained firefighters to rescue victims from the fire also trained to rescue the victims of traffic accidents, the building collapsed, and others. The service of the fire department or the BPDB (disaster relief Agency areas) are implementing emergency Government elements or who is given responsibility in carrying out the tasks of handling the problem of fires and disasters that are included in the service of rescue (rescue) such as ambulance and National SAR Agency [1]. In the service of prevention and Mitigation of fires is also part of Bandung city extension. And the guidance they often do extension-outreach to the general public. The extension aims to mensiagakan the public about dealing with fire and disaster.

Based on the results of interviews with Heads of section extension and construction of DPPK Bandung Regency that extension methods is done in place of extension still uses conventional methods i.e. through lectures and slide presentations that refers to the material most writings only, based on the condition then the problem occured giver material feel difficulty in giving an idea of how the difference models fire extinguishers and other material. When doing outreach that needed a simulation so that participants can better understand and extension can apply daily to the materials late in a given extension, but the extension is sometimes carried out in the service of the fire department or at penyuluhannya participants, based on the condition then the problem is sometimes not done simulations when doing outreach due to place a limited extension.

Based on problems that have been spelled out, the giver of the material requires the help of interactive multimedia, one of which was accompanied by interactive multimedia simulations that can display information through sound, image, movement and color. Interactive multimedia development is expected to help givers of guidance material to explain the material with complete by adding the description of difference models of pemapam light by doing way more interactive, and can give ease to the giver of the material to do simulations that can provide an overview to participants extension how to tackle fires and how to overcome it through simulations to always ready should a fire occur.

1.1. The Extension

Outreach is a derivative from the word exstension is widely used and is common in Indonesia language extension comes from the basic torches which means giver of light amid the darkness. In the Netherlands language extension called Voorlichting that means giving explanation to help someone find the way, in the language of the United Kingdom and Germany termed the extension as the giving of advice or Beratung which means someone can provide clues

to a person but a person who has the right to determine the options.
The extension is the giving of information to the public about a thing that neccessary either informative, persuasive, rekreatif or combined models.Extension with identical things (problems) are common.Principal characteristics of the extension are as follows:
1. The existence of one or more speakers as a resource person.
2. More use of verbal communication.
3. Can be combined with various activities.
4. Are common.
5. Target audiences
6. Do not demand the audience get involved further in the target extension, they simply find out information only.
7. Are flexible can be done anywhere (formal, informal, large or small in scale).

1.2. Method of interactive learning

Interactive learning method is a method of instruction that is used to present a discussion or learning resources committed by teachers to create interactive educational atmosphere, between teachers with students, students and students with learning resources that support the occurrence of the processes of learning and teaching.

1.3. **Mobile applications**

According to Buyens, mobile applications mobile application is derived from the Word application and mobile. Application which means the application, application, application. Colloquially application is ready to use the programs designed to carry out a function to the user or other applications and can be used by the intended target while the mobile can be interpreted as a shift from one place to another. By using a mobile application, you can easily perform a variety of activities ranging from entertainment, selling, learning, working on Office work, browse and lainlain. The utilization of mobile applications for the most popular entertainment by almost 70% of cell phone users, because by making use of the existence of the feature game, music player, video player to make us become increasingly easy to enjoy anytime and anywhere.

1.**4. The simulation**

The simulation can be defined as a system
used to solve or elaborate on the problems in real life full of uncertainty with no or using certain methods and models or more accentuated on the use the computer to get the solution.

