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The implementation of augmented reality of promotional media in daihatsu dealers

Tri Handayani[1], Rihayes[2], Tri Yuliati[3], Ari Sellyana[4]
[1,2,3,4]Sekolah Tinggi Teknologi Dumai

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ABSTRACT

Some companies make product offers or promotions that aim to improve the quality and attractiveness of their products and increase consumer attractiveness. Daihatsu Duri car dealership is one of them. Augmented reality (AR) is one of the media used for product marketing. This research is how to use Augmented Reality to promote Daihatsu dealers and display 3D objects of Rocky Daihatsu cars on mobile markers as promotional media. The results of this study indicate that in the menu display experiment, one menu that was not displayed successfully was to select zoom. Testing on markers can be tested properly. For remote experiments, at a distance of 60 cm it can be detected, but not consistently. Meanwhile, light testing shows that the ambient light type of ARCamera Light is a bit dark, and markers are not detected properly. A stable internet connection is required to use this app, and lighting is also very important as AR cameras cannot detect markers in low light, so they cannot display 3D objects automatically.

Corresponding Author:

Tri Handayani,
Informatics engineering,
Sekolah Tinggi Teknologi Dumai,
Jl. Utama Karya Bukit Batrem, Dumai - Riau, Indonesia
Email: trihandayani.stt@gmail.com.

1. INTRODUCTION

With advances in technology, there are many ways to market products, such as using print media (brochures, banners, etc.) and online media. The use of technology in product promotion fosters interesting, innovative, and interactive innovations. Besides, the use of hardware and software in the delivery of promotions into one unit. Promoting something is a means of advancing the commerce industry. The purpose of promotion is develop trade business, and it is the company's responsibility to engage and communicate with target customers. Customer satisfaction is a crucial factor that depends on the quality, productivity, and nature of services offered by a particular service provider. In the case of restaurants, customer satisfaction is a property of the restaurants' image, customer interests, dining environment, quality of food and the price to be paid (Dampage , Egodagamage, Dissanayaka, & Senarathne, 2021)

Some companies carry out product offers or promotions aimed at increasing the quality and attractiveness of their products and increasing consumer appeal. The Daihatsu Duri car dealership is one of them. One car from each company is offered at every car show staged at the mall or showroom. Under these conditions, more brochures will be used in

marketing to promote cars. The brochures distributed to prospective customers or busy visitors during the event were good, but because the units were limited, it made it difficult for potential customers who wanted to see the model and spare parts of the car directly.

Augmented reality (AR) is one of the media used for product marketing. Augmented reality (AR) technology provides a better perception of real-world objects by including additional information on the user's actual view. In general, AR systems project computer-generated augmentations over real objects, combining real and virtual objects. (Siriwardhana, Porambage, Liyanage , & Ylianttila, 2021). Therefore, the application of augmented reality (AR) 3D objects for Rocky Daihatsu cars on mobile markers really needs to be done; apart from being promotional, this application can also make it easier for the public or customers to find out in detail about Rocky cars.

Previous research related to augmented reality (AR) has been conducted by ((Saryani, Cholisoh, & Nurwana, 2022) in this study the application of augmented reality as a media promotion media was studied at Raharja University. The resulting design includes application flow design, application functionality, and application interface design. The resulting design can clearly describe the application and display 2D images of objects in 3D. Information that has not been included in the brochure can be displayed virtually and attractively. Then, research conducted by ((Affan, Suryanto, & Arfriandi, Implementation of Augmented Reality as Information and Promotion Media on Dieng Tourism Area, 2018) resulted in an Augmented Reality application that can visualize Dieng tourist attraction information as interactive tourism information and promotion, attracting the media. Users will get information about every tourist attraction in Dieng through an augmented reality application that contains a lot of content about sites that have been scanned by Natural Markers at each Dieng tourist attraction location with their smartphone.

