



# IMPLEMENTATION OF AUGMENTED REALITY IN INFORMATION MEDIA AREA TOUR OLELE MARINE PARK IN GORONTALO

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Article history:	Abstract:
<b>Received:</b> 20 <sup>th</sup> July 2023	Tourism area information media is a media needed by tourists to find information about tourist areas to travel and enjoy nature. Information media of Olele Marine Park tourist area consisting of Olele Beach, Limboto Waterfall, Limboto Lake, Botumoito Waterfall, Kwandang Beach, Otanaha Fort, Saronde Island, Koleang Village, Biluhu Beach, Tomilito Beach, facilities in the tourist area. Media information on tourist areas can be sought directly and indirectly. However, the information source is less interesting and less interactive. Therefore, AR (Augmented reality) technology is the right solution to overcome this problem. This research aims to create an application using AR (Augmented reality) implementation technology on the information media of the Olele Marine Park tourist area based on Android. 3D objects will appear by utilizing the camera feature of the smartphone device to detect markers. Augmented reality is the incorporation of an object that exists in the virtual world into the real world in the form of 2D or 3D that can be seen and heard in real time. The method used in this research is Marker Based Tracking. Applications that utilize augmented reality technology in tourist areas can be used by tourists and the general public. Based on the results of alpha and beta tests, it is known that the value is 5.67% for accuracy, relevance, and completeness. It can be concluded that information media in tourist areas is feasible to use to help information media for tourists, and people who want to visit the Olele Marine Park tourist area, because it can increase interest and interest. This application will run on the Android 7.0 (Nougat) mobile platform and supports ARCore with an application capacity of 145MB.
<b>Accepted:</b> 20 <sup>th</sup> August 2023	
<b>Published:</b> 24 <sup>th</sup> September 2023	

**Keywords:** Android; Augmented Reality; Marker-based Tracking; Multimedia Development Life Cycle;

## INTRODUCTION

Olele Marine Park own beauty view lower unique sea in Gorontalo Bay (Gulf Tomini). No wonder if the divers and enthusiasts photography lower sea local nor international give nicknamed "The Hidden Paradise in Sulawesi" Olele Marine Park so popular among diver local nor abroad Because has the rare and only Salvador Dali Coral in the world can found in Gorontalo. Olele Marine Park start planned as area tourism in 2005 by Fadel Muhammad, the current Governor of Gorontalo that . In 2006 , Govt area Then establishing the Olele Marine Park as a Regional Marine Conservation Area (KKLD). [1]. There are several object tourism that becomes Power pull for visitors , such as Olele Beach This beach famous with sand white and clear sea water , waterfall Limboto, Lake Limboto, Waterfall Botumoito, Kwandang Beach, Fort Otanaha, Island Saronde, Koleang Village , Biluhu Beach, Tomilito Beach. So that tourists who visit Still felt not enough fulfil hope so that opportunity For promote area tour Which There is not enough utilized in a way optimal.

*Augmented reality* is merger something objects that exist in cyberspace (virtual) to in the real worldshaped 2D or 3D Which can seen And heard in a way real time [2]. Technology AR can insert something information certain to in the digital world and display it in the real world with media assistance such as webcam, computer, *smartphone* or glasses specifically [3]. AR can developed in device which *smartphone* at the moment This Already Lots used. *Smartphones* are the phone does Lots function computer usually own between advance screen touch, internet access, And system that operation capable operate application Which downloaded [4].

In other methods you can implemented in AR is method *Markerless*, method This more practical in application of *Augmented reality* using a smartphone because in its use can used anywhere without use connection Internet. Study

This aim For implement *augmented reality* (AR) in information media area tour Olele Sea park sea and area tour Bahari which is located in Gorontalo is based on Android. eligibility with estimate camera pose based on on the *Marker pamphlet* Which possible can in *scan* or be read AR [6].