1.5. **Multimedia**

Multimedia consists of two words namely multi and multi media, which means many, compounds, and diverse, while the media means an intermediary tool for delivery of something. Multimedia is also a combination of text, graphics, sound, animations and videos are submitted by computer or electronic manipulation and digital equipment to another. When a user is allowed to control what and when such elements will be sent, then it would be called multimedia interkatif multimedia.
Understanding more about multimedia, the multimedia objects are divided into several types:
1. The text of the
2. Pictures
3. Animation
4. Audio
5. Video
6. Interactive Links

1.6. **Virtual Reality**

Virtual Reality (VR) is an environment that simulated by the computer. Predominantly visual experiences, displayed on a computer screen or lens stereoscopic display. Some simulations include additional sensory information in accordance with such a noise through the speakers. Some systems are already equipped with advanced effects invisible but can be felt, this is referred to as force feedback. Users can interact with the environment through his virtual input devices like the keyboard and mouse, or through other electronic devices such as electronic gloves, shoulder hand motion treadmill or virtual play.
The basic concept of VR is trying to create a world inside the computer. The user wears a variety of tools to be able to translate their movements so it can be used to manipulate virtual objects. Even though VR brings users to explore the real natural through simulations, for example, in simulations of exploration in outer space, the undeniable VR fixed a map and not a real-world area. VR ignore people around the user, ignore the bench seating the wearer, and a variety of other tangible aspects. It can be said that the VR focussed business simulate the real world into the computer than directly manipulating objects or the real world to solve a problem.

1.7**. Google Cardboard**

David Coz and Damien Henry on Google Cultural Institute in Paris built a cardboard box for a smartphone as a prototype for a Virtual Reality. The results give rise to so many "ooh" and "aah" which inspire them to introduce it to a wider audience.
Google is a virtual reality rides Cardboard developed by Google with cardboard or cardboard boxes that had been cut off following a pattern and stay folded like origami folded and using mobile as its screen. Cardboard can also be made from an ordinary cardboard boxes by following the pattern of the design provided by Google.
Cardboard display units do not have a special 3D images projecting to the eyes of the user. Instead, the

unambiguous an Android phone and a pair of lenses that can also be purchased on its own.
The Smartphone is inserted into the Cardboard so that its screen facing pairs of lenses, which will project the screen display it to the user's eyes.
To select a wide range of applications in Cardboard demo, users stay menolehkan head towards left and right. Head movement is detected by the sensor in a wide range of smartphones, and the menu display will follow the direction of the eyes of the user. The option selected in the menu will be highlighting, then run by shifting existing spherical magnets on the side next to the Cardboard

This magnet is moved toward the bottom of the finger. Smartphones will detect a shift in the magnetic and interprets it as a command to run ("click") the selected menu. So a finger removed, the magnet will be again driven by itself towards the top because there is a down side in another magnet with the same polar so that both are mutually "refused".
Input method such that of deliberately contrived by Google so that users do not have to toggle open the smartphone to run the applications menu Cardboard. This headset can be worn without the touch screen smartphone.
The use of smartphones as image viewer and make Cardboard processing center does not need to have any special hardware. To run function "back" or return to the main menu, headsetberikut smartphone simply shifted from landscape (horizontal) orientation to portrait (vertical).
As with any other VR technologies, Cardboard serves two separate images on the screen of a smartphone. The lens on a Cardboard display projecting at the eye of the user so that includes all of the field of view of the eye.
These two images are each intended create a left and right eye of the user, and are automatically merged by the brain so that it becomes a three-dimensional display intact. The results were truly remarkable. Wearing Cardboard not will look "plunge" into an other-worldly. Free users can turn in any direction in the realms of VR, 360 degree, right-left or top-down. An example of its use is if we play game VR, then as if we were in the game world, then watch 3D video, watch the movie as though we are at the cinema, virtual tour, 360 ° movies (as if we were there).
Google Cardboard can be used along with most modern Android phones, including the Iphone too. Mobile must be running Android 2.1 (Jelly Bean) or above.
IPhone 5/5S with a 4″ screen can also, just that it is indeed the FOV (field of view) is limited. The larger screen is better between 4.5 "s/d 6.3″.
In addition mobile must have features sensor Accelorometer and Gyroscope. To find out you can find it online. Sometimes there are applications which can walk pretty well only with Accelorometer, but most require a Gyroscope.

