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To cite this article: M Yamin *et al* 2019 *J. Phys.: Conf. Ser.* **1413** 012031

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Visualization of Multi-Storey Building Visitor Guide Animation By Optimizing Macromedia Flash MX of Action Script Functions and 3D Max Studio (Study: Engineering Faculty Building, Muhammadiyah University of Yogyakarta)

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Abstract. Yogyakarta Muhammadiyah University (UMY) has 7 faculties, divided into 5 zones, namely the north zone, the west zone, the south zone, the east zone, and the middle zone. The Faculty of Engineering (FT-UMY) occupies the north zone. The problem is how one knows the location, position, and function of the room in the building, because every educational institution has many buildings, the shape of the building the same / similar, each building is occupied by many faculties, and has a large number of rooms. The concept of Visualization or Visual Communication Design is the study of communication concepts and creative expressions, techniques and media to convey messages and ideas visually, such as pictures, audio, video by processing graphic design elements. The Software / Tools used are Macromedia Flash MX and 3D Max Studio by utilizing and creating animation and visualization data base information systems with simple action script commands, generating visitor guide software has input data, namely: 1 faculty button and has 4 search buttons, i.e., find the lecturer button, find a room, search for majors, and find employee button. Has 4 output data consisting of: View (side view, rear view, and front view), path, floor plan, and building.

1. Introduction

Yogyakarta Muhammadiyah University (UMY) is one of the many private tertiary institutions in the City of D.I. Yogyakarta which has many lecture buildings, because UMY has 7 faculties with 18 strata-1 study programs and 2 strata-2 study programs and the total number of active students in the academic year 2007/2008 was 8,332 people. In the 2007/2008 academic year UMY received 4130 students from 6974 registrants (UMY Student Affairs Bureau, 2008) which had to be balanced with facilities and infrastructure such as lecture buildings, laboratory buildings, library buildings, etc.

UMY was officially established on March 1, 1981. The UMY building occupies \pm 25 hectares of land located on the ring road west ring, Tamantirto sub-district, Kasihan sub-district, Bantul district, Yogyakarta. (UMY Guide, 2010). From the development team of the UMY Campus in 2010, the UMY buildings are divided into 5 zones (area), namely:

- a. West Zone, consists of: Masjid
- b. East Zone, consist of: building A. R Fahrudin, and Ahmad Dahlan building



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- c. Centre, consists of: building stars
- d. North zone, consists of: construction of the Faculty of Medicine, construction of the Faculty of Engineering, construction of the Faculty of Agriculture and building of an Eksakta laboratory.
- e. South zone, consists of: the Faculty of Law Building, the Faculty of Economics building, the Faculty of Islamic Religion building, the Isipol Faculty building, the library building, and the non-exsacta.

The Faculty of Engineering at Muhammadiyah Yogyakarta University (FT-UMY) occupies the northern area of the Maeshorah Hillal building. FT-UMY existed and stood in the first year of established UMY, which is dated 01 March 1981, initially there is only one department of civil engineering, then developed so far there are three departments, namely civil engineering courses, engineering courses and mechanical engineering courses.

If we see from the building side, FT-UMY have a lot of room such as:

- a. FT Conference Room.
- b. Board room (TU) FT.
- c. Board room course (TU).
- d. Speaker Room D.
- e. Reference space E. FT.
- f. FT Zone.
- g. Seminar Room G. FT.
- h. Major seminar rooms.
- i. FT. Teaching room.
- j. General FT Stadium Hall.
- k. Space SPMU-TPSDP.
- l. Space Information Technology Reseach Group (ITRG-FT).
- m. Space Electrical English Club (EEC).
- n. PUSPER space, and
- o. Laboratory Room.

How does one know the location, position and function of the room in the FT-UMY building? This is because UMY has many buildings, the shape of the building is the same/similar, and each building is occupied by many faculties, and has a large number of rooms. Initial research was conducted in all faculties of the UMY and non-UMY campus areas randomly as many as 35 questionnaires.