Study This aim For can beneficial for visiting tourists to the Olele Sea park sea and area tour as a medium of information with nickname "The Hidden Paradise in Sulawesi" Research This use variation distance 5cm, 10cm, 20cm, 30cm, 40cm, 50cm, as sub indicators distance detection Then use resolution 32x50px, 64x100px, 96x150px, as sub indicator *pixels* and colors. The result of testing prove that distance detection influenced resolution *pixels* as well as color *markers* Which accepted by system [7]. Study development furthermore produce Virtual Tour application as promotional media object tour visiting tourists to park sea Olele Sea . He made it something Virtual Tour with Users Interfaces Which interesting Interactive , Users Friendly for supports and makes it easier introduction a number of location facility park sea Olele Sea . Methodology Which used in research This is Multimedia Development Life Cycle (MDLC) methodology . In the Virtual Tour on promotional media This its implementation using the Web. Virtual tour application as a promotional medium for objects tour park sea has in accordance with Expected specifications, next the virtual tour application can be accessed use desktop device . Deep 360° panoramic virtual tour implementation on the website already in a way interactive and user friendly. Making application Already through testing stage and have been free from errors in the virtual tour application. With exists virtual tour of the object tour park sea , tourists local nor abroad can know about beauty nature and rocks with access the website for can explore Miscellaneous rocks in the object \_ tour park sea . [8].

Study This aim For makes it easier para tourists , so that para traveler No Again stuck on oninstruction direction . Method Which used that is *Markers Based Tracking* . Method This covers planning , *design* , *implementation* And testing. Use *Augmented reality* on process understanding user to medi information around area tour make material For search information for more interesting Because exists interaction in a way direct with object 3D [9].

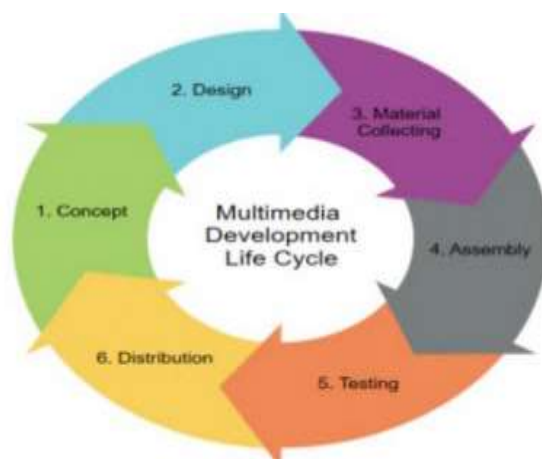
Study This made For can interesting interest traveler For know information more easy about tour Olele Marine Park will aimed among them from a number of tour consists from 10 (ten) of them Olele Beach , Waterfall Limboto, Lake Limboto, Waterfall Botumoito, Kwandang Beach , Fort Otanaha , Island Saronde , Koleang Village , Biluhu Beach , Tomilito Beach . [10]. Then based on study previous about Implementation Markerless Augmented Reality Location Based In Search of Tourist Locations in Bengkulu City. Application This Already can used by users For look for direction location Bengkulu City tour with use Markerless Augmented Reality Location Based. The methodology used Markerless Location Based , Tols used in application This is Android Studio, Based on Android. Tourist moment This become sector a very large industry and has role strategic in development economy , draft existing basis \_ in application This For makes it easier search direction location area tour as well as displays videos. Development tourist globally experienced growth which is very fast and evident give the donation very big for economy world [11].

And study final that is about Media Information around Region Tourism . Study This aim For media Information interactive that helps the search process Information around area tourism in the area Olele Sea tourism park sea , app This has a main menu consisting of 4 *buttons* , namely AR *Camera* , instructions , about us, and *home* , in the main menu section There are 3 *buttons* , namely the main menu and *video profile* . Planning application *Implementation Augmented Reality* (AR) on media information area Olele Sea tourism park sea This started from making 3D objects in virtual *software* then continue with make *markers* in *the software* adobe photoshop CS6. After That make it the application use *software* unity [12].

Based on existing exposure explained , yes concluded that AR technology can used as media information Which flexible , so that make it study about " *Implementation Augmented Reality* (AR) On Media Information tour Olele Marine Park

**METHOD**

In study This method Which used is Multimedia Development Life Cycles, Where method This own 6 stages , namely concept, design, material collecting, assembly, testing and distribution. Method overview This can seen in figure 1.



**Picture 1.** Diagram Multimedia Development Life Cycle.

Stage concept ( conceptualization ) that is determine goal , including identification audience , application ( presentation , interactive , And etc), objective application ( information , entertainment , training And etc) And specification general . Baserule For The design is also determined at the stage this , like size application , target, etc. In stages This There is a number of necessary stage attention , among other things , determine objective application that is For give information around area tourism . Description Application Implementation This *augmented reality* runs and operates on the device system operation android.