In this research will implement augmented reality (AR), with the method used is marker-based tracking. This study uses several paths, including initialization of features on markers, namely the process of preparing images with PNG and JPG extensions to be used as markers, and tracking "target" images, namely the process flow of the camera on the mobile so that it can detect markers after displaying 3D objects for Daihatsu Rocky cars. The purpose of this research is How to use Augmented Reality to promote Daihatsu dealerships and display 3D objects for Rocky Daihatsu cars on mobile markers as promotional media.

2. RESEARCH METHOD

The method used in this study is a marker based tracking. This study uses several paths, including: 1. Feature initialization on the marker is the process of preparing images with PNG and JPG extensions for use as markers. 2. Tracking Image "Target" is the flow of the camera process on mobile so that it can detect a marker. 3. Bringing up the 3D object of the Daihatsu Rocky car is a stage at the time the target image detection matches the one in the database, so the object will appear. The stages where an object will appear on the target image have been applied so that when tracking the camera image, it is capable of detecting markers that have been set and displaying 3D objects.

Figure 1. 3D Object on Top of Media Marker

Next, do an analysis to find out the distance and angle needed to bring up objects. To display objects look perfect and well then designed with position 450 Device : xiaomi poco X3 pro, minimum distance: 25 cm and maximum distance: 50 cm.

The design stage is carried out with the aim of finding the best shape for the application that will be built by taking into account the problems and requirements that exist in the system. At the stage of combining the use of hardware and devices, the appropriate software is required to achieve an optimal design that is simple to implement.

a. Augmented Reality Rocky Car Brochure

The author uses a brochure as the implementation and utilization of a car brochure, which of course has several pictures and objects focused.

Figure 2. Car Brochure

This brochure only provides a general description of the spare parts specs for one unit of the Rocky automobile. Information about the actual shape, requirements, and other information will be realistically shown by creating the target picture marker.

b. Front End/User Menu Structure

The design of the menu structure is an illustration of the application usage path users will take when using this mobile application. Structure Design The menu in this application can be seen in Figure 3.

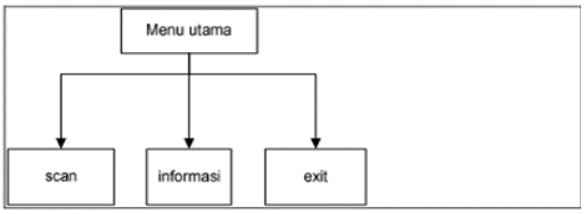
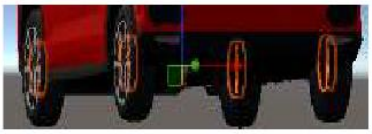


Figure 3. Daihatsu rocky car app AR Menu Structure

C. Car 3D Object Design

Car 3D objects are designed using Blender 3D. There are 15 spare parts that will be displayed with the design in Table 1 as follows:

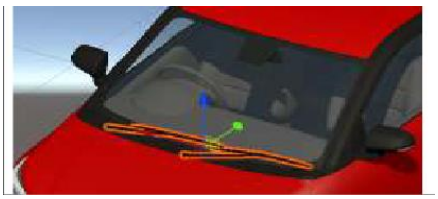
Table 1. Car 3D object

Object Name	Object Name 3D Image Object
1. Full 3d Car	
2. Brake caliper	
3. Brake Disk	
4. Bumper front	
5. Trunk	
6. In terior	

7. Rim

8. Front light

9. Wiper



10. Tire

11. Mirrors

12. Windows glass

13. Seat place

14. Sensor

15. Steering

3. RESULTS AND DISCUSSIONS

At this stage, the results of the interface design are implemented in the built system. The following is the initial display menu interface for the first time when the application is accessed by the user.

Figure 4. AR main menu

After that, in the display menu interface after scanning, the user has to press the buttons to change color, zoom, or rotate to control 3D objects. can be seen in Figure 5.

Figure 5. Menu for displaying scan results

The main menu interface includes an information menu that displays how to use the application shown in Figure 6.

