

APPLICATION OF AUGMENTED REALITY TECHNOLOGY IN A CUSTOM CAR RIDE SELECTION APPLICATION (CASE STUDY: IMPALA AUTO FASHION)

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ABSTRACT

The use of augmented reality technology as an auxiliary medium in the wheel selection process is proof of the very rapid development of technology. An effective way to make work easier is by utilizing augmented reality technology, namely combining two-dimensional objects or three-dimensional objects that are applied to the real world. In other words, augmented reality is a combination of two or three-dimensional objects with the real world. A lot of time and energy is simply spent during the process of replacing car rims because the car owner does not feel comfortable with how to disassemble the rims, therefore the augmented reality application is a breakthrough to simplify and speed up the process of selecting rims, the method used is concept, design, assembly, testing, and distribution. The result of the research is an augmented reality application to simplify the process of selecting and replacing car rims on Impala auto fashion.

Keywords: *augmented reality, MDLC, custom car*

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INTRODUCTION

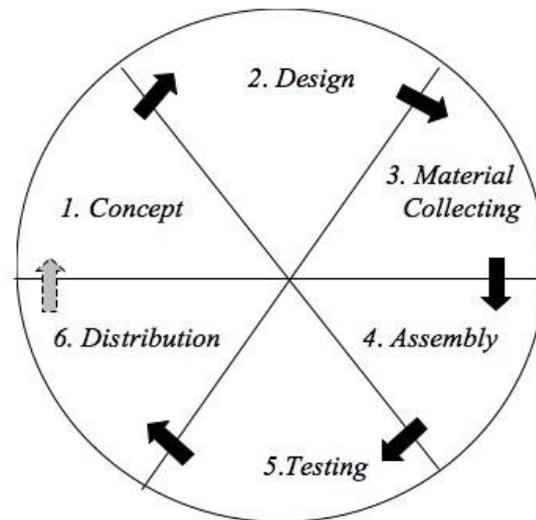
Augmented reality itself is an environment that inserts 3D virtual objects into a real environment. AR allows users to interact in real-time (Al Fatta, 2007; Gorbala & Hariadi, 2010). The use of AR has now expanded to various aspects of our lives and is projected to experience very significant development. This is because the use of AR is very interesting and makes it easy to use it to do things (Fachrurozi & Wibowo, 2023; Gusty Syafruddin, 2018; Nazruddin Safaat H, 2012). For some car owners, modification by replacing standard rims with racing or competition models is not something that is often done. The aim of replacing the rims on a car is to make the car look more attractive according to the desired character (Aprianto et al., 1945; Kevin Anggara, 2022). However, in reality, replacing rims is not as easy as you might imagine by just going to the rim shop then looking for a suitable model and installing it. From the results of the researcher's interviews with shop owners, there are still several complaints that are often encountered because not all the rims sold match what customers want, in terms of model and specifications, so the author plans to create an augmented reality application to make the process of selecting rims easier (Darnita & Pranata, 2021; Maramis, 2016; Rifa'i et al., 2014).

The application of Augmented Reality application to help customers choose rims is expected to help and make it easier for consumers who are looking for rims at Impala Auto Fashion which is located at Jalan Gerilya Purwokerto, as well as able to improve service and as a facility to make it easier for consumers to choose custom rims because it uses Augmented technology reality so that consumers can easily choose rims that are suitable for use with their vehicle (Alam, 2021; Fransiska et al., 2017; Muntahanah et al., 2017).

With this in mind, the author tried to create an application called "Augmented Reality Rims". This application has the main feature, namely displaying the Augmented Reality of the rim that will be selected and providing information about the rim itself in the form of diameter, price range, and number of bolt holes.

METHOD

The method used in system development in this research is the multimedia development life cycle (MDLC) with the Luther-Sutopo version (Rentor, 2013).



The MDLC development stages are as follows:

1. Concept

In this stage, the purpose of the application is determined, namely to make it easier for consumers to choose rims with Augmented reality so that consumers can more easily match the rims they want available at Impala Auto Fashion for consumer cars and save time and energy for handling mechanics.

2. Design

Design (design) At this stage, detailed application specifications are made in an application design, apart from determining what needs will be needed to apply the concept that has been created.

3. Material Collecting

Material collecting is collecting materials according to needs by collecting data in Impala Auto Fashion in the form of photos of wheel rims which will be entered into the application.