Tabel 1. First Respondents

No	Major	Amount
1	Communication/UMY	13
2	Fisipol/UMY	1
3	Management/UMY	3
4	HI/UMY	5
5	Accounting Economics/UGM	1
6	Agriculture/UMY	1
7	Government Sciences/UMY	3
8	LAWI/UMY	4
9	FAI/UMY	1
10	Economics/UMY	2
11	Electro/UII	1
Total		35

From the results of research conducted obtained data

Table 2. Visitor Problems

No	Question	Percentage (%) \approx Respondent	
		Ya	Tidak
1	Are you confused about finding a room in FT	82.86 % \approx 29 orang	17.14 % \approx 6 orang
2	Do you need a long time to find the room you are looking for at FT	85.71 % \approx 30 orang	14.29 % \approx 5 orang

2. Research Method

According to Sunardi Purwosuwito, visualization or design of visual communication is a science that learns the concept of communication and creative expressions, techniques and media to convey messages and ideas visually, such as images, Audio, Video by processing Graphic design elements form images, fonts and colors, and layout them, so that messages and ideas can be accepted by the lens.

2.1. Visualization Term

The term visualization is developed from graphic design, namely:

- Graphic Art/Graphic Arts, including in the fine arts group.
- Chart/Chart, is a question related to a text or image that contains meaning to convey a message or information.
- Graphic design, the term used before using the term Visual Communication Design, derived from the Greek word "Graphos" which means "writing/drawing".
- To anticipate the development of visual communication and its broader role, he used the term visual communication design visualization or design.

2.2. Principles and Visualization Elements

Visual messages must be creative (original, innovative and fluid), communicative, effective and effective, yet beautiful/aesthetically pleasing. The elements of graphic design are just like the basic elements in other design disciplines. Elements (including shape, shape, texture, line, value and colour) form the basic principles of visual design. Principles, such as balance, rhythm, pressure (emphasis) and unity, then form a broader structural aspect of the composition.

2.3. Visualization Tools

The equipment used for the design visualization of an object is resourceful (mind), eye, hand, traditional tools (such as pencil or ink), and computer. A concept or idea is generally not considered a drawing until it is realized or expressed in visual form.

The software/tools that can be used to design the visualization of an object that more attractive and vivid are as follows:

2.3.1. Design

- Adobe Photoshop: Point-based design (bitmap).
- Adobe Image Ready: Reframe images in HTML format.
- Adobe Illustrator: vector design.
- CorelDraw: Vector design.

2.3.2. Animation

- 3D Studio Max and SketchUp 5: To create objects and 3D animations.
- GIF Building Set: Create an animated GIF file.
- Macromedia Flash: Shows small vector animations.
- Microsoft Gif Animator: Create an animated GIF file.
- Swift 3D: Design 3D animations with FLASH file formats.
- Swish: Create a wide range of text effects with the FLASH file format.
- Ulead Cool 3D: Create a 3D text effect animation.

2.4. *The Need for Knowledge in the Design of Visual Communication*

- a. Know the concept of visual communication design as the basis of the design/design and communication strategy.
- b. Familiarize with graphic design (visual communication design) and language as a visual information data processor.
- c. Know the technical of principles, information technology processes and information systems management.
- d. Understand the elements of graphic design as an effective, effective, communicative and aesthetically creative messaging tool in the context of conceptual policy/planning/strategy and implementation and evaluation.
- e. Understand communication strategy, psychology and social/cultural anthropology.
- f. Understand some new media, especially the world of media/cyberspace and technology:
 - Animation - Visual, audio-visual video (Mix Media).
 - Interactive media and web/website commonly used to complement online media and mix media/multimedia.
- g. Master the concept of visual communication design and universal global marketing. Master process and design techniques that can anticipate the development of the entrepreneurial/enterprenuership world.

