Application Development Visualization 3D Infotainment Map of Indonesia Komputer University

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ABSTRACT

Indonesian Computer University is one of universities in Indonesia didn't have interactive map on their campuss, until now the information that give from campuss there is not enough, so that the student difficult to finding locations around campus area. The application can give Visualization 3D Infotainment Map of Indonesia Computer University on dekstop will be installed in every building UNIKOM's main room.

This application can give informations and simulation room in the area building to let users more easily find information room in the campus. In this application there are features such as providing room information, employees information, visualization is use by First Person Camera and search room area with A* Algorithm.

On the results of the research test consisting of alpha testing using black box testing method that focus on software functional and beta testing by creating a questionnaire to the students who studied in Indonesian Computer University to get result for this application to help users find the information and give visualization for user to make user easier to get the information.

Keywords: Modeling, Texturing, First Person Camera, A* Algorithm

1. INTRODUCTION

Indonesia komputer University (UNIKOM) is a private University located in Bandung, West Java, exactly on JL. Si No. 112-116. Since its establishment in 2000, each year the University Computer Indonesia received approximately 3,000 new students up to academic year 2015/2016 University Computer Indonesia has 2 buildings there are 6 faculties and 23 Courses with a number of students as much as 15,000 people from different corners of the country and from abroad who are being educated at the University of Indonesia (UNIKOM) Computer.

The campus of UNIKOM have many rooms good classroom, Secretariat departments, professors, laboraturium spaces and other spaces. Based on the results of data collection using the questionnaire addressed directly to 50 students on the campus ofUNIKOM with 96% of the student's results still lack information about the layout of the room on the campus of UNIKOM so hard the student in finding existing spaces around campus.

University of Indonesia still does not yet have Computer media to provide complete information about the existence and the layout of a room around campus so in finding a room either visitors or students had to find a way to ask someone else or find your own information by relying on the number of available spaces at the door of the room, then it needs a multimedia technology to provide information about the layout and other information regarding the University Campus Computer room in Indonesia , which is currently one of the most exciting form of information is by way of interactive where users can more easily obtain the information given, by building an interactive multimedia application on the campus of the University of Indonesia and the user can interact directly with the system so that the user will have no trouble to get more information and get to know the layout of the room around the campus of UNIKOM.

Based on existing problems, then one solution is offered with the research entitled 3D Visualization applications development folder in the University Building Infotainment Computer Indonesia.

1.1 Goals and Intention

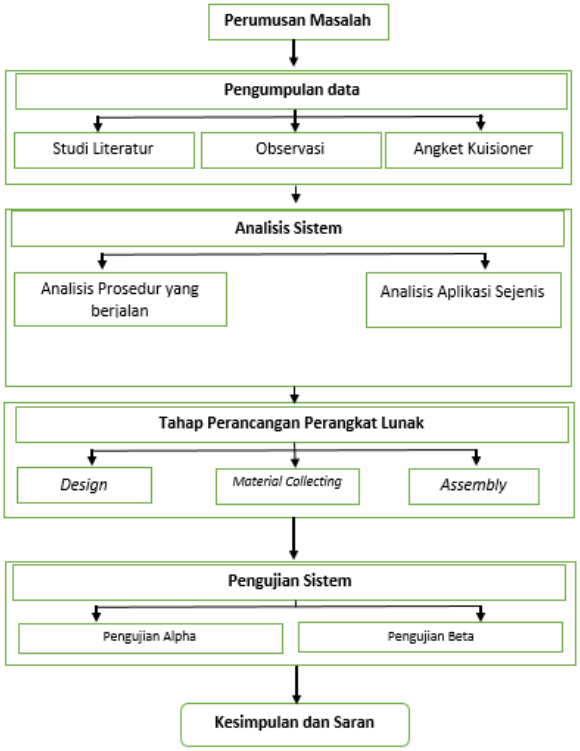
As the matter was examined, then the point of writing this final task is to build the application in the Folder of the University Building Infotainment Computer Indonesia.