4. Assembly

In this stage, several software are used such as Adobe Photoshop, Vuforia, and Unity 3D.

5. Testing

This stage is tested by the manufacturer or carried out by the manufacturer himself. In testing this application, the accuracy of the object is checked based on the marker, because it only uses one marker. The next test is testing the availability of objects/objects with a size that matches the size of the rim so that the marker is well highlighted.

6. Distribution

In this stage, applications that have been tested and declared good according to the purpose of manufacture will be given to Impala Auto Fashion.

RESULTS AND DISCUSSION

Concept

This augmented reality application aims to help Impala Auto Fashion customers choose wheel rims to be installed on their cars to shorten the time compared to the disassembly method, as well as lighten the burden on the mechanics who install them. This application can only be used on Android devices with cameras, Android specifications must be Jellybean and above, and requires approximately 80MB of internal memory.

Design

Design is the stage of making specifications regarding the architectural style program, appearance, and material or material requirements which are carried out in detail because they will have an impact on the next stage.

a. Shooting



Figure 1 Photo of Vossen wheels rims

b. Create PNG material



Figure 2 Process of making rims in PNG format

c. Coding

```
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
F:\Skripsi HNZ_Marker + Velg\Scrip\Assets\SwitchPanel
SwitchPanel.cs | SwitchPanel.cs | SwitchPanel.cs
1 using System.Collections;
2 using System.Collections.Generic;
3 using UnityEngine;
4
5 public class SwitchPanel : MonoBehaviour {
6
7     public WhatPanel WP;
8
9     public void MainMenu ()
10    {
11        WP.MenuPanel=true;
12        WP.FilihUkuran=false;
13        WP.Ukuran1=false;
14        WP.Ukuran10=false;
15        WP.Ukuran17=false;
16        WP.Ukuran18=false;
17        WP.Ukuran20=false;
18        WP.Fanduan=false;
19        WP.Tentang=false;
20    }
21
22    public void FilihUkuran ()
23    {
24        WP.MenuPanel=false;
25        WP.FilihUkuran=true;
26        WP.Ukuran1=false;
27        WP.Ukuran10=false;
28        WP.Ukuran17=false;
29        WP.Ukuran18=false;
30        WP.Fanduan=false;
31        WP.Tentang=false;
32    }
33
34    public void Fanduan ()
35    {
36        WP.MenuPanel=false;
37        WP.FilihUkuran=false;
38        WP.Ukuran1=false;
39        WP.Ukuran10=false;
40        WP.Ukuran17=false;
41        WP.Ukuran18=false;
42        WP.Fanduan=true;
43        WP.Tentang=false;
44    }
45
46    public void Tentang ()
47    {
48        WP.MenuPanel=false;
49        WP.FilihUkuran=false;
50        WP.Ukuran1=false;
51        WP.Ukuran10=false;
52        WP.Ukuran17=false;
53        WP.Ukuran18=false;
54        WP.Fanduan=false;
55        WP.Tentang=true;
56    }
57
58    public void Kembali ()
59    {
60        WP.MenuPanel=true;
61        WP.FilihUkuran=false;
62        WP.Ukuran1=false;
63        WP.Ukuran10=false;
64        WP.Ukuran17=false;
65        WP.Ukuran18=false;
66        WP.Fanduan=false;
67        WP.Tentang=false;
68    }
69
70    public void Home ()
71    {
72        WP.MenuPanel=true;
73        WP.FilihUkuran=false;
74        WP.Ukuran1=false;
75        WP.Ukuran10=false;
76        WP.Ukuran17=false;
77        WP.Ukuran18=false;
78        WP.Fanduan=false;
79        WP.Tentang=false;
80    }
81
82    public void Exit ()
83    {
84        WP.MenuPanel=false;
85        WP.FilihUkuran=false;
86        WP.Ukuran1=false;
87        WP.Ukuran10=false;
88        WP.Ukuran17=false;
89        WP.Ukuran18=false;
90        WP.Fanduan=false;
91        WP.Tentang=false;
92    }
93
94    public void About ()
95    {
96        WP.MenuPanel=false;
97        WP.FilihUkuran=false;
98        WP.Ukuran1=false;
99        WP.Ukuran10=false;
100       WP.Ukuran17=false;
101       WP.Ukuran18=false;
102       WP.Fanduan=false;
103       WP.Tentang=false;
104   }
105