2.5. *Flow Chart*

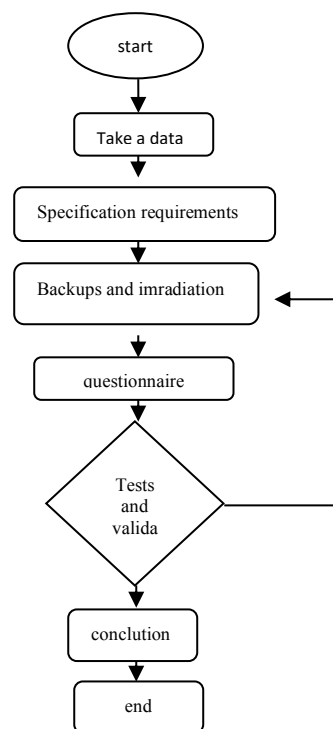


Figure 1. Flowchart Design and Testing

2.6. Visualization App Design

The development is seen in this design by putting in place detailed application specifications. At this point, the selection of media users intend to use the media accordingly, not reducing the purpose of the system.

2.6.1. Design Charts (IMAGES)

Using 3D Studio Max or SketchUp 5 The process of creating object images and 3D animation of the complex FT-UMY construction area, from creating a construction plan to a 3D building image.

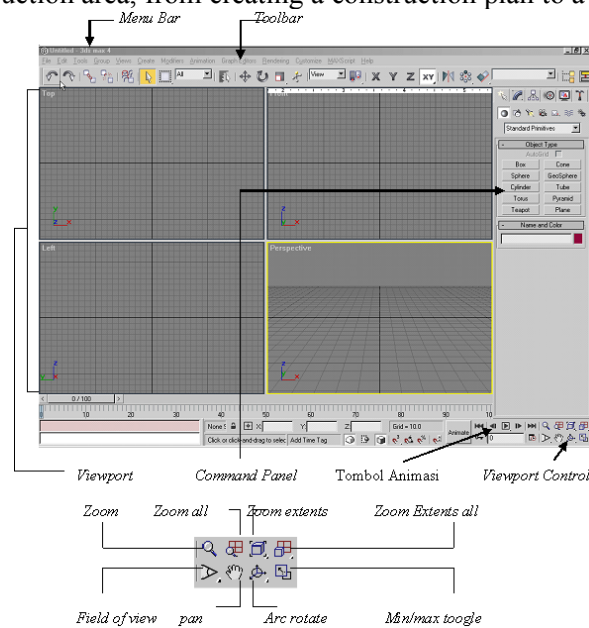


Figure 2. 3D Studio Max or SketchUp 5

2.6.2. Design of the Application Form

Display design for part of the main application (form), including:

2.6.2.1. Shape for the main menu.

2.6.2.2. Train for the search menu, which is the form search speaker, find space, find a course and find employees.

2.6.2.3. Form for the majors, that is. electro, civil and machine form.

2.6.2.4. Form for the Faculty of Engineering.

2.6.2.5. Additional forms, i.e. forms at a glance, logos, support software, on FT, thank you, and biodata admins.

2.6.2.6. Form for exit/exit, shape appears, tracks, floor plans and buildings



Figure 3. Image of design application menu

2.6.3. Database/Action Script Design

The development of the system produces parts and unifies with the system, in addition to developing application software, its functions include special activities such as editing and writing. Using 2004 Macromedia Flash MX software to create animations and database visualization of the information system with a simple action script command:

```
gotoAndStop("background",1);
} animasi : Frame 1 stop(); background
on (press) {
gotoAndStop("background",5);}
on (press) {
gotoAndStop("background",5);}
on (press) {
gotoAndStop("background",5);}
on (press) {
gotoAndStop("background",5);}
on (press) {
gotoAndStop("background",5);}
on (press) {
gotoAndStop("background1",35);
}
```

2.7. Validation and Testing of Application Functions With

Based on the test results, the quantitative analysis was to explain the ease of interpretation of the results of the data analysis. This analysis is also used to draw conclusions from the statistical state presented. The 45 respondents sampled the questionnaire from students of UMY students and non-UMY students. The 45 respondents are:

Table 3. Testing of Respondent

Major/university	Amount
Electro/UMY	14
Machine/UMY	4
Dentistry/UMY	2
PSIK/UMY	2
Agriculture/UMY	2
HI/UMY	3
IK/UMY	6
Management/UMY	2
Law/UMY	3
Economy/UMY	4
Accounting/UGM	1
M. Computer Science/BSI	1
AKP/UNY	1
Total	45

Responses from all respondents collected were classified and aggregated as required. Using the respondent's selection techniques systematically when the selected respondents actually tested the visitor guide software offered.

