# DEVELOPMENT OF 3D INTERACTIVE VIRTUAL TOUR APPLICATIONS AS A PROMOTIONAL MEDIA OF ELITE TOWNHOUSE BELLEFILLE IN PT. DINAMIKA ARTISTIKA 75 (CASE STUDY HOUSEHOLD TYPE 225)

Rizpan Ilham[1], Richi Dwi Agustia[2]
[1] Informatics Engineering, [2]Faculty of Engineering and Computer Science - Universitas Komputer Indonesia (UNIKOM)
St.Dipatiukur No. 112-116, Coblong, Lebakgede, Bandung, Bandung City, Jawa Barat 40132
E-mail : rizpan27@gmail.com[1], richi@email.unikom.ac.id[2]

## ABSTRACT

PT.Dinamika Artistika 75 is a company that running in architectural consultant, currently the company is built a house with type 225, which is a house that has 2 floors and has a land area and building area of 225 square meters, for elite townhouse bellefille housing. In the promotion process, the company experiencing problems, the obstacles faced related to the response of prospective buyers who feel less satisfied in getting detailed information of the type 225, so it takes an application that is able to provide a detailed picture of information to prospective buyers. The research methodology that being used is qualitative research method. Referring from a study (Akip Suhendar, 2016) in building a virtual tour application that is used to describe every corner of the campus section, however the application is still not interactive and tend to be static, while the application will be built to have interaction and manipulation features that make it more interactive and dynamic. The results of the research is the development of 3D virtual tour applications that provide an overview of the type 225 includes the interior and exterior with more interactive, and dynamic. Based on the results of interviews to companies and questionnaires that given to 30 prospective buyers, shows the application can help companies in promoting and providing information with more detail about the design of type 225 building to prospective buyers.

**Keyword :** Virtual Tour, Interactive, House Type 225, Modeling 3D, PT. Dinamika Artistika 75

## 1.INTRODUCTION

PT. Dinamika Artistika 75 is a company engaged in architectural engineering, located on South Meteor II Road Block A2 No. 2. 301A Bandung City, West Java. PT. Dinamika Artistika 75 was established on October 25, 1975. The company serves consultancy services that include the design of the building design and interior and exterior design to the stage of construction. Currently PT. Artistic Dynamics 75 is working on the elite residential project Townhouse Bellefille located in south tangerang, for the type of house to be built is a type 225 that is a 2 storey house with a land area and building area of 225 square meters.

Based on the results of interviews that have been done with Mr. Dede as Manager at PT. Artistika Dynamics 75 that handles elite residential projects Townhouse Bellefille states that, there are some problems found related to the process of promotion and sale of type 225 houses, this is caused by the media campaign used only in the form of brochures and pamphlets. This media gives little information to prospective buyers about the 225 type house structure offered, ie in the form of two dimensions and building plan only, it is less effective seen from the absence of the overall depiction of the house, as well as for more detailed exposure on every angle Including home from the interior and exterior of each room. According to the promotional section referring to the questionnaire results of 45 prospective buyers regarding the promotion media currently used in the promotion process of type 225 house, it is concluded that the prospective buyers are dissatisfied with the promotional media used today, this is due to several factors including the candidate Buyers can not see in detail every side of the room type 225 house offered, sometimes sometimes the incompatibility of existing information brochures or pamphlets with the reality of the product offered, unlike what is imagined by prospective buyers, due to the limited information contained in the media campaign when this.

Virtual tour is a combination of Virtual Reality and three dimensions (3D) which is a technology created so that users can interact with a computer-simulated environment (computer-simulated environment), an actual environment that is imitated or really an environment that only exists In imagination, built using the help of computer hardware and software. Virtual Tour presents a form of visualization in the form of 3 dimensional model that can be seen from various sides, which gives the description of the form of an object in more detail.

Based on the above exposure, this study aims to build interactive 3D Tour applications as a media promotion elite Townhouse Bellefille housing in PT. Artistic Dynamics 75 with case study of type 225 house.

### 1.1. Research Methology

The research methodology used using the multimedia development life cycle (MDLC) approach [2], and qualitative research methods, whose function is to know what research problem is still temporary so it will develop or not change at all after doing field research. The flow of research in Figure 1 is the steps taken to support the research process that will be made so that research can run more focused and systematic.