106   public void Help ()
107   {
108       WP.MenuPanel=false;
109       WP.FilihUkuran=false;
110       WP.Ukuran1=false;
111       WP.Ukuran10=false;
112       WP.Ukuran17=false;
113       WP.Ukuran18=false;
114       WP.Fanduan=false;
115       WP.Tentang=false;
116   }
117
118   public void Contact ()
119   {
120       WP.MenuPanel=false;
121       WP.FilihUkuran=false;
122       WP.Ukuran1=false;
123       WP.Ukuran10=false;
124       WP.Ukuran17=false;
125       WP.Ukuran18=false;
126       WP.Fanduan=false;
127       WP.Tentang=false;
128   }
129
130   public void Privacy ()
131   {
132       WP.MenuPanel=false;
133       WP.FilihUkuran=false;
134       WP.Ukuran1=false;
135       WP.Ukuran10=false;
136       WP.Ukuran17=false;
137       WP.Ukuran18=false;
138       WP.Fanduan=false;
139       WP.Tentang=false;
140   }
141
142   public void Terms ()
143   {
144       WP.MenuPanel=false;
145       WP.FilihUkuran=false;
146       WP.Ukuran1=false;
147       WP.Ukuran10=false;
148       WP.Ukuran17=false;
149       WP.Ukuran18=false;
150       WP.Fanduan=false;
151       WP.Tentang=false;
152   }
153
154   public void Disclaimer ()
155   {
156       WP.MenuPanel=false;
157       WP.FilihUkuran=false;
158       WP.Ukuran1=false;
159       WP.Ukuran10=false;
160       WP.Ukuran17=false;
161       WP.Ukuran18=false;
162       WP.Fanduan=false;
163       WP.Tentang=false;
164   }
165
166   public void License ()
167   {
168       WP.MenuPanel=false;
169       WP.FilihUkuran=false;
170       WP.Ukuran1=false;
171       WP.Ukuran10=false;
172       WP.Ukuran17=false;
173       WP.Ukuran18=false;
174       WP.Fanduan=false;
175       WP.Tentang=false;
176   }
177
178   public void AboutUs ()
179   {
180       WP.MenuPanel=false;
181       WP.FilihUkuran=false;
182       WP.Ukuran1=false;
183       WP.Ukuran10=false;
184       WP.Ukuran17=false;
185       WP.Ukuran18=false;
186       WP.Fanduan=false;
187       WP.Tentang=false;
188   }
189
190   public void ContactUs ()
191   {
192       WP.MenuPanel=false;
193       WP.FilihUkuran=false;
194       WP.Ukuran1=false;
195       WP.Ukuran10=false;
196       WP.Ukuran17=false;
197       WP.Ukuran18=false;
198       WP.Fanduan=false;
199       WP.Tentang=false;
200   }
201
202   public void PrivacyPolicy ()
203   {
204       WP.MenuPanel=false;
205       WP.FilihUkuran=false;
206       WP.Ukuran1=false;
207       WP.Ukuran10=false;
208       WP.Ukuran17=false;
209       WP.Ukuran18=false;
210       WP.Fanduan=false;
211       WP.Tentang=false;
212   }
213
214   public void TermsOfService ()
215   {
216       WP.MenuPanel=false;
217       WP.FilihUkuran=false;
218       WP.Ukuran1=false;
219       WP.Ukuran10=false;
220       WP.Ukuran17=false;
221       WP.Ukuran18=false;
222       WP.Fanduan=false;
223       WP.Tentang=false;
224   }
225
226   public void DisclaimerPage ()
227   {
228       WP.MenuPanel=false;
229       WP.FilihUkuran=false;
230       WP.Ukuran1=false;
231       WP.Ukuran10=false;
232       WP.Ukuran17=false;
233       WP.Ukuran18=false;
234       WP.Fanduan=false;
235       WP.Tentang=false;
236   }
237
238   public void LicensePage ()
239   {
240       WP.MenuPanel=false;
241       WP.FilihUkuran=false;
242       WP.Ukuran1=false;
243       WP.Ukuran10=false;
244       WP.Ukuran17=false;
245       WP.Ukuran18=false;
246       WP.Fanduan=false;
247       WP.Tentang=false;
248   }
249
250   public void AboutUsPage ()
251   {
252       WP.MenuPanel=false;
253       WP.FilihUkuran=false;
254       WP.Ukuran1=false;
255       WP.Ukuran10=false;
256       WP.Ukuran17=false;
257       WP.Ukuran18=false;
258       WP.Fanduan=false;
259       WP.Tentang=false;
260   }
261
262   public void ContactUsPage ()
263   {
264       WP.MenuPanel=false;
265       WP.FilihUkuran=false;
266       WP.Ukuran1=false;
267       WP.Ukuran10=false;
268       WP.Ukuran17=false;
269       WP.Ukuran18=false;
270       WP.Fanduan=false;
271       WP.Tentang=false;
272   }
273
274   public void PrivacyPolicyPage ()
275   {
276       WP.MenuPanel=false;