1.3.3-dimensional (3D)
3D and Stereoscopy-did the same? Such perspectives are often puzzled by 3D – which is less precise, because it is the only three dimensional "simulation". Therefore, the 2 ½ D is a more expressive approach. Stereoscopy images (or "real 3D"), however, requires at least two images that simulate both our eyes. This can also be done by using traditional photography (stereo photography), computer (such as Virtual Reality) or Lasers (Holography).
3D images can be displayed as stereo pairs in the 3D view (for slides or prints), or on a computer screen. Other formats including images anaglif (requires 3D glasses merah-hijau or merah-biru) and digital stereo projection (also with 3D glasses polarized "passive" or "active LCD glasses-catcher").
The word "stereo" comes from Greece and means "related spaces". When talking about stereo, usually leads to the sound of stereophonic. The restrictions associated with stereoscopy images, drawn or photographed. With the intention of avoiding confusion with stereophonic sound, now talking about 3D images and 3D movies in particular, namely 3D, of course, three dimensions.
Someone who lives in the neighborhood, space, three-dimensional. Our perception about the space is made almost exclusively by our eyes. There are many ways of mengorientasi spaces, such as perspective, tint, contrast and displacement.
The lens of the eye on healthy humans projecting two slightly different images to the retina, which is then transformed, by the brain, in the representation of space. Stereoscopic space observation that this perception is the result of actual through both eyes.
A number of people-eyed healthy, however, had eyes since birth, making the stereoscopy looks unlikely. They are generally oriented in its environment by using one of the other methods mentioned above. Although a person with only one eye, but can learn how to move safely, using non-standard signals stereoscopy.
3D photo duplicate the way how we look at an object or 3D scene by taking a couple photos that are separated by the same distance with a separation between the eyes of certain people. Two pictures then have a similar vision point of view seen by eyes
left and right. This image, if it is directed to the left and right eye, United by the brain into a single image with a form of depth. Perhaps the most familiar example of the View-Master ™ that most had already been played by kids (all ages).
Stereopticon is a projector or "magic lantern", which has two lenses, usually one above the other. Stereopticon is widely known under the stereoscope. Stereopticon is not memproyeksi or display stereoscopic/3D images. The two lenses are used separate images when projected. All stereopticon can

be classified as magic lanterns, but not all magic lantern is a stereopticon.

1.3. Stereoscopy

Stereoscopy, stereoscopic imaging or 3D (three dimensions) is a technique capable of recording three-dimensional information or creating the illusion of into (ilusion of depth) on an image. Illusions into photography, film, or other two-dimensional image is created with a bit of difference image for each eye. A lot of the 3D view using this method. First introduced by Charles Wheatstone in 1840, stereoscopy is used in photogrammetry as well as for entertainment via stereograms. Stereoscopy is used to view images that are copied from a large multi-dimensional data sets for example from experimental data. Modern industrial three dimensional photography using a 3D scanner to detect and record 3 dimensional information. Information in three dimensions can be reconstructed from two images using a computer with the corresponding pixels in the image to the left and right.

Traditional stereoscopic photography mengkreasi the illusion of 3D ranging from a pair of 2D images. The easiest way to create a perception in the brain is by providing two different images in the eyes of observers representing two perspectives of the same object, with a minor deviation similar perspectives that both eyes naturally receive in vision binoculars. If the eye can berakomodasi with maximum and distortions can be avoided, both 2D image can be displayed to the eyes of the observer so that any object at infinite distance will be seen by the eye of an observer is oriented straight, eyes of the observers will not be crossed nor diverging. When on the picture that there is no object at infinite distance, such as a horizon or clouds, the images must be blank means that the picture is equally close.

1.4. Unity

Unity is an integrated tool to create architecture and simulation. Unity can not do design or modelling, because unity is not a tools for designing. A lot of things that can be done in unity, there are features reverb audio zone, particle effects, sky box to add the sky, and much more, and can also directly edit the texture of an editor like photoshop etc.