The Design Stage is stage making specification about style, architecture, form, appearance , and material/ material requirements For development , at stage This makes it easier making application Where all over multimedia objects are created with based on flowchart interface, structure navigation , storyboard interface and flow chart interfaces Which originate from stage design .

In stages this , material related teaching materials / materials learning is gained from interview . For getdata in the form of photos , videos and information written around area tour system selected information For know How system information that will made works, meanwhile For material related *Augmented reality* , author get material from book reference, journal And Internet. The assembly ( manufacturing ) stage is stage Where all object or material Application put together . Making application based on design design Which has made . All object or material made And combined becomeOne complete application. In stages This used a number of application like *blender* for create 3D and *animation* ,Adobe Photoshop for editing photos / images , adobe after effects for motion graphics video creation , adobe premiere pro For video editor And effect video/audio, unity 3d, And ARCore For devolep .

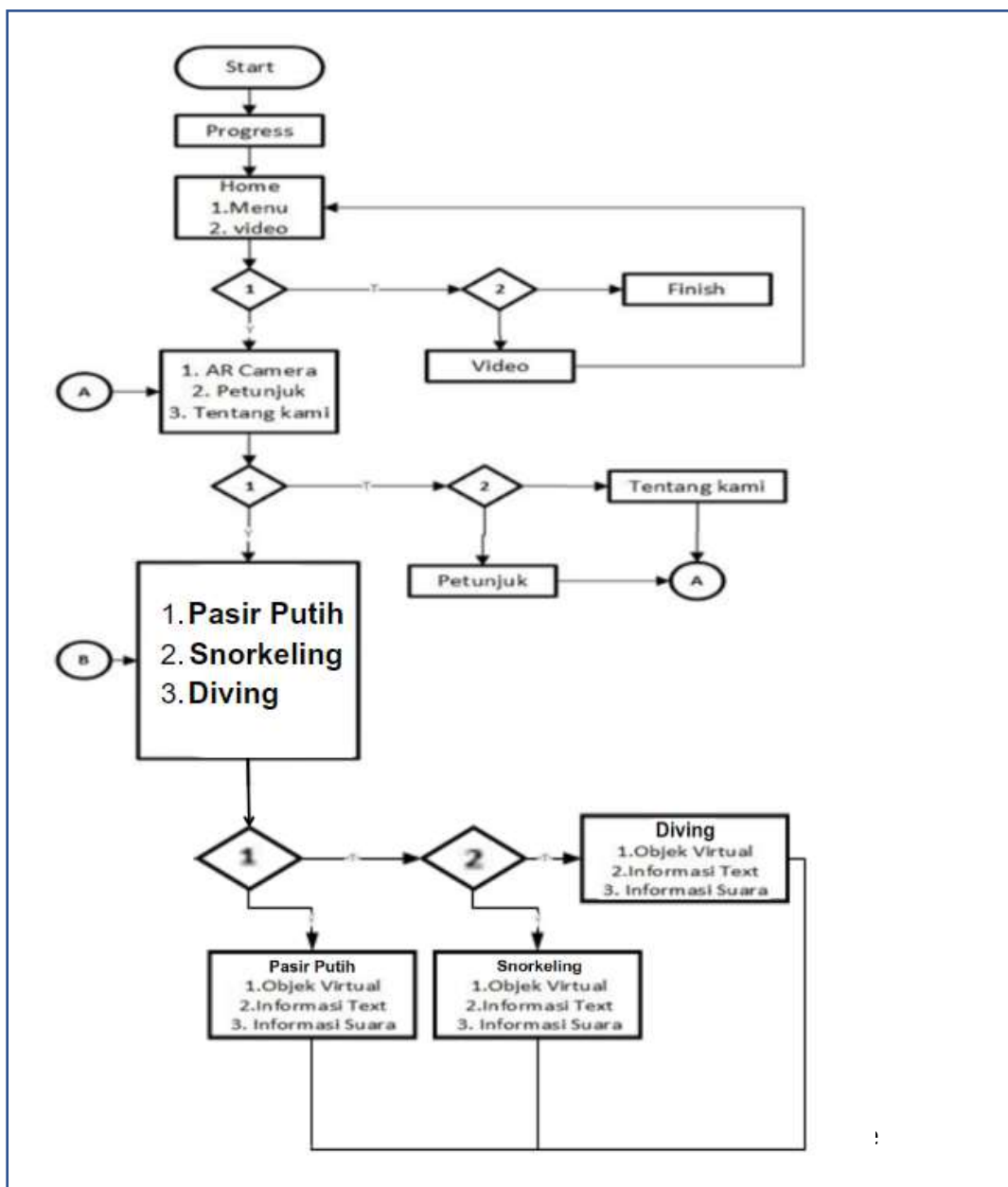
Stage testing called Also as stage test try, stage test try Alone is stages Where application Whichhas made used For First time after application built , For know shortage, advantages , orcompatibility with design Which has made . Test try Which done consists from: Test try Structural that is stage processchecking is application that is built Already in accordance with plans made in the design process . Test it out Functional that is checking process stage is every existing button in application This Already in accordance with its function or no . And Validation trials ie stage checking information data displayed by the system in accordance the truth with What Which There is in area tour Which used.