As for the expected goals in applications that are built are:

1. Help users either students or visitors to get information about an existing room in University campus building Indonesia's computer.
2. Give the application to read a map with 3D visualization interactively so that it can be more easily accepted by the user is intended for users who want to see the infrastructure of the building.

1.3 Research Methodology

The research method has several stages related research in the development of multimedia application Visualization 3D Infotainment Unikom Folder that can be supported in the development of applications and writing in this research:



Gambar Error! No text of specified style in document.**.** Research Methidilogy

Diagram of the research methods used to describe the way how a research will be carried out. A stage will be done related to the construction of the multimedia application itself is as follows.

1.3.1 Formulation of the problem

Formulation of the problem is an attempt to express in writing what research questions need to be answered or resolved the way of solving the problem. Problem formulation is an elaboration of problem identification and demarcation problems. In other words, the formulation of this problem is a complete and detailed questions about the scope of the issues that will be examined are based on the identification of problems and limitations problems.

1.3.2 Data collection

Data collection activities is looking for the real data that will be used to address the issue of research. Data collection methods used in the study to build the multimedia application is as follows:

a. The study of Literature
   The gathering by way of collecting literature, journals, paper and the readings that have to do with the title of peneltian in the development of multimedia interactive map applications.
b. Observations
   Data collection with the research and review of direct permalasahan of knowledge in delivery, from the start the permissions directly from the Rector of up to analyze the needs of whatever is required in applications that will be built.
c. Questionnaire
   Data collection with selembaran questions to be addressed to the respondent, namely students studying at the University of Indonesia's computer.

1.3.3 system analysis

Conduct an analysis of the existing system with the aim of designing a new system. System analysis process is divided into three, namely the analysis of the running procedures, analysis of similar applications and analysis system that will be built.

1.3.4 Stage Design Software

Stage Design software in principle aims to help produce a quality software. The design of application program used refer to model Sutopo, Ariesto Hadi [12]. stages – stages in the development of the software to be built are:

a. Design

Design (design) is the stage of creating the specification regarding the architecture program, display styles and needs in materials/materials for the program.

b. Material Collecting

Collecting material is where the collection of materials to suit your needs done like building and modelling information on the map. This step can be done in parallel with the stages of Assembly. In some cases, Collecting Materials and stage-stage Assembly will be done in parallel is not linear.

c. Assembly

Assembly stages (making) is a stage where all the multimedia material or object that has been created from the beginning to build object 3Dimensi room in the building of the University of Indonesia as well as Computer display perangcangan that exist in the application to be built will be consolidated and pasted code in Unity 3D tools.

1.3.5 Testing System

System testing is done at the time of software development is already built with the purpose of directing the testing to find mistakes – mistakes and make sure that the input is limited will provide the actual results that correspond to the required results. The stage of testing is done in the system are:

a. Testing the alpha
   A programme applied in the establishments, the program must be free of mistakes or errors. Therefore, the program must be tested in advance

to find errors that might occur, this testing method using black box testing.

b. Beta testing

Beta testing is the testing that was done objectively dmana tested directly spaciousness that is concerned with creating a questionnaire regarding the satisfaction of users.

1.3.6 the conclusions and suggestions

research is a brief statement about the results of the analysis of the description and discussion of the results of hypothesis testing that has been done in a study.

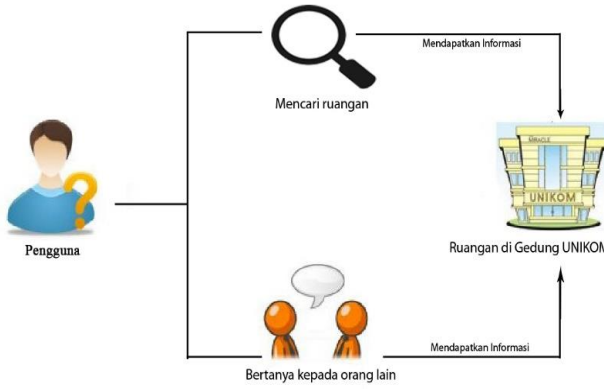
1.9 Blender 3D

Blender 3D, is one of the 3D animation software is capable of. In addition to 3D animation, Blender can also be used to work on the creative content in the field of multimedia special effects, such as color, making game koreks iteraktif and editing (editing) videos. One of the other advantages, Blender can run on various operating systems.