277       WP.FilihUkuran=false;
278       WP.Ukuran1=false;
279       WP.Ukuran10=false;
280       WP.Ukuran17=false;
281       WP.Ukuran18=false;
282       WP.Fanduan=false;
283       WP.Tentang=false;
284   }
285
286   public void TermsOfServicePage ()
287   {
288       WP.MenuPanel=false;
289       WP.FilihUkuran=false;
290       WP.Ukuran1=false;
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292       WP.Ukuran17=false;
293       WP.Ukuran18=false;
294       WP.Fanduan=false;
295       WP.Tentang=false;
296   }
297
298   public void DisclaimerPagePage ()
299   {
300       WP.MenuPanel=false;
301       WP.FilihUkuran=false;
302       WP.Ukuran1=false;
303       WP.Ukuran10=false;
304       WP.Ukuran17=false;
305       WP.Ukuran18=false;
306       WP.Fanduan=false;
307       WP.Tentang=false;
308   }
309
310   public void LicensePagePage ()
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312       WP.MenuPanel=false;
313       WP.FilihUkuran=false;
314       WP.Ukuran1=false;
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318       WP.Fanduan=false;
319       WP.Tentang=false;
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322   public void AboutUsPagePage ()
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328       WP.Ukuran17=false;
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330       WP.Fanduan=false;
331       WP.Tentang=false;
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334   public void ContactUsPagePage ()
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337       WP.FilihUkuran=false;
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342       WP.Fanduan=false;
343       WP.Tentang=false;
344   }
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346   public void PrivacyPolicyPagePage ()
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356   }
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358   public void TermsOfServicePagePage ()
359   {
360       WP.MenuPanel=false;
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370   public void DisclaimerPagePagePage ()
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382   public void LicensePagePagePage ()
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384       WP.MenuPanel=false;
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394   public void AboutUsPagePagePage ()
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418   public void PrivacyPolicyPagePagePage ()
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430   public void TermsOfServicePagePagePage ()
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439       WP.Tentang=false;
440   }
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442   public void DisclaimerPagePagePagePage ()
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445       WP.FilihUkuran=false;
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450       WP.Fanduan=false;
451       WP.Tentang=false;
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454   public void LicensePagePagePagePage ()
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457       WP.FilihUkuran=false;
458       WP.Ukuran1=false;
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466   public void AboutUsPagePagePagePage ()
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478   public void ContactUsPagePagePagePage ()
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493       WP.FilihUkuran=false;
494       WP.Ukuran1=false;
495       WP.Ukuran10=false;
496       WP.Ukuran17=false;
497       WP.Ukuran18=false;
498       WP.Fanduan=false;
499       WP.Tentang=false;
500   }
501
502   public void TermsOfServicePagePagePagePage ()
503   {
504       WP.MenuPanel=false;
505       WP.FilihUkuran=false;
506       WP.Ukuran1=false;
507       WP.Ukuran10=false;
508       WP.Ukuran17=false;
509       WP.Ukuran18=false;
510       WP.Fanduan=false;
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512   }
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514   public void DisclaimerPagePagePagePagePage ()
515   {