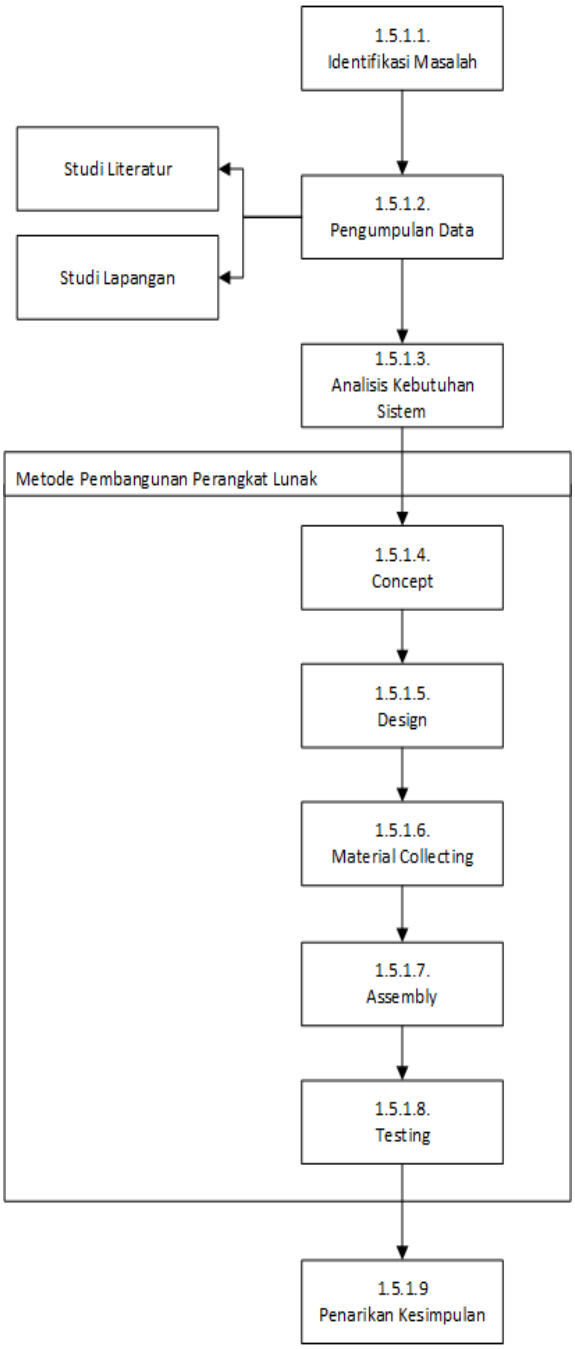



**Figure 1 Research Flow**

## 2. Theoretical Basis

### 2.1 Virtual Tour

Virtual Tour in general is a program that combines photography technology with information technology that aims to provide information space (space) as a whole and interactive. Virtual Tour consists of a collection of photos, images, videos, or virtual 3D models from the actual place, run by using desktop computer or other electronic media.

In a journal compiled by Osman, Wahab and Ismail, virtual tour is a technology that puts users in the picture and allows the user to increase situational awareness and increase the power to see, capture and analyze virtual data significantly [1].

Virtual Tour can be a media that can bring and bring the imagination to its users, so as if users experience and feel the real situation.

### 2.2. 3D Modeling

3D modeling is the process of developing a mathematical representation of any three-dimensional objects (either inanimate or living objects) through specialized software. This product is referred to as a 3D model. It can be displayed as a two-dimensional image through a process called 3D rendering or used in computer simulation of physical phenomena. Models can also be physically created using 3D Printing devices. Models can be created automatically or manually. Manual process of geometric modeling prepares data for 3D computer graphics similar to plastic arts such as sculpting.

### 2.3 Autodesk 3Ds Max

3D Max or 3D studio Max is one software or software that is often used by product designers to create animations or modeling in the form of 3 dimensions.

This app was released by one of the autodesk media companies and intertainment that was originally known as discrett and kinetix. 3D max is one of the many modeling applications to create 3D models and most widely used by designers spread all over the world. This application allows users to explore the ability and power of our imagination to create or produce a 3D-shaped work either in the form object object to form a unique character.