Features (Scripting) in unity is as follows:

Supports 3 languages programming, JavaScript, C #, and Boo.

1. Flexible and EasyMoving, rotating, and scaling objects only need to inline code. So too with duplicating, removing, and changing properties.
2. Multi Platform Games can be on PC, Mac, Wii, iPhone, iPad and android.
3. Visual Properties in the define Variables with scripts shown in the editor. Could be moved, drag and drop, get to choose a color with the color picker.

NET-based penjalanan program conducted with the net Open Source platform, Mono

2. THE CONTENT OF RESEARCH

2.1. Analysis of the running Procedures

The process of awarding guidance material is an activity at the core of the learning process in which the giver gives material or describe materials directly to participants of the extension. As for the flow of procedure is as follows:

1. The giver explaining the material the material guidance to participants of extension by way of reading out the indicated material to participants of the extension through a slide presentation
2. Participants extension notice or recorded material has been presented in the book each
3. Process flow of granting the extension described material into the shape of activity diagram as follows:

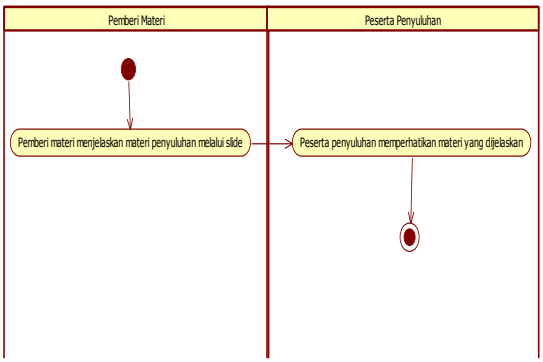


Figure 1 the procedure of granting of Extension Material

2.2. Analysis of the Multimedia Applications to be built

Media learning and simulation is media of learning which contained material about material api classes, types of tools pemdam lightweight api, how to cope with fires and how to prevent in case of fire. This interactive multimedia application intended for the extension in the service of prevention and Mitigation of fires of Bandung city. This interactive multimedia development goals namely to help givers material explaining the material about the api classes and types of apar through simulations, simulations of how to cope with fires, simulating how to prevent fires, provides convenience to the giver of the material to provide examples that can give you guidance to participants how to cope with the fires through simulation and how to prevent fires through simulations, as well as to help participants extension to make it easier to understand the material that has been given.

2.3. Analysis of the architecture of Virtual Reality

There are many computer graphics library that can be used to develop a real time virtual environment. This

library can generally be developed along with the programming language it has often been used as C++, C #, Perl, Java or Python.
Computer graphics library sepertui Open GL, Direct3D, Java3D and VRML, generally have the ability to develop virtual environments. There are a number of ways, such as multithreading can be used to enhance the capabilities of 3D and create multi-user interactions on program uses virtual reality technology

2.4. The concept of Virtual Reality to be built
The concept of virtual reality technology to be built that is able to perform simulation and interaction. To enter the virtual reality, the Google tool wear Cardboard users connected to the computer and the system that is in it. In this way, at least two senses the user's body i.e. the eyes and neck, controlled by the computer. For better results, usually this virtual reality devices also monitor what users. For example the lens which controls the movement of the eyeball and responded by sending the user enter a new video. virtual reality is sometimes used to refer to a virtual world that is presented to your computer, such as at a wide variety of computer games that is now rampant development, although only based representation of text, sound and graphics.

Dengan menggunakan konsep virtual reality yang berupa simulasi dan interaksi maka bisa diterapkan kedalam masalah yang ada yaitu dengan mensimulasikan cara-cara untuk menanggulangi kebakaran dan cara mencegah kebakaran selain itu juga pengguna dapat berinteraksi dengan sistem dengan cara pengguna dapat memadamkan api.