516       WP.MenuPanel=false;
517       WP.FilihUkuran=false;
518       WP.Ukuran1=false;
519       WP.Ukuran10=false;
520       WP.Ukuran17=false;
521       WP.Ukuran18=false;
522       WP.Fanduan=false;
523       WP.Tentang=false;
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526   public void LicensePagePagePagePagePage ()
527   {
528       WP.MenuPanel=false;
529       WP.FilihUkuran=false;
530       WP.Ukuran1=false;
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532       WP.Ukuran17=false;
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538   public void AboutUsPagePagePagePagePage ()
539   {
540       WP.MenuPanel=false;
541       WP.FilihUkuran=false;
542       WP.Ukuran1=false;
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544       WP.Ukuran17=false;
545       WP.Ukuran18=false;
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547       WP.Tentang=false;
548   }
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550   public void ContactUsPagePagePagePagePage ()
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552       WP.MenuPanel=false;
553       WP.FilihUkuran=false;
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556       WP.Ukuran17=false;
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558       WP.Fanduan=false;
559       WP.Tentang=false;
560   }
561
562   public void PrivacyPolicyPagePagePagePagePage ()
563   {
564       WP.MenuPanel=false;
565       WP.FilihUkuran=false;
566       WP.Ukuran1=false;
567       WP.Ukuran10=false;
568       WP.Ukuran17=false;
569       WP.Ukuran18=false;
570       WP.Fanduan=false;
571       WP.Tentang=false;
572   }
573
574   public void TermsOfServicePagePagePagePagePage ()
575   {
576       WP.MenuPanel=false;
577       WP.FilihUkuran=false;
578       WP.Ukuran1=false;
579       WP.Ukuran10=false;
580       WP.Ukuran17=false;
581       WP.Ukuran18=false;
582       WP.Fanduan=false;
583       WP.Tentang=false;
584   }
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586   public void DisclaimerPagePagePagePagePagePage ()
587   {
588       WP.MenuPanel=false;
589       WP.FilihUkuran=false;
590       WP.Ukuran1=false;
591       WP.Ukuran10=false;
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594       WP.Fanduan=false;
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598   public void LicensePagePagePagePagePagePage ()
599   {
600       WP.MenuPanel=false;
601       WP.FilihUkuran=false;
602       WP.Ukuran1=false;
603       WP.Ukuran10=false;
604       WP.Ukuran17=false;
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609
610   public void AboutUsPagePagePagePagePagePage ()
611   {
612       WP.MenuPanel=false;
613       WP.FilihUkuran=false;
614       WP.Ukuran1=false;
615       WP.Ukuran10=false;
616       WP.Ukuran17=false;
617       WP.Ukuran18=false;
618       WP.Fanduan=false;
619       WP.Tentang=false;
620   }
621
622   public void ContactUsPagePagePagePagePagePage ()
623   {
624       WP.MenuPanel=false;
625       WP.FilihUkuran=false;
626       WP.Ukuran1=false;
627       WP.Ukuran10=false;
628       WP.Ukuran17=false;
629       WP.Ukuran18=false;
630       WP.Fanduan=false;
631       WP.Tentang=false;
632   }
633
634   public void PrivacyPolicyPagePagePagePagePagePage ()
635   {
636       WP.MenuPanel=false;
637       WP.FilihUkuran=false;
638       WP.Ukuran1=false;
639       WP.Ukuran10=false;
640       WP.Ukuran17=false;
641       WP.Ukuran18=false;
642       WP.Fanduan=false;
643       WP.Tentang=false;
644   }
645
646   public void TermsOfServicePagePagePagePagePagePage ()
647   {
648       WP.MenuPanel=false;
649       WP.FilihUkuran=false;
650       WP.Ukuran1=false;
651       WP.Ukuran10=false;
652       WP.Ukuran17=false;
653       WP.Ukuran18=false;
654       WP.Fanduan=false;
655       WP.Tentang=false;
656   }
657
658   public void DisclaimerPagePagePagePagePagePagePage ()
659   {
660       WP.MenuPanel=false;
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1000      WP.Ukuran17=false;
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1004  }
```