Figure 6. Menu for displaying scan results

As soon as the AR camera recognizes the corresponding marker pattern, a successful display of 3D items is made on each marker by the interface. Table 2 below shows the outcomes of the presentation of 3D objects that appear on the marker:

After the AR camera has successfully completed its task of detecting the presence of the marker, the interface display has succeeded in embedding 3D objects in each individual marker. Results of the 3D object's marker-based tampiling may be shown in table 2.

Table 2. Car 3D object

Marker Name	Result of AR Camera Marker Detection
	

The alpha test plan is a test of the functionality contained in the application to determine whether the functionality is in line with what the user wants or not. Marker Name as a Result of AR Camera Marker Detection. Test plan table of the system built are referred to in table 3 as follows:

Table 3. Application Testing Plan

No. Components	tested Test item	Type testing
Menu	Choose the Blackbox scan button Selecting	Blackbox Blackbox Blackbox

	Selecting the Exit button	
Marker	Choose Marker brochure	Blackbox
Distance	Camera distance to marker	Blackbox
Light	The light around the camera on markers	Blackbox
Rotation	Select the rotation button	Blackbox
Zoom	Selects the blackbox zoom button	Blackbox
Change color	Selects the change button color	Blackbox
Spare parts	button Selects the spare parts button	Blackbox

The test results contain the exposure of the test plan that has been prepared in the test scenario. This test is carried out to pay attention to the input into the system and output from that input. Based on the test plan, it can Alpha testing is carried out on the following applications:

a. Testing the menu display

This test is a functionality test for displays menus that have been implemented in the application

Table 4. Menu Display Testing

No.	Case/tested	Test scenario	Results that expected	Test result
1.	Menu	Select scan menu	Do tracking use detect patterns markers for bring up 3D objects in a manner virtual	[√] Succeeded [ ] Not successful
2.		Select knob information	When user push the button information then will display how to use application	[√] Succeeded [ ] Not successful
3.		Select exit button	When user hit exitinfo then it will come out from the application	[√] Succeeded [ ] Not successful

4.	Select change color	When user press replace color then change color object	[√] Succeeded [ ] Not successful
5.	Select zoom	When user pressing zoom will be magnify objects	[ ] succeed [√] Not successful
6.	Select spare parts	When user pressing spare parts will be magnify objects	[√] succeed [] Not successful

Select spare parts When user pressing spare parts will be magnify objects [√] succeed [] Not successful

b. Marker Testing

Marker Testing Marker testing is done to find out whether each marker shown to have an error or not, the result of the test can be seen in table 5.

Table 5. Testing on Markers

No.	Case/tested	Test scenario	Results that expected	Test result
1.	Marker	Marker Shows	Markers brochure Showing Car 3D objects	[√] Succeeded [ ] Not successful

c. Distance testing

Testing the distance of using a marker, the closer the marker is to the camera, the smaller the detected marker is, and it can be captured properly. However, as the distance between the camera and marker increases, the size of the marker visible to the camera decreases, so the marker pixels become less visible and less likely to be detected.

Table 6. Distance Testing

Distance (Cm)	Distance test results
10	are detected, but the object is too big, so some are not visible
20	Detected and the object is well visible
30	Detected and the object is well visible
40	Detected and the object is well visible
50	Model
60	was detected but was inconsistent. Not detected

d. Light testing

This test is very influential on the object to be displayed on a marker pattern that will be detected by ARCamera

Table 7. Light Testing

ARCamera ambient light type	Results for ambient light type
Marker bright	light is well detected
The light is rather dark.	The marker is not detected properly
Marker sunlight	well detected

4. CONCLUSION

The conclusion obtained from this study is that the functional output results are as expected, but there are still some functions that are not as expected due to limitations in using the library in this application. A stable internet connection is required to use this app, and lighting is also very important as the AR camera cannot detect markers in low light, so it cannot display 3D objects automatically. This augmented reality can help Daihatsu dealers Kota Duri in promoting products by displaying 3D objects of Rocky Daihatsu cars on mobile markers. Future research can complete the display of spare parts in more detail and display 3D objects from other types of Daihatsu cars.

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