### 2.4 Unreal Engine 4

Unreal Engine is a Game engine that is software intended for the creation and development of a video game. Now there are many outstanding all kinds of game engine and among the many game engine that circulated there are very famous, namely Unreal Engine from Epic Games and Unity from Unity Technology.

Unreal Engine 4 is the latest game engine series developed by Epic Games, and was first introduced in 1998 with the first-person shooter genre game. Although primarily developed for first-person shooters games, but Unreal Engine is also good for making other genre games. Unreal Engine 4 uses the C ++ programming language, and Unreal Engine is a tool used by many game developers at the moment.

Unreal engine 4 has a number of excellent features including the blueprint feature [12].

Briefly blueprint is a visual script editor, a feature developed by Unreal Engine to create games without having to write any programming code. Although it is clear there are limits that can be done by blueprint. But this feature is very helpful to create a prototype of a game or application.

## 3. Analysis and Design

### 3.1 Problem Analysis

Problem analysis is a form of exposure problem in PT. Dynamics Artistika 75 before the construction of this virtual tour application. The problems encountered include the following:

1) Clients want more detailed information about 225 type housing units such as interior and exterior parts of 225 type housing units, so that clients get a clearer picture of the overall building model of the 225 type house unit, while the current media is not satisfactory for client.
2) The promotional media currently used (brochure / pamphlet) is less effective in the promotion process, because it only displays a small part of the specification information of the type 225 housing unit that only displays the 2D (two dimensional) building model to the extent of the image without knowing the appearance of real home units.

.

### 3.1 Analysis of the System to be Built

The application to be built is a Virtual 3D tour application for 225 type home units using desktop platform. The desktop platform is chosen because it has several advantages, especially in terms of a more detailed 3d presentation, with sharper visuals, making it more effective than other platforms. The goal to be achieved from the design of this application is to be able to display information about the type 225 home unit with more effective and interactive and easy to use by the client. Virtual tour home unit 225 is static so no database usage is required, all only use local storage and do not use internet connection when its usage. The system flow to be built is divided into two main processes, namely:

1. Virtual tour process
2. Object Manipulation Process

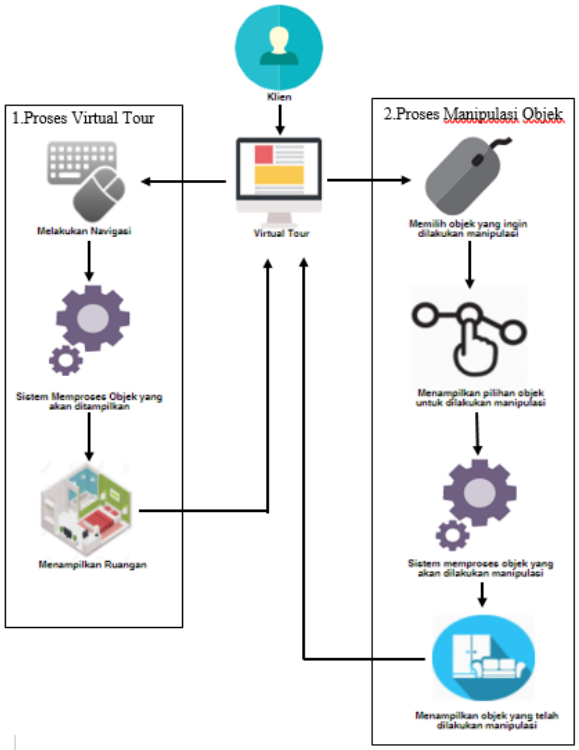



**Figure 2 System Flow to be Built**

1. Virtual Tour Process

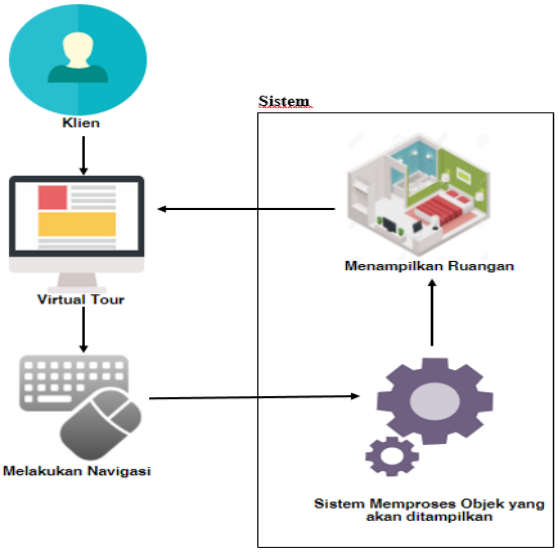



**Figure 3 System Flow of Virtual Tour to be Built**

Information :

a) The client is an app user, this app is offline.
b) When the client runs the application, then selects the virtual tour menu then the system will process to display the virtual environment.
c) Navigation is performed by the client to explore the virtual environment.
d) The system processes any navigation performed to any other functionality.

e) The system displays each side of the room the client wants to explore.

2. Manipulation Object Process

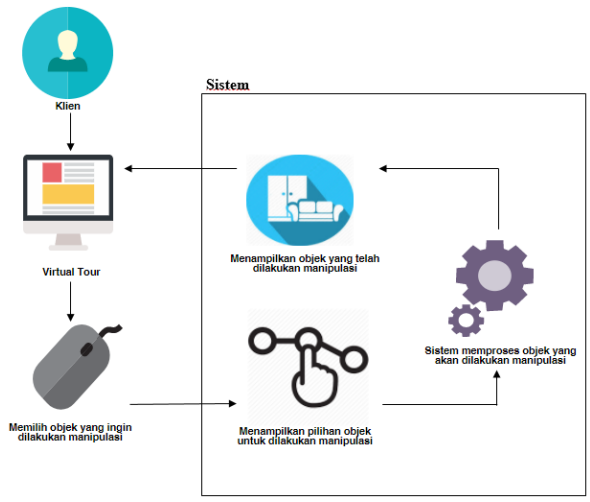



**Figure 4 System Flow of Manipulation Object to be Built**

Information :

a) The client is an app user, this app is offline.
b) When the client runs the application, then selects the virtual tour menu then the system will process to display the virtual environment.
c) The client selects the object to be manipulated.
d) System displays options to the client for object manipulation.
e) The system processes the selection of manipulated objects.
f) System displays objects that have been manipulated.

### 3.3 House Modeling Analysis of Type 225

At this stage, refer to the data that has been obtained before, then used as a reference for making 3D models, making some objects such as furniture and the exterior and interior using 3Ds Max tools while building models using unreal engine engine game 4. Then all the necessary materials Combined, by going through several stages necessary to become a virtual tour application. Groove modeling model of type 225 can be seen in Figure 5 below.

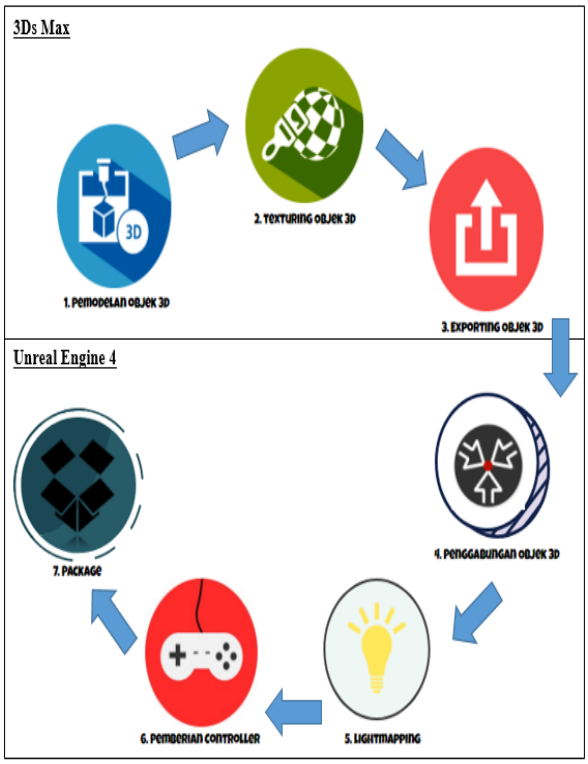



**Figure 5 System Flow of House Modeling of Type 225**

Outline the process of making the application Virtual Toour 3D Interactive is done through 7 Stages, ie starting from the modeling process (Modeling), then texturing, followed by Exporting, merging and compiling objects, Lightmapping, giving controller and ending package process. Explanation of the design stages undertaken:

1) 3D Modeling

At this stage that is done is making the 3D objects needed. In making this 3D object using Autodesk 3Ds Max modeling tools and for the reference is the floor plan, as well as 3d models of sketch-up.

2) Texturing

At this stage determine the characteristics of an object in terms of texture. On each object will be made texture to look more real / real, that is by giving the color index on each part of the object in accordance with the specified.

3) Exporting Object

At this stage is done exporting 3D objects created using 3Ds Max into the form .FBX file. This file can be further manipulated such as merging and arranging objects in unreal engine game engine 4.

4) Merging and Arrangement of Objects

At this stage is done merging and preparation of 3D objects that have been made. This process uses unreal engine engine 4 game, exported in the form of .FBX file imported into Unreal Engine 4, at this stage the objects are arranged in such a way as to resemble real conditions in the real world.

5) Lightmapping

At this stage is done giving light to the scene. Light or light is an important part of a scene, the light

determines the color and atmosphere of the 3D environment.

6) Provision of Controller or Navigation

At this stage the first person controller is made, but in unreal engine 4 itself has been available without the need to make from scratch, which is required next is the adjustment of the first person controller functions innate unreal engine 4 according to the needs of the client. For setting the input used in the application, make it through the features of unreal engine 4 is blueprint, the process of design is done by visual scripting.

7) Package

Is the process or the final stage of the whole making of this 3D Virtual tour application. In this stage all data that has been stored or entered in the process of modeling, texturing, exporting, merging and arranging objects, lightmapping, and controlling will be translated in an output. The output or package of the unreal engine is an application with a ready-to-use .exe format.

### 3.4 Software Requeirements Specification

Software requirements specification is done based on virtual tour application needs. Software requirements specifications are divided into two parts: SKPL-F (Requirements for Functional Software Requirements) and SKPL-NF (Non-Functional Software Requirements Specification). Functional SKPL can be seen in table 1:

**Table 1 SKPL Functional**

| Numb | Requirement Code | Requirement Description |
|---|---|---|
| 1 | SKPL-F-01 | The system can conduct a virtual tour process |
| 2 | SKPL-F-02 | The system can displays a video process |
| 3 | SKPL-F-03 | The system can displays a information process |
| 4 | SKPL-F-04 | The system can displays a guide process |
| 5 | SKPL-F-05 | The system can displays a resolution process |
| 6 | SKPL-F-06 | The system can displays a object interaction process |
| 7 | SKPL-F-07 | The system can displays a object manipulation process |

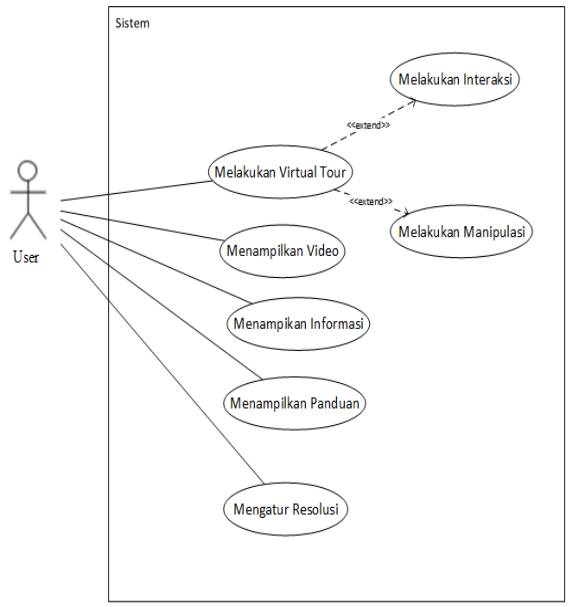



**Figure 6 Use Case Diagram**

### 3.4 Design Menu Structure

The design of the menu structure is a picture of the flow of application usage. The design of the menu structure of this application, as shown in Figure 7.