The type of questionnaire is a closed questionnaire, where the questionnaire consists of questions with a number of optional answers.

Table 4. App Ratings

No	Question	%			
		SS	S	TS	STS
1	easy to use.				
2	has a menu (link) that is easy to understand.				
3	has an attractive look.				
4	pictures of the building in accordance with the original building.				
5	can save time in room search.				
6	room searches are more effective than having to ask others.				
7	7 is able to provide accurate information.				
8	8 has the output/information space in the Faculty of engineering that corresponds to the location and the actual condition.				

Table 5. User Satisfaction Tests Toward Application

No	Question	Description	
		Yes	No
1	Do you know the position/layout of the rooms in the Faculty of Engineering.		
2	Do you know the position/layout of the part you are aiming for.		

All data obtained from respondents can be used as an analysis to take a conclusion.

3. Result and Discussion

Flow chart that runs in the visitors guide app.

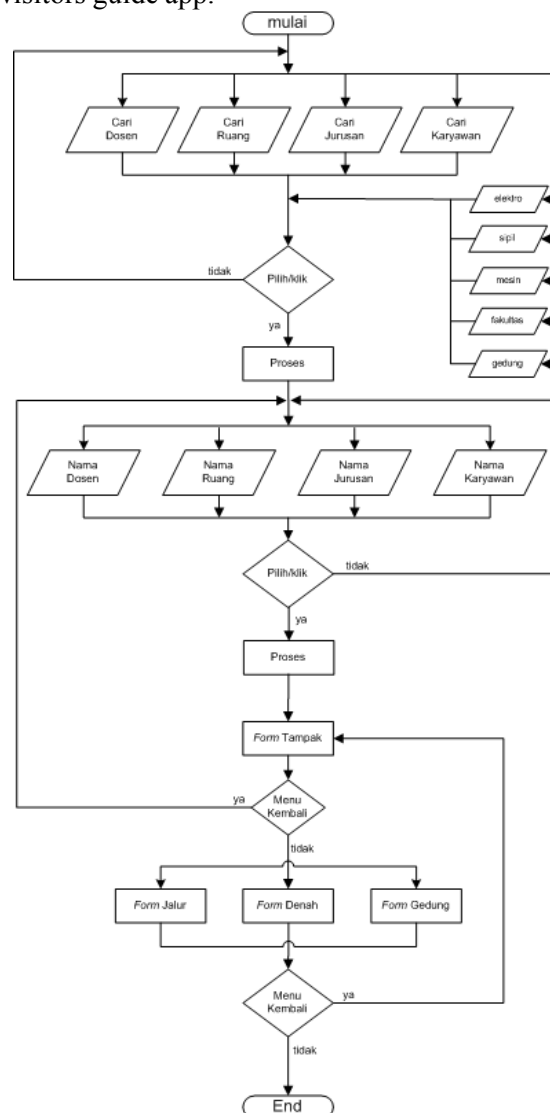


Figure 4. Flowchart of Visitors Guide App.

3.1. Complex Images of FT-UMY Building (3Dimensions)

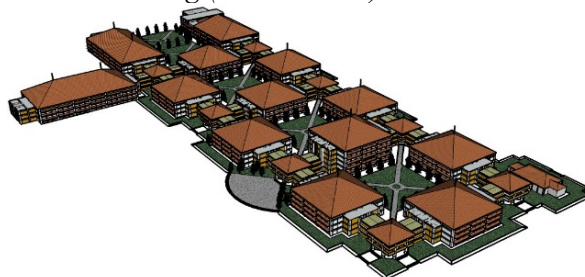


Figure 5. Complex Building of FT-UMY (3D)

The construction of the FT-UMY building has plenty of space, including: FT Conference Room, Ft Board of Directors (TU), Board of Directors (TU), Speakers Department, FT Reference Room, FT Seminar Room, Course Space Seminars, Room FT, General FT Stadium, Space SPMU-TPSDP, Space

Information Technology Reseach Group (ITRG-FT), Space Electrical English Club (EEC), PUSPER and Lab Room.