The distribution stage is carried out with compile application to in apk format . after get away in test stage try that already determined next existing applications made in form apk Can used by society , or Can in distribute to in network sale application like playstore .

Tools used in study This including laptops, cellphones and mice. Whereas For material which used in study This is *Blender, Adobe Photoshop, Adobe After Effects, Adobe Premiere Pro, Unity 3d* and ARCore.

## RESULTS AND DISCUSSION

Information media area tour Olele Marine Park consists from Olele Beach : This beach is door enter main to Olele Marine Park . This beach own sand beautiful white and clear sea water. great place For relax and sunbathe. Conservation Area : Olele Marine Park is area protective conservation \_ diversity biological Gorontalo sea, can do snorkeling and diving For explore reef beautiful coral and a variety of marine life , including colorful coral fish . Diving Post : Olele Marine Park be equipped with a diving post that allows divers For explore beauty lower sea with experienced guide. Island Olele : Island This located nearby beach and offers beautiful view. Research Center: Olele Marine Park also has center research that focuses on understanding and preservation ecosystem sea. Restaurants and Stalls : restaurants and stalls around Olele Marine Park that serve food local and delicious fresh sea . Natural Scenery : Apart from underwater activities , you can enjoy view beautiful nature around the Olele Marine Park . Forests and mountains around this area provide chance for hiking and picnics.ke place tourism, facilities Which There is in area tourism . Menu main consists from *button videos* profile , play menu, *exit* .Description from block diagram media information area tour can seen on figure 2.









Marine Park

Technology *Augmented reality* (AR) is A visual technology that combines object or virtual world to in real world view in real time. Under construction application Implementation *augmented reality* in media information area Tour Oleh Marine Park This that is started from analyze. Then next with designing design application *interface* . Stage furthermore is implementation existing *interface* designed into the form system . For furthermore done testing to application For know is application there is error or error. The result of Users Interfaces application can seen in Table 1.

**Table 1 . Results Users Interfaces.**

Page	Users Interfaces	Information
Appearance Page <i>Splashscreen</i>		Page loading or <i>splash screen</i> This is appearance media applications information Which has installed And Can run on the device android.

<p>Menu Main</p>		<p>On page menu main there is three <i>button navigation</i> Which can in choose, <b>button main menu</b> is <i>button navigation</i> For going to to page <b>AR Camera, Instructions , About we.</b> <i>Buttons Profile videos</i> is <i>button navigation</i> For going to to appearance <i>videos</i> for introduction aroundtourist area                  Olele Marine Park , explanation regarding section -part route road ortour Which will aimed at, <b>Exit</b> For go out application .</p>
<p>Play Menu</p>		<p>Main menu pageconsists from four buttons, <b>AR Camera, Instructions , About We And button home,</b> AR Camera Which containing area tour Which will aimed at , there is written information media text, audio, and images around the area tourism . After in click or in scans <i>markers</i>so will appear information media tourist area the as well as narrative the explanation Andthere is a buttonReturn For go to Page Menu Main.</p>