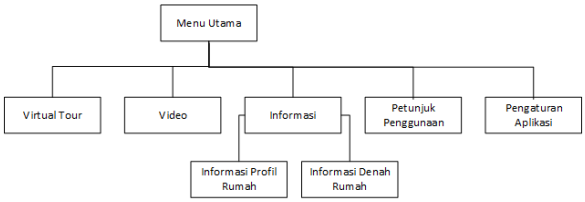
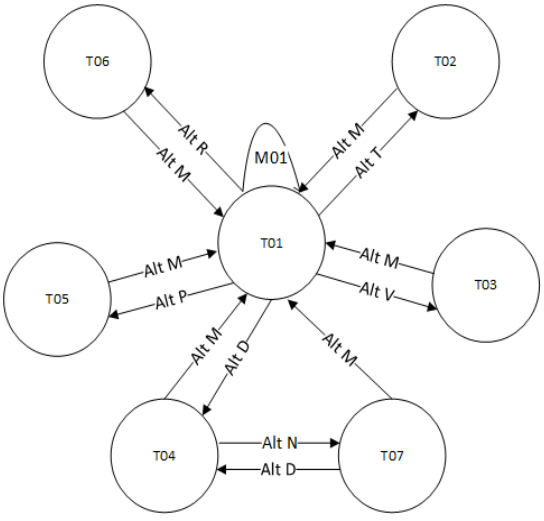



**Figure 7 Menu Structure**

### 3.4 Semantic Network

Semantic networks are graphical knowledge that shows relationships between objects. Semantic network of 3D virtual tour application Interactive housing elite Townhouse Bellefille is shown in figure 8.




**.Figure 8 Semantic Network**

Information :
T01 = Mainmenu
T02 = *Virtual tour*
T03 = Video
T04 = Details of the house
T05 = Guide
T06 = Resolution
T07 = House Plan
M01 = Notification Messages

## 4. Results and Discussion

The final result of this research is an interactive 3D virtual tour application that is used to provide information about 225 type home units in more detail and thorough.

### 4.1. Class Implementation

Implementation Class 3D interactive virtual tour application for media promotion of elite townhouse bellefillle housing in PT. Artistic Dynamics 75 with case study of type 225 house, can be seen in table 2.

**Tabel 2 Class Implementation**

| No | Nama *Class* | Kode Antar muka | Nama File Fisik | Keterangan |
|---|---|---|---|---|
| 1 | mainmenu | T01 | mainmenu _BuiltData .uasset | Controls the buttons in the main menu. |
| 2 | Virtualtour | T02 | virtualtour _BuiltData .uasset | Return from virtual tour to main menu. |
| 3 | Video | T03 | Video_Bui ltData.uass et | Return from video to main menu. |
| 4 | Informasi | T04 | informasi_ BuiltData. uasset | Return from information to main menu. |
| 5 | Panduan | T05 | Panduan_ BuiltData. uasset | Return from guide to main menu. |
| 6 | Resolusi | T06 | resolusi_B uiltData.ua sset | Return from resolution to main menu. |
| 7 | Widget | - | Widget_B uiltData.ua sset | A series of initial functions that can be used to build an interface displays. |
| 8 | FirstPerson Character | - | FirstPerso nCharacter _BuiltData .uasset | Control the virtual tour application. |
| 9 | Sofa_BP | - | Sofa_BP_ BuiltData. uasset | Manipulation of 3d object soda in 3d virtual tour application. |
| 10 | Meja_BP | - | Meja_BP_ BuiltData. uasset | Manipulatio n of 3d object table in 3d virtual tour application. |

### 4.2 The Application Interface

The opening view (main menu) is the first view when 3D virtual tour application is running.