Figure 3 Coding

Material Collection (material collecting)

Material collection is the stage of collecting materials that suit the needs being worked on. These materials include wheels, backgrounds, and icons that will be included in the application.

a. Making Markers

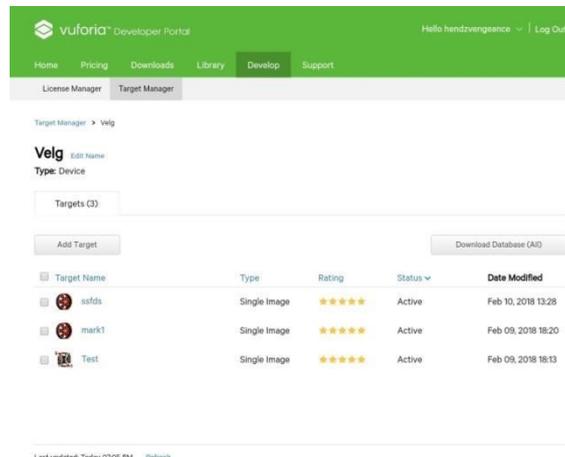


Figure 4 Database on the Vuforia website

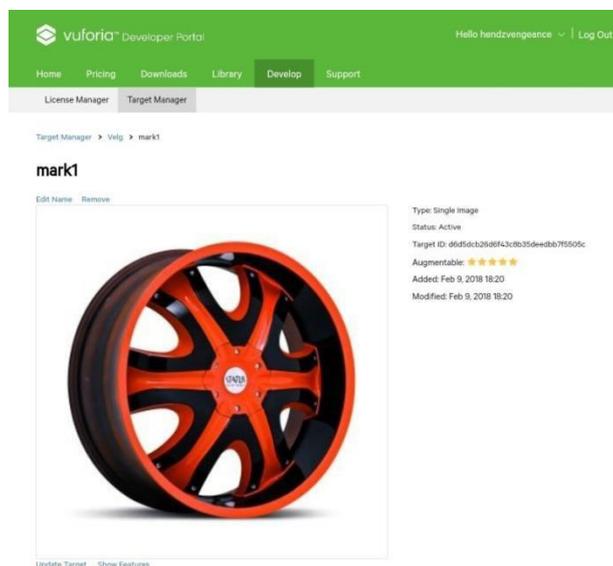


Figure 5 Markers

Application of Augmented Reality Technology in a Custom Car Ride Selection Application (Case Study: Impala Auto Fashion)

b. Making rims in PNG format



Figure 6 Making PNG rims

c. Making applications

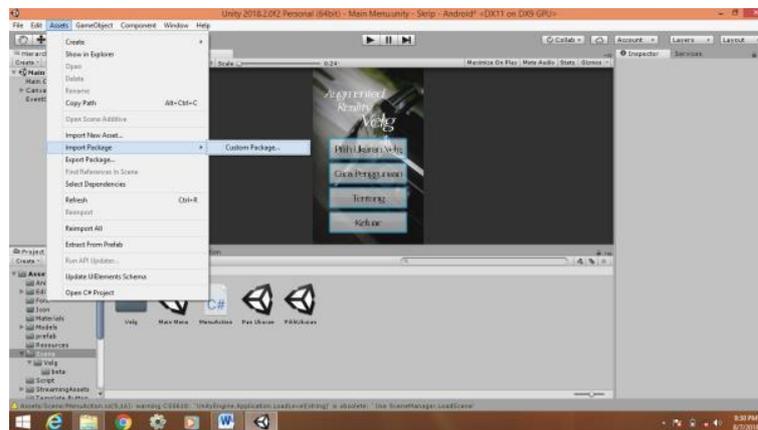


Figure 7 Import Marker

d. Import rims

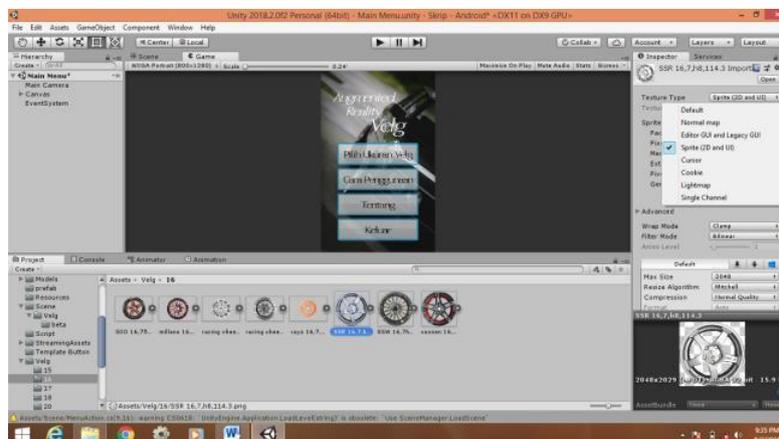


Figure 8 Imported Rims

Application of Augmented Reality Technology in a Custom Car Ride Selection Application (Case Study: Impala Auto Fashion)