3.2. Application Menu

This Form has the main button, as follows:

- a. 1 Main Menu button.
- b. 4 search buttons, namely:
Search for lecturers, search for space, search for majors, and search for Employees button.
- c. 3 course buttons, namely:
Electro, civilian, and Machine buttons.
- d. 1 button Faculty of Engineering.
- e. Button building, namely:
- f. Laboratory link buttons, F1 Building buttons, F3 Building buttons and F4 building buttons.
- g. Additional buttons, namely: Fleeting, logos button, supporting software , about FT, thank you, and biodata admin buttons.

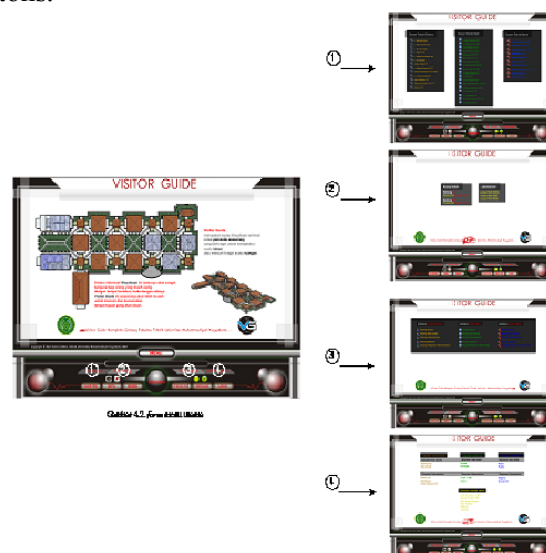


Figure 6. Application Menu

3.2.1. Lecturer Search Menu

This form is used to locate and locate the location/position of the speaker room, such as the electro speaker, the civilian speaker and the FT-UMY machine speaker.

3.2.2. Room Search Menu

This form is used to locate and locate the location/position of conference rooms and FT-UMY laboratories. This form contains two functions of the research space, namely the conference room and the laboratory. In the laboratory, the research is transformed into 3 buttons: electrical engineering, civil engineering, mechanical engineering.

3.2.3. Major Search Menu

This form is used to locate and locate the location/position of the speaker room, the administration room, the lab room, the seminar room and the main room in each major.

3.2.4. Employee Search Menu

This form is used to locate and locate the location/position of the employee's space, such as employee administration majors, laboratory employees and engineering faculty employees.

3.2.5. Faculty search Menu



Figure 7. Faculty Menu

This form contains the names of the Faculty of Engineering space, such as the Faculty of the Executive Room, the Faculty of the TU Room, the Seminar Room, the Conference Room, the EEC Space, the ITRG Space, the PUSPER Space, the Faculty of the Reference Room, The SPMU-TPSDP space, faculty area, General Stadium and teaching room.

3.2.6. Building Menu

This form is used to find the location/position and know the rooms based on the name of the building in FT-UMY.



Figure 8. Building Menu

This form contains five link buttons: F1 Building, F3 Building, F4 Building and (two) laboratories.

3.2.7. Exit Form

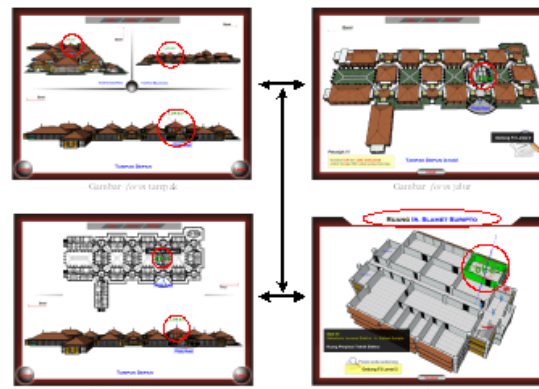


Figure 9. Exit/exit

The form that was created must be easily understood and understood by the user, and then made 4 different views, as follows:

3.2.7.1. Form Appears

Displays images of 3D buildings with 3 buildings visible, face, rearview mirror and front-facing.

3.2.7.2. Path Form

Shows a 3D building image with a path/direction to the destination point.