2. CONTENT OF RESEARCH

2.1 Analysis process

Analysis of the running System or analysis process is a step that gives an overview of the system that is running right now. This analysis aims to give a more detailed picture of how the workings of the system that is running. Analysis in finding room on the campus of the University of Indonesia's computer is as follows:



Gambar 2. Analisis Prosedur yang sedang berjalan

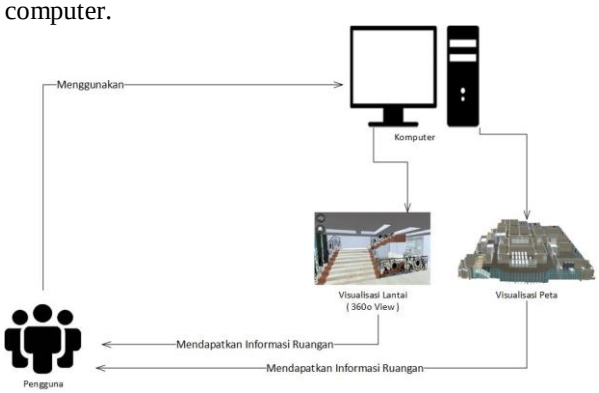
Explanation:

1. The user is looking for a room to ask to others exist around the campus of the University of Indonesia's computer.

2. Users looking for their own room with a view the room number information that is on the door of the room

2.2 System Architecture

On the system architecture of the application to be built is composed of several components, namely the user application folder by using computer infotainment in the middle room entrance on the campus of the University of Indonesia's computer.

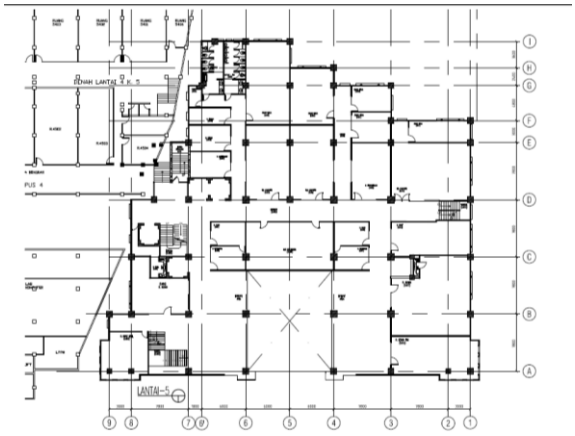


Gambar 3. System Architecture

While using the application, the user can look at a map and seeing the visuals around the room on the floor that was already selected by the user in the form of 3D grafs. On visualization of map users can direct the camera on the application and travel to around the floor to see and to get information about an existing room in a building on the campus of the University of Indonesia's computer.

2.3 Creation of 3Dimensional

The creation of 3-dimensional objects to visualize the object with the specified 3-dimensional graphics with the scale on the floor plan of the original building of the University of Indonesia's computer. Tools used for the manufacture of 3-dimensional object of this is to use a Blender.



Gambar 4. *Print Out* Floor Plans

The process of creating texture in 3 dimensional objects is the process of making and administering of colour and material on an object

that was made so it would seem a real impression. The granting of material or texture on a 3D object will define the appearance and type of material of the 3D object.