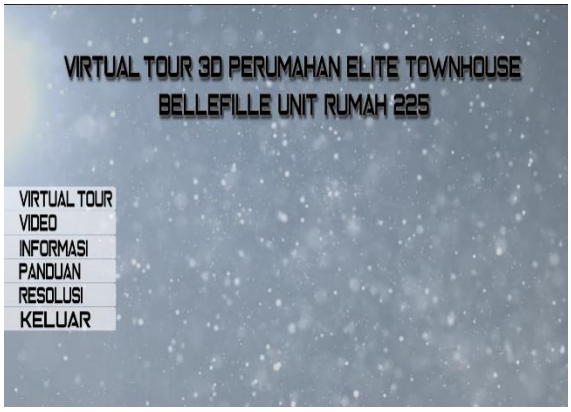



**Figure 9 Main Menu Interfaces**

The main menu display is a view on the main menu page where there are 6 (six) menu buttons are virtual tour menu, video, information, resolution, and exit menu.




**Figure 10 Virtual Tour Interfaces**

The virtual tour menu display is a virtual tour page where users can explore every corner of the house to get an overview and information about 225 type home units using keyboard and mouse navigation. In this virtual tour menu users can also interact and manipulate Against some objects that exist in this virtual tour.

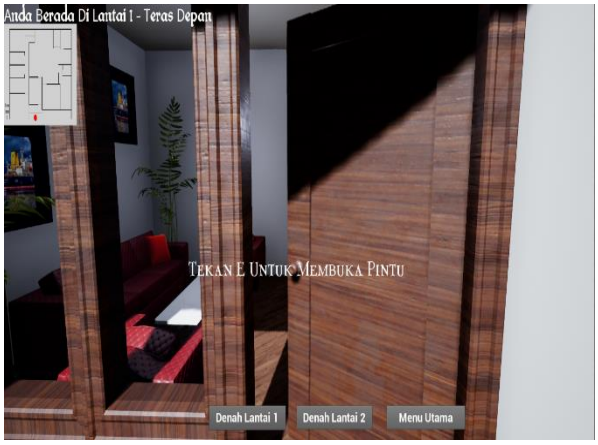



**Figure 11 Object Interactions Interfaces**

Interaction object view is a view on the virtual tour page where the user can interact with some objects in the virtual tour, for example the interaction to membka door.

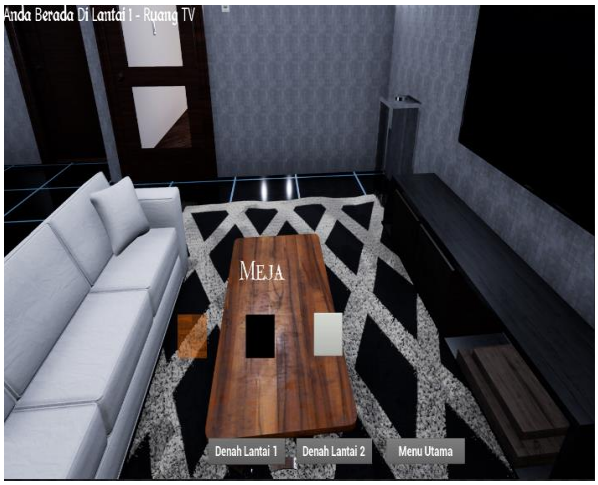



**Figure 12 Object Manipulations Interfaces**

The object manipulation view is a view on a virtual tour page where users can manipulate multiple objects in the virtual tour, for example interaction to change the color index of the table

## 5. TESTING

System testing is performed to determine errors or deficiencies in the system being tested. Testing also intends to determine whether the system is built is in accordance with the design made and meet the needs of users.

### 5.1 Blackbox Testing

After testing using blackbox method in 3D interactive virtual tour application for media promotion of elite townhouse bellefillle housing for type 225 house, it can be concluded that the existing functions are in accordance with SKPL made.

### 5.2. User Feedback

a. Conclusion of Questionnaire Result on First Purpose

Based on the results of questionnaires respondents from 6 statements can be concluded that interactive 3D interactive tour media for the elite townhouse bellefillle housing at PT. Artistic Dynamics 75 with case study of type 225 house, is in the Very Positive category of applications built because the total percentage is located between 1795 (quartile 3) with 755 (Maximum), which is the score limit on the very positive attitude category. This means that overall respondents viewed this application very well.