3.2.7.3. Floor Plan Form

Shows an image of the 2D building floor view and the front view of the building.

3.2.7.4. Building Form

Shows a more detailed 3D room image with a space location, a space name and a path/direction to the destination point.

3.3. Software Validation

This validation process is done to prove that all the functions of the software must be expected by the administrator and the user. By doing a certain component part validation process, starting from the input until the software output is expected to get a better application result. Following Table 6 Software Validation.

Table 6. Software Validation

No	Function	Output Result	Status
1	Search for lecturer	Shape appearances: Side view, rear view and front view of the building. Plane shape: Images of the 2D construction plan look up and in front of the building. Line shape: path/direction to the destination point. Construction form: View the speaker's name and the speaker room at FT-UMY and the path/direction to the destination point.	reached
2	Search for room	Shape appearances: Side view, rear view and front view of the building. Plane shape: Images of the 2D construction plan look up and in front of the building. Line shape: path/direction to the destination point.	reached

		Shape building: Conference room and display lab in FT-UMY and line/direction at point destination location.	
3	Search for major	Shape appearances: Side view, rear view and front view of the building. Plane shape: Images of the 2D construction plan look up and in front of the building. Line shape: path/direction to the destination point. Building shape: Shows the name of the space and rooms on the FT-UMY and the path/direction to the destination point.	reached
4	Search for employees	Shape appearances: Side view, rear view and front view of the building. Plane shape: Images of the 2D construction plan look up and in front of the building path form: The path/direction to the destination point location. Building form: Displays the employee's name and the employee's space at FT-UMY as well as the path/direction to the destination point location.	reached

3.4. Software Function Test by User

This test was carried out by demonstrating the visitor guide complex visualization software FT-UMY building and providing questionnaires to the user in order to know the level of satisfaction of respondents in terms of ease in the use of the software, software display, software benefits and real-world software information.

The *questionnaires* distributed to respondents up to 45 people calculated their statistical data with a different percentage of responses on each of the questions asked. The following Table 7 is a result table of questionnaire testing software functions by user.

Table 7. The Result of Questionnaire Testing Software Functions by User

No	Questions	Percentage(%) \approx Respondent			
		SS	S	TS	STS
1	Easy to use.	22 % \approx 10	76 % \approx 34	2 % \approx 1	0 % \approx 0
2	Has a menu (link) that is easy to understand.	13 % \approx 6	69 % \approx 31	18 % \approx 8	0 % \approx 0
3	It has an attractive look.	20 % \approx 9	69 % \approx 31	11 % \approx 5	0 % \approx 0
4	Images of buildings according to the original building.	13 % \approx 6	69 % \approx 31	16 % \approx 7	2 % \approx 1
5	Can save time in room search.	22 % \approx 10	67 % \approx 30	11 % \approx 5	0 % \approx 0
6	Room search is more effective than having to ask others.	11 % \approx 5	71 % \approx 32	18 % \approx 8	0 % \approx 0
7	Able to provide accurate information.	9 % \approx 4	71 % \approx 32	20 % \approx 9	0 % \approx 0

Table 8. User Satisfaction Tests Toward Application

No	QUESTION	Description (%)≈ Respondent	
		Yes	No
1	Do you know the position/layout of the rooms in the Faculty of Engineering.	82.22 % ≈ 37	17.78 % ≈ 8
2	Do you know the position/layout of the part you are aiming for.	88.89 % ≈ 40	11.11 % ≈ 5

4. Conclusion

- (1) Based on the result of the questionnaire that distributed to 45 respondents, it can be concluded that this visitor guide software can help visitors in the process of finding a room at FT-UMY. In case this software can save time in the search room. Up to 10 respondents - 22% said they strongly agreed, 30 respondents - 67% said they agreed, in case room search is more effective than having to ask others, Up to 5 respondents, of whom 11% agree, 32 respondents, 71% responded by the accord.
- (2) This visitor guide software has data input, namely: 1 faculty button and has 4 search buttons, namely: button search speaker, search space, search for majors, and employee search button. It has 4/exit data consisting of: visible (side view, rear view, and front view), path, floor plan, and building.

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