2.5. Analysis of Google's Cardboard Architecture
Inside the Cardboard there are two lenses, two 25 mm biconvex lens with focal 45 mm will focus the eyes on to the mobile screen and the eyes are met by what VR application view on the screen. If we move the head looked or looks up, the sensor will adjust the view screen, so as if we were inside the VR applications. Here is a picture of the workings of Google Cardboard:

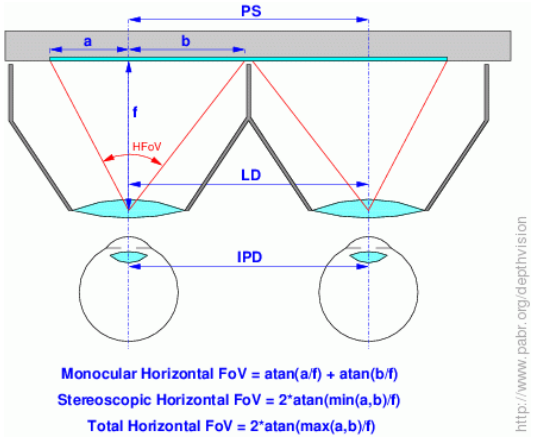
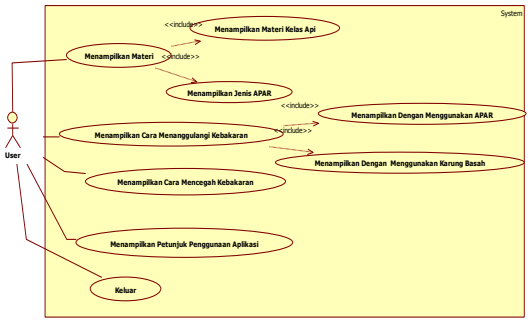


Figure 2 How to work Google Carboard

2.6. Needs Analysis Software
Needs analysis software will be used in building interactive multimedia for education on prevention and countermeasures of the fire is as follows:
1. Android OS 4.1 (Jelly Bean) or to the top
2. Features the Accelorometer sensor and Gyroscope

2.7. Needs Analysis Hardware
Hardware requirements analysis is one of the things that are important
because without an eligible hardware application that will be created will not run properly. Hardware to run applications that need to be built to the specifications of the hardware:
1. Android Platform
2. the screen is 4.5 "-6 "
3.1 GB RAM min
4. Google Cardboard

2.8. Use Case Diagram
Use case diagram interactive multimedia for education on prevention and countermeasures of the fire can be seen in the following image:



Gambar 1 *Use Case Diagram*

2.8. Activity Diagram
Activity diagrams depicting the flow activity in a variety of systems that are being designed, how each

flow beginning, decisions that may occur, and how they ended. Activity diagram in the development of interactive multimedia outreach prevention and countermeasures of fire are as follows:

1. Activity Diagram Showing Matter

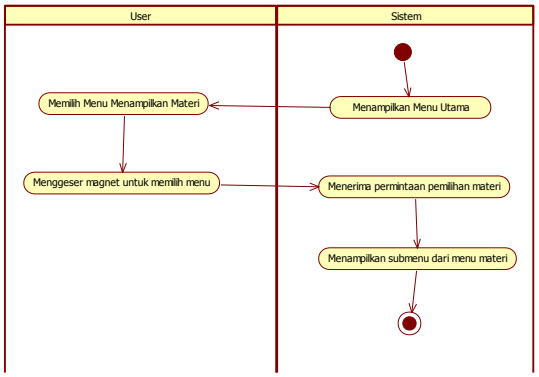


Figure 4 Activity Diagram Showing Matter

2.10. Sequence Diagram

Sequence diagram depicts interactions between objects in and around the system (including user, display, and so on) are described with respect to time. Sequence diagram in the development of interactive multimedia outreach prevention and countermeasures of fire are as follows:

1. Sequence Diagram Showing Matter

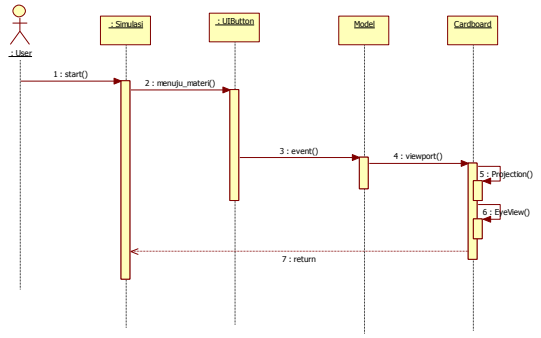


Figure 5 Sequence Diagram Showing Matter

2.11. Class Diagram

The class describes the State (attributes/properties) of a system, while also offering services to manipulate the situation (the method/function). Class diagrams is decrypt group objects with properties, behaviour (operations) and the same relation. So with the existence of a class diagram can provide a global view of a system. It is reflected in the
existing classes and his associate one with the other.
The following Class diagram Picture of the development of interactive multimedia outreach prevention and countermeasures of fire:

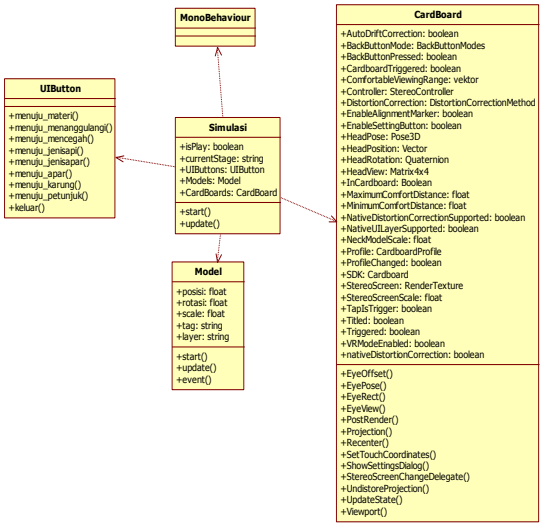
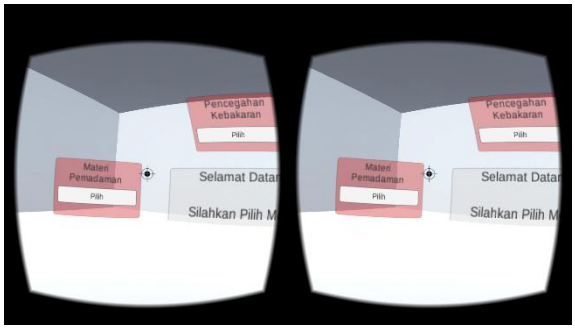
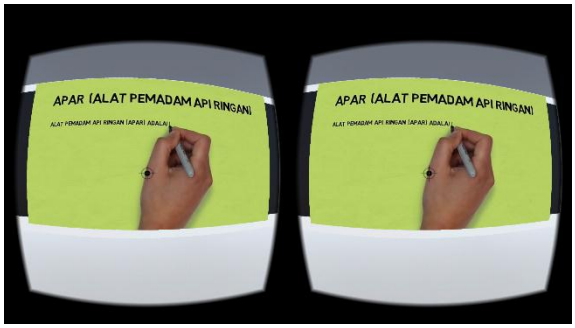