Gambar 5. Texture Process

Following are the results of 3-dimensional object modeling with Blender 3D application that will be in use for the Unity application can create interactive applications

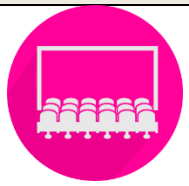


Gambar 6. 3D object

2.4 Map Legend

The making of a legend on a map of existing needs in the area of building of the University of Indonesia's computer and can be seen in the following table :

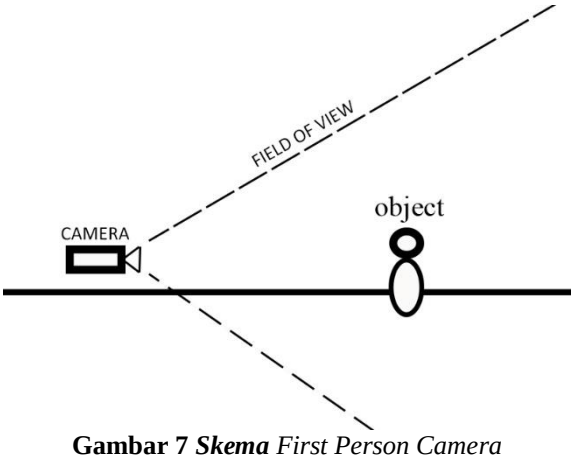
Tabel 1. Tabel informasi

Icon	Deskripsi
	*Icon* yang memberikan informasi letak Auditorium
	*Icon* yang memberikan informasi letak Canteen / Kantin
	*Icon* yang memberikan informasi letak *Emergency Exit* / Tangga Darurat
	*Icon* yang memberikan informasi letak tangga naik.
	*Icon* yang memberikan informasi letak Lift
	*Icon* yang memberikan informasi letak Toilet
	*Icon* yang memberikan informasi letak Mushola / Mesjid
	*Icon* yang memberikan informasi letak Perpustakaan
	*Icon* yang memberikan informasi tentang dimana pengguna bisa melihat kedalam gedung
	*Icon* yang memberikan informasi letak Area Parkir

2.5 First Person Camera

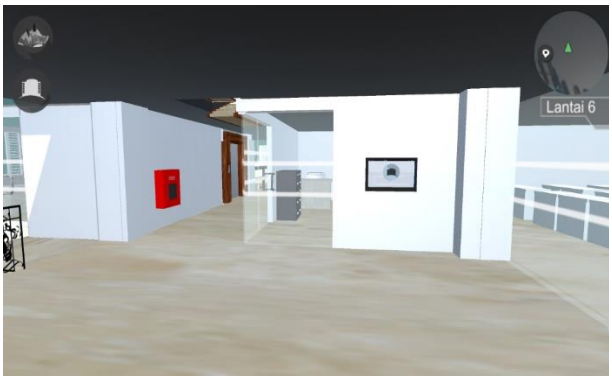
In 3-dimensional visualization needed a point of view of the users of the system where the user can see the area of the room, basically tools Unity

Engine is an application to create a game, in-game interface to the user has a very important role especially how point of view that is used when the application is in a 3-dimensional visualization is executed. First person camera is an ability to see the visual perspective of the first person point of view in which the standpoint of the way from the user side of the main cast is as different from the third person camera, where the camera will be in different positions with an object and will follow an object.



Gambar 7 ***Skema*** *First Person Camera*

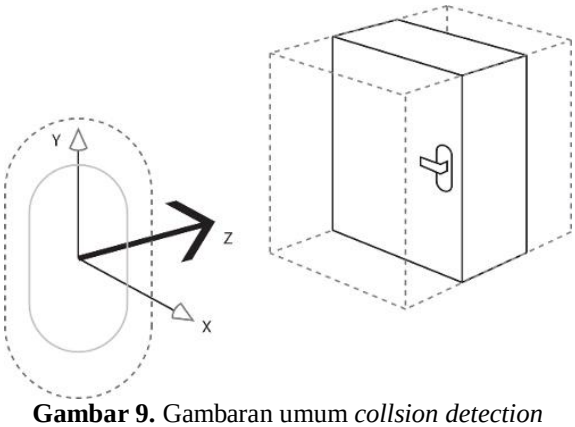
In a first person camera users can point the camera in accordance with the desire of users to view room located in the area of the building in accordance with the field of view that can be reached by a camera. Users can direct the camera by using the controls on the keyboard towards the object in the form of information – the information room.