<p>Start AR Camera</p>		<p>This is page feature <i>Augmented Reality (AR)</i> , when <i>user</i> click knob start AR Camera point camera For detect <i>markers</i> or pamphlet position flat like floor , table , walls , and surfaces flat other will appear 3D objects like water plunge or tour others . There is narrative sound , And media information , text, image .</p>
<p>Instruction</p>		<p>On page This explained instruction use application on the start <i>button</i> click Instructions .</p>
<p>About We</p>		<p>On page This there is explanation about application And data writer as well as mentor making application this .</p>
<p>Exit or Go out</p>		<p>On the page this is the user you know user application in point For go out application or still in application .</p>

Application implementation *augmented reality (AR)* in information media area Tour Olele Marine Park This can executed on Android OS minimum nougat 7.0 And support AR Cores. Stage next is a trial system application This with method run on Android Smartphones. Testing This done For know lack or weakness from applications , such as menus do not walking , button No works and so on . In testing application there is a number of stage to be carried out , namely : Trial structural This is stage For checking application Which made is Already in accordance with design Which previously Already in for in stage design .

**Table 2 . Test Try Structural**

No	Appearance Page	Status Test
1.	Page Loading Screen	Appear , In accordance
2.	Page Menu Main	Appear , In accordance
3.	Page Play Menu	Appear , In accordance
4.	Page Videos Profiles	Appear , In accordance

5.	Page Go out	Appear , In accordance
6.	Page AR Camera	Appear , In accordance
7.	Page Instruction	Appear , In accordance
8.	Page About Us	Appear , In accordance

Test try functional This done For know is system Which made Already works with good . Onstage This done test For know is function from every knob or menus on the page can works with good . Based on test try Which has done so in a way whole knob or menu on every pagecan works And walk in accordance with desire Results This can seen on Table 3 :

**Table 3 . Test Try Functional**

No	Name Scenes	Appearance	Results
1	<i>Scenes Splash Screen</i>	Logos background , Loading	Succeed
3	Page <i>Scene</i> Main	<i>Videos Profiles</i>	Succeed
		Play Menu	Succeed
		Go out	Succeed
4	<i>Scenes</i> Play Menu	AR Camera	Succeed
		Instruction	Succeed
		About We	Succeed
		Return	Succeed
5	<i>Scenes</i> Information Tour	<i>Augmented Reality</i>	Succeed
		<i>Scroll Slides</i>	
		Return	Succeed
6	<i>Scene</i> Start AR	<i>Scans Markers</i>	Succeed
		Audio/Sound	Succeed
		Return	Succeed
7	<i>Scenes</i> Instruction	Return	Succeed
8	<i>Scenes</i> About Us	Return	Succeed

Validation Test is stage Where is checking information data from something object is Already in accordance with the data that has been collected previously at the material collecting stage , in other words, validation here For ensure is application Which made Already in accordance with hope user or not yet . In lower This is testtry testing the application For scanning markers or pamphlet is information can be displayed form information or no . Validation test is stage checking information data and objects displayed on the system scene Already in accordance with existing data ( facts ). collected at stage data collection . Results of trials carried out at stage this , data And information Which is displayed by system Which made Already in accordance with data Which has collected on stagedata collection .



**Picture 3 . Results Test Try Validation Already Appropriate .**

Testing compatibility is testing whole operational applications on a wide range type device Android. On testing compatibility this , application tested start from stage *installation* until moment operated on the device ,on study this , is used 4 devices Android with version Android 2.3 ( *Gingerbread*) until android 8.1 (Oreos).

**Table 4 . Test Compatibility**

No	Version SDK	Version Android	Information	Appearance
1.	(Gingerbread)	2.3	Succeed	
2.	(Jelly Bean)	4.3	Succeed	
3.	(Lollipop)	5.1	Succeed	
4.	(Oreos)	8.1	Fail	

Stage This application has finished made . Test try Beta done with method do survey on *audience* . Objectivetesting This For measure level quality system . Appearance results survey seen presentative every aspect For condition as repair application , where survey This done to respondents as many as 30 people. Created questionnaire refers to categories there is three criteria assessment , ie accuracy , relevance , and completeness . Each criterionthrough questionnaire . Percentage results survey addressed on Table 5.