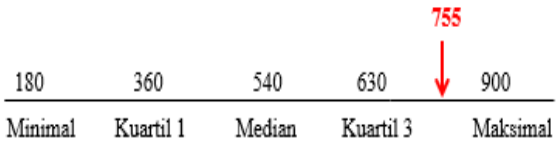



**Figure 13 Overall Scale**

b. Conclusion of Interview Result on Second Purpose

Based on the interview result, it can be concluded that this virtual tour application can assist the company in promoting the design of building type 225 housing units to the prospective buyer with better and informative, besides this application is as expected by the company because it can describe the type 225 house unit with More details than previous promotional media. Broadly speaking this application is in accordance with the goals to be achieved from the construction of this application.

## 6 Closing

A. Conclusion

Based on the results of research, analysis, system design, and implementation and testing in the form of questionnaires, can be drawn the following conclusions:

1. From the results of questionnaires to 30 respondents who are prospective buyers of the type 225 home unit, the overall scale is in a very positive category of applications built, meaning that overall respondents viewed this application very well.
2. From the results of interviews on the company, this application can help the company in promoting the design of building type 225 home units to prospective buyers with more detail and informative

B. Suggestions

To improve the quality and functionality of this application then the suggestions that can be put forward for future improvement and consideration are as follows:

1. The system has been built can be developed with the addition of features to add objects in realtime while doing Virtual Tour.

2. The system has been built can be developed with the addition of fast travel feature to move to the desired location during the Virtual Tour.

## REFFERENCE


[1] Aznoora Osman, Nadia Abdul Wahab, Mohammad Hafiz Ismail, “Development and Evaluation of an Interactive 360° Virtual tour for Tourist Destinations”, Journal of Information Technology Impact, Vol. 9, No. 3, pp. 173-182, 2009.

[2] Luther, Arc C, Authoring Interactive Multimedia. Boston: AP Professional, 1994.

[3] athania, Moh. Sofyan S. Thayf., Hamdan Arfandy. "Virtual Tour Berbasis 3d Untuk Pengenalan Kampus Stmik Kharisma Makassar".Mei, 2014.

[4] Colasante, Meg. Nicola Building Virtual Tour; “Considering simulation in the equity of experience concept”, Problems with learning from computer-based simulations: a case study in technology. British of Educational Technology, pp. 106-117, 2011.

[5] Jan, Dusan; Rogue, Antonio; Leuski, Anton; Morie, Jacki; Traum, David. “A Virtual Tour Guide for Virtual Worlds”, CA : Marina Del Rey,2009.

[6] Cook, A.D,“A case study of the manifestations and significance of social presence in a multi-user virtual environment”, Florida : HarperCollins, 2009.

[7] Tjiptono, Fandy,“Strategi Pemasaran”, Yogyakarta: Andi, 2000.

[8] Kotler, Philip., Marketing Management, Millenium Edition North Western University New Jersey, Prentice Hall Inc, 2002.

[9] Binanto, Iwan, “Multimedia Digital – Dasar Teori dan Pengembangannya”, Yogyakarta: Andi, 2010.

[10] Elst, P., & Jacobs, S., “Object-Oriented ActionScript 3.0”, First Edition. Brussel : Apress, 2007.

[11] Darwiyanti, Sri., Romi Satria Wahono,”Pengantar Unified Modeling Language (UML)”,Jakarta : IlmuKomputer, 2003.

[12] Blueprint Visual Scripting [Tersedia].: https://docs.unrealengine.com/latest/INT/Engine/Blueprints/index.html [Diakses: 20 Mei 2017].

[13] Harianto Bambang., “Rekayasa Sistem berorientasi Objek”, Bandung : Informatika Bandung, 2004.

[14] Mustaqbal. Sidi M.Roeri Fajri Firdaus .Hendra Rahmadi ”Pengujian Aplikasi Menggunakan Black Box Testing Boundary Value Analysis (Studi Kasus : Aplikasi Prediksi Kelulusan Snmptn)”, Universitas Widyatama, Teknik Informatika, Fakultas Teknik, Badung vol.1,no.3,2015.

[15] Akip Suhendar, Aditya Fernando. "Aplikasi Virtual Tour Berbasis Multimedia Interaktif Menggunakan Autodesk 3Ds Max".September, 2016.