Gambar 8. *First Person Camera*

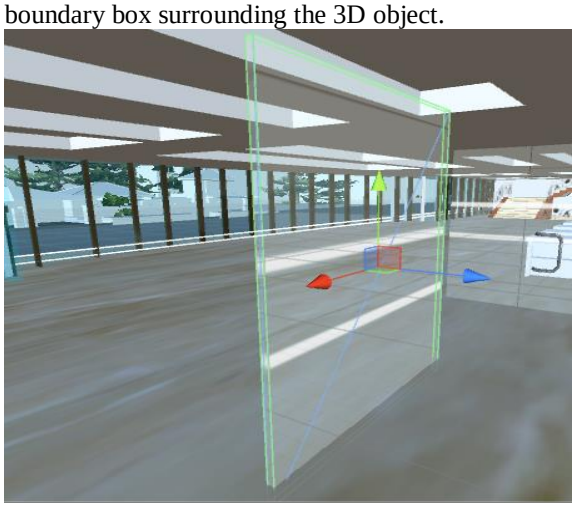
2.6 ***Collision Detection***

Collision detection is the detection of a collision between two or more objects so that objects can react and not mutually penetrating when objects meet. Collision detection is a fundamental thing in the field of game programming, the function that is used to be able to know what objects – objects that come into contact with one another in the field coordinate 2 dimensional or 3 dimensional. In addition, Collision detection is also useful for determining the position of one object with another object so that there is no object that pierces.



Gambar 9. Gambaran umum *collsion detection*

Collision detection functionality already available in unity 3D tools. The technique used is the bounding box of the unity that forms the boundary box surrounding the 3D object.



Gambar 10. Penggunaan *collsion detection*

In the image above is a bounding box with green stripes are applied on all door room in the floor in the application that is being built. Just as the Bounding box are applied on the stairs before, Bounding box there is a part of the door is a cube.

2.7 Analisis of Hardware

The minimum hardware specification required in order to run the application Visualization 3D Infotainment this folder with optimum is as follows:

Tabel 2. Spesifikasi Perangkat Keras yang dibutuhkan

Perangkat Keras	Spesifikasi
Prosesor	Processor dengan minimal kecepatan 1,80 GHz
Memory	RAM 1 GB
Harddisk	Free Space minimum 800

Perangkat Keras	Spesifikasi
	MB
VGA	VGA dengan kecepatan minimum 512GB
Monitor	Monitor dengan resolusi 1366 x 768 pixel
Mouse	Standar
Keyboard	Standar

2.8 Black box Testing

Black box testing testing that is done just observe the results of execution through test data and functional checks of the software. Black box testing to evaluate only from the outside appearance and functionality. The following is a table of the results of testing done on a black box application Visualization 3D Infotainment Folder in the building of the University of Indonesia's computer.

Tabel Error! No text of specified style in document.**.** Kasus dan Hasil Pengujian *Black Box*