**Table 5. Test Try Beta**

No	Criteria	Indicator	SS	S	K.S	T.S	STS
1	Accuracy	Application in accordance For made as information media	19	11	0	0	0
		Making guide method use application Already clear	18	11	1	0	0
		Making media applications information area tour beneficial so that need provided For tourists	20	10	0	0	0
2	Relevance	Information Which be delivered	17	11	2	0	0



		clear And easy understood					
		Language on application This easy understood	17	11	2	0	0
		Feature on the application This Already Enough complete	12	14	4	0	0
3	Completeness	Design on application This Enough interesting	17	11	2	0	0
		Information seen Good in applications, virtual objects, videos, backgrounds, text system location , coloring , And background sound	14	13	3	0	0
		Information voice Which be delivered heard clear and can understood	16	9	5	0	0
		Between the information be delivered with object displayed virtual showing suitability	14	14	2	0	0

Acquisition score evaluation

a. Accuracy =  $(57 \times 5) + (32 \times 4) + (1 \times 3)$

$$\begin{aligned} &= \frac{285 + 128 + 3}{90} \\ &= \frac{416}{90} \\ &= 4.62 \end{aligned}$$

b. Relevance =  $(46 \times 5) + (36 \times 4) + (8 \times 3)$

$$\begin{aligned} &= \frac{230 + 144 + 24}{90} \\ &= \frac{398}{90} \\ &= 4.42 \end{aligned}$$

c. Completeness =  $(61 \times 5) + (47 \times 4) + (12 \times 3)$

$$\begin{aligned} &= \frac{305 + 188 + 36}{120} \\ &= \frac{529}{120} \\ &= 4.43 \end{aligned}$$

average =  $(164 \times 5) + (115 \times 4) + (21 \times 3)$

$$\begin{aligned} &= \frac{825 + 620 + 63}{300} \\ &= \frac{1,508}{300} \\ &= 5.67 \end{aligned}$$

Accuracy obtain score 4.62, Relevance obtain score 4.42, Completeness obtain score 4.43. Withthus the average score interpretation respondents is 5.67. Based on Table 3 average score Very Good interpretation . Based on average score obtained interpretation respondent , then results alpha and beta testing shows that implementation *augmented reality* (AR) in information media area Tour Olele Marine park is very good For made as media information area tourism .

**CONCLUSION AND SUGGESTION**

Based on description from each each chapter And results discussion so can concluded that application Whichmade in study This is Implementation *Augmented Reality* (AR) in Information Media Tour Olele Marine park , creation application This using unity 3D software, and vuforia . Application This made based on existing data collected from various source among them from source person Tour Olele Marine park , data object Which in take amount 10 object area tour Which Already identified onstage planning . In the Marker Based Tracking technique applied in the area Tour Olele Marine Park This writer utilise feature existing camera on a smartphone. Where a marker like picture or Markers used by the author in each door enter place tourism , so that tourists can accept information Which is displayed by Application Augmented Reality (AR) on Media Information Tour Olele Marine Park . Test results accuracy camera to the Marker on each place existing tours provided pamphlet or this Marker from size The largest marker is 16 x 16 cm and far away distance up to 149 cm, then results testing This done in tourism Olele Marine Park . Where out of 10 tests generated by the Application use a number of appropriate SDK version with distance camera to that marker tested , so that obtained mark accuracy 100% on size And distance Which has determined . Based on results testingalpha with use

scale likert , gain score practitioners ' interpretations multimedia applications show clarity visual is 3, criteria consistency is 3.17, criteria communicative and aesthetic is 3. So the average score is 3.53 interpretation . Whereas acquisition beta testing with scale likert show criteria accuracy is 4.62, relevance is 4.42, completeness is 4.43. So the average score interpretation public is 5.67. Based on results alpha and beta testing can concluded that application implementation of augmented reality (AR) in information media area tour park national mountain mist snakefruit end this is Good and Very Good for made as a medium information para tourists . Results from study This displays information form picture or object virtual, text, audio Andvideo already provided on site tourism . Benefit from study This expected can interesting interest traveler For know information more easy about tour Olele Marine Park .

Based on results from study this , researcher give suggestion on parties Which related based onproblem Which happen , that is as following :

1. Add feature animation It moves in 3 dimensions which is attractive to tourists or visitors more interested look for Information tour Olele Marine Park through application this .
2. Can use method other like GPS Based Tracking or Markerless Tracking.

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