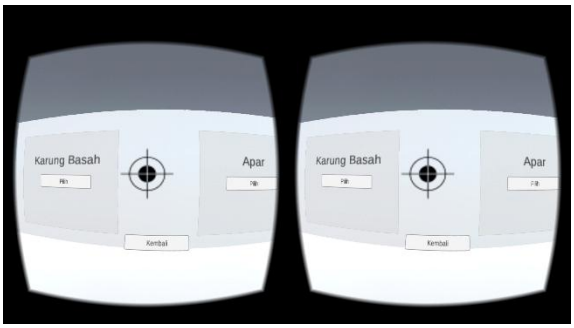
Figure 6 the Class Diagram

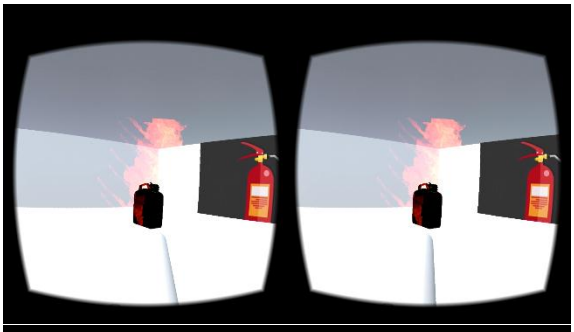
2.12. The implementation of the interface

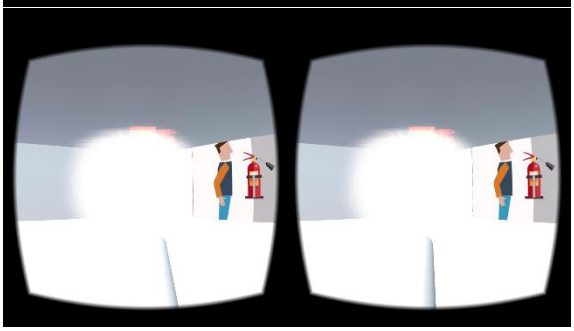
Implementations of interfaces are part of the display form designating each interface on an application already built, the interface images can be viewed from the attachment interfaces.











3. COVER

3.1. Conclusions

Based on the results of implementation and testing, then the conclusion of the final assignment is as follows:

1. Based on the results of testing conducted through interviews to the Chairman of the extension in the service of prevention and Fire Mitigation, multimedia interaktf this may help explain the material in the material of the givers of guidance with a complement that is by adding a description instances differences models of fire extinguishers and other material by doing way more interactive
2. This interactive Multimedia can also provide convenience to the giver of the material to do simulations that can provide an overview to participants extension how to tackle fires and how to overcome it through simulations to always ready should a fire occur.

3.2. Any suggestions

Interactive multimedia for education on prevention and countermeasures of the fire is still far from perfect and a lot of shortcomings. Therefore, the need for further development and refinement in order to meet the needs of users who are increasingly growing. As for the advice against this learning media development for the future are as follows:

1. Addition of material about other fires to complement the existing application.
2. how to cope with the addition of other fires such as the Hydran menggunai or fire caramemadamkan pasi, r and others
3. Animation and simulation to be copied again to make it more interesting

DAFTAR PUSTAKA

[1] "Dinas Pencegahan dan Penanggulangan Kebakaran," [Online]. Available: http://dppk.bandung.go.id. [Accessed September 2015].

[2] F. Ardiyansyah, "Implementasi Pattern Recognition Pada Pengenalan Monumen-Monumen Bersejarah di Kota Bandung Menggunakan Augmented Reality Berbasis Android," in *Universitas Komputer Indonesia*, 2014.

[3] Z. Baihaqi, Pembangunan Aplikasi Multimedia Pengenalan Perilaku Hidup Bersih dan Sehat (PHBS) Tatanan Sekolah Dengan Metode Pembelajaran Interaktif (Studi Kasus di Pemerintahan Kota Cimahi), Universitas Komputer Indonesia, 2014.

[4] B. Hariyanto, Rekayasa Sistem Berorientasi Objek, Bandung: Informatika, 2004.

[5] A. Nugroho, Rekayasa Perangkat Lunak Menggunakan UML dan Java, Yogyakarta: ANDI, 2009.

[6] "VRIndo," [Online]. Available: http://www.vrindo.com/. [Accessed 7 10 2015].

[7] "Cardboard Indonesia," [Online]. Available: http://cardboard-id.com. [Accessed Oktober 2015].