Komponen yang Diuji	Kasus Uji	Hasil Sesuai Uji Kasus	Keterangan
Halaman Utama	Memilih tombol "Masuk Gedung"	Menampilkan halaman visualisasi peta	[√] Diterima [ ] Ditolak
	Memilih tombol "Panduan Penggunaan Sistem"	Menampilkan halaman panduan penggunaan sistem	[√] Diterima [ ] Ditolak
Visualisasi Peta	Memilih tombol "pilih peta"	Menampilkan peta yang dipilih	[√] Diterima [ ] Ditolak
	Memilih tombol "visualisasi lantai"	Menampilkan halaman visualisasi lantai	[√] Diterima [ ] Ditolak
	Memilih tombol "Pencarian"	Menampilkan halaman pencarian	[√] Diterima [ ] Ditolak
Panduan Penggunaan Sistem	Memilih tombol "Kembali"	Menampilkan halaman utama	[√] Diterima [ ] Ditolak
Visualisasi Lantai	Memilih tombol "Menu utama"	Menampilkan halaman utama	[√] Diterima [ ] Ditolak
	Memilih tombol "Visualisasi Peta"	Menampilkan kembali ke halaman visualisasi	[√] Diterima [ ] Ditolak
	Memilih tombol "Informasi ruangan"	Menampilkan informasi ruangan	[√] Diterima [ ] Ditolak
	Memilih tombol "Naik tangga"	Menampilkan pesan konfirmasi menuju lantai berikutnya	[√] Diterima [ ] Ditolak
	Memilih tombol "Turun tangga"	Menampilkan pesan konfirmasi menuju lantai sebelumnya	[√] Diterima [ ] Ditolak

Cases and test results on the search is if the user enters data correctly when doing a search, could be seen in the table below:

Tabel 4. Kasus dan Hasil Uji Benar Pencarian

Kasus dan Hasil Uji (Data Benar)			
Data Masukan	**Yang Diharapkan**	**Pengamatan**	**Kesimpulan**
Pencarian : 6016	Text Field pencarian dapat terisi dengan benar	Text Field pencarian dapat terisi dengan benar	[√] Diterima [ ] Ditolak
Tombol	**Yang Diharapkan**	**Pengamatan**	**Kesimpulan**
Cari	Data pencarian benar dan sesuai lalu akan menampilkan lokasi pencarian	Data pencarian sesuai lalu menampilkan lokasi pencarian	[√] Diterima [ ] Ditolak

Cases and test results incorrectly on the search is if the user does not enter data at all and the user does not enter data correctly when doing a search, could be seen in the table below:

Tabel 5. Kasus dan Hasil Uji Salah Pencarian

Kasus dan Hasil Uji (Data Salah)			
Data Masukan	**Yang Diharapkan**	**Pengamatan**	**Kesimpulan**
Pencarian : (kosong)	Sistem dapat menampilkan pesan bahwa data pencarian yang dimasukan tidak tersedia	Menampilkan pesan "Masukan data dengan benar"	[√] Diterima [ ] Ditolak
Pencarian : Abc123	Sistem dapat menampilkan pesan bahwa data pencarian yang dimasukan tidak tersedia	Menampilkan pesan "Masukan data dengan benar"	[√] Diterima [ ] Ditolak

2.10 Result of Black Box testing

Based on the results of testing a black box has done with cases that have been tested, then it can be inferred that in the 3D Visualization application folder in the University Building Infotainment Computer Indonesia does not have an error process and functionally appropriate application with generate design.

3. CONCLUDING

3.1. Conclusion

Based on the results of implementation and testing, then the conclusion of the construction of the 3D Visualization of multimedia Infotainment application folder on your computer this Indonesia University Buildings are as follows:

1. Based on the results of testing the black box on the system and a detailed questionnaire that was done to students. This interactive multimedia applications can assist users to more easily complete about a room in the building area of the University of Indonesia's computer.
2. Multimedia application that is built on this information can give you a map with interactive simulations and there are ways of describing the layout of the room in University campus building in the area of Indonesia with Computer visualization 3Dimensi.

3.2. Suggestion

3D Visualization of multimedia Infotainment Folder in the building of the University of Indonesia's computer is still far from perfect and said there were still many shortcomings. Therefore, the need for further development and refinement in order to meet the needs of the users on the University Campus Computer Indonesia. As for the suggestions – advice to developers against the application for the future are as follows:

1. the make and model of the building and adding a room in University campus area Computer Indonesia with more detail.
2. Navigation expected not only directs the user by using the main staircase alone but will give distance information from a large number of routes that can be traversed.

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