e. Create a Canvas

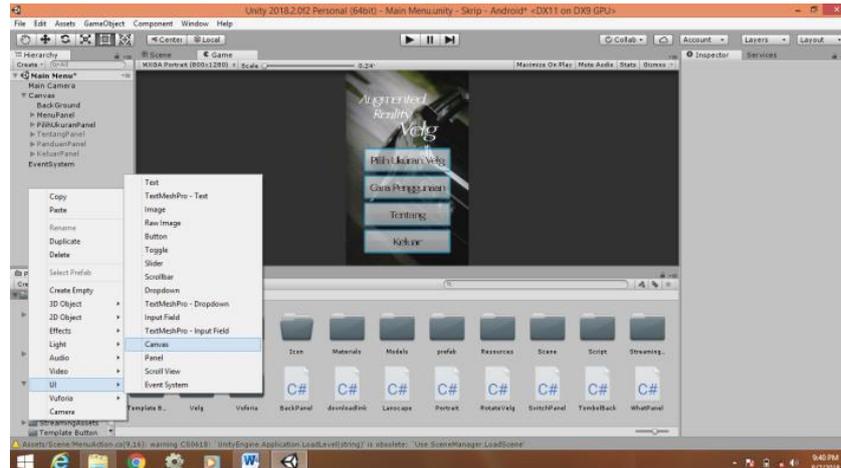


Figure 9 Create a canvas

f. Add Text



Figure 10 Adding Text

g. Adding a Button

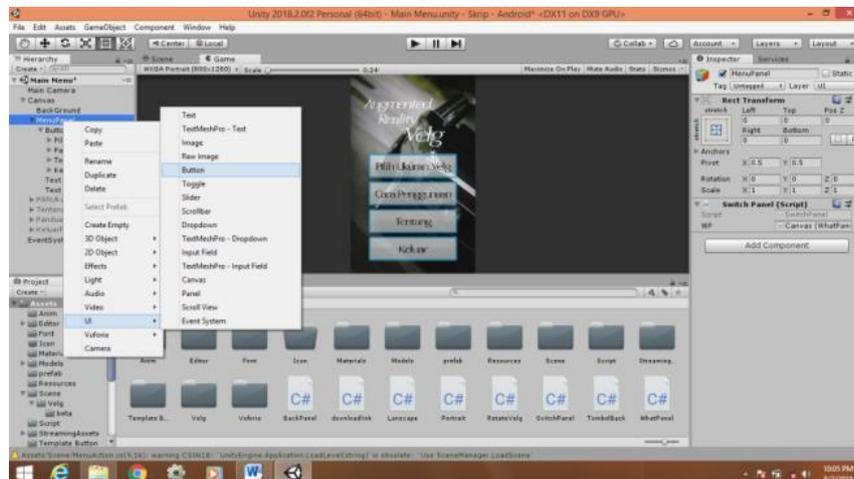


Figure 11 Adding Button

h. Measure the rim with a marker



Figure 12 Measuring Rim with Marker

i. Adding Script



Figure 13 Adding Script

Testing

In this test, the author carried out two types of testing, namely system testing and acceptance testing. Testing the Augmented Reality Rim application as a whole (Haris & Hendrati, 2018; Sudyatmika et al., 2014). In this stage, the Black Box method is carried out testing. Black Box testing is program testing based on program function. There were a total of 20 respondents with a total of 6 questions, so the score interval for each question was 20-80, the highest score for strongly agrees is $4 \times 20 = 80$, while for disagreeing $1 \times 20 = 20$, the solution uses the index formula.

CONCLUSION

In conclusion, the development of the Augmented Reality Application for Wheels, crafted through the sophisticated Unity 3D software, stands as a commendable achievement. The

application, meticulously tested through black box testing, has successfully aligned with the envisioned design, as evidenced by the conclusive test results. This innovation has now materialized into a practical and user-friendly mobile application. By submitting this technology to Impala Auto Fashion, it not only fulfills its intended purpose as a tool for consumers to effortlessly navigate and select wheels for purchase but also emerges as a highly beneficial and recommendable solution within the automotive industry. This accomplishment underscores the effectiveness and relevance of utilizing cutting-edge technology, reinforcing its potential to enhance consumer experiences and streamline decision-making processes in the realm of auto customization.

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