Reservation and virtual tour application design of tourism village in Banyuwangi based on android

Eka Mistiko Rini[1], Dianni Yusuf[2]

[1,2] Software Engineering Study Program, Department of Informatics Engineering,
State Polytechnic of Banyuwangi, Banyuwangi, Indonesia

[1]ekamrini@poliwangi.ac.id, [2]dianniyusuf@poliwangi.ac.id

Abstract—**Tourism development is the impact of changes in traveler interest in destinations such as nature, interacting, and learning the uniqueness of culture. Tourism Village is a form of integration between accommodation and supporting facilities offered in a community life system that combines with the rules and traditions that apply. To attract Travelers, a virtual tour application is required so they can see visual tourist villages directly and it can be used as advertising. The traveler must come directly to the site to place an order. Therefore, we need an application regarding the information and ordering tour packets system on Tourism Villages in Banyuwangi by Android-based to hook up the travelers and Tourism Village managers. The application development method uses the waterfall model by analyzing system design needs and testing. By using the waterfall method in the development of information systems the quality of the resulting system will be good because the implementation will be carried out gradually. Application developed using a Java programming language for the Android platform supported by the Android SDK and Android Studio as the development environment. This application aims to make it easier for travelers to get information about Tourism Villages and to order tour packages online.**

Keywords— Banyuwangi, java, tourism village, virtual tour, waterfall.

I. INTRODUCTION

Banyuwangi is one of the rapidly growing districts in Indonesia, this is due to economic development and technological progress and development which continues to be improved, especially in the tourism sector. Because tourism is one of the mainstay sectors of economic activity which is oriented towards expanding employment and employment opportunities. The development of the tourism sector is currently receiving serious attention from various parties because in addition to creating jobs, tourism development is also able to increase regional income [1]. Currently, the tourist city which is a new leading destination in the eastern part of East Java is highlighted by many parties related to the efforts of the local government and all its people to make the city of Banyuwangi an important destination in Indonesia [2]

The diversity and uniqueness of tourism potential in Banyuwangi is expected to attract local and foreign tourists. Banyuwangi continues to work with various steps to improve the tourism sector, besides holding various tourism events with natural beauty, Banyuwangi is also developing a Tourism Village. Tourism Village is an integrated tourism concept in an area that combines local tourism potential in the form of local cultural arts, natural beauty, accommodation, culinary, and direct interaction with the local community.

Tourism Village is a form of integration between attractions, accommodations, and supporting facilities presented in a structure of community life that is integrated with the prevailing procedures and traditions [3]. A Tourism Village has a unique charm (which can be in the form of the physical uniqueness of the rural natural environment, as well as the socio-cultural life of the people) which is packaged naturally and attractively so that the attractiveness of the countryside can drive tourist visits to the village (Kementrian Kebudayaan dan Pariwisata). Tourism villages have tourism products that have cultural value and have strong traditional characteristics [4]

In 2019 Banyuwangi has become a leading destination. This city carries out 'city branding' and 'city image' [5] so that it can align with destinations that have long been known to the world like Bali.

Banyuwangi is one of the districts in Indonesia that has been successful in developing the concept of a Tourism Village. There are several tourist villages in Banyuwangi which are tourist destinations, including Tamansari Tourism Village, Kemiren Tourism Village, and Temenggungan Tourism Village. Tamansari Tourism Village has made a significant contribution to the community because the local community's income has increased. This tour offers a rural natural atmosphere that reminds tourists of natural and traditional nuances. Visitors will be invited to tour the corn garden, factory, and sulfur processing.

Temenggungan Tourism Village has various tourism potentials, such as historical tourism, spiritual tourism, and cultural arts tourism. The sacred historical site in Temenggungan is the Sritanjung Well Site. Performing patrol music is a tradition from the Temenggungan Tourism Village to welcome guests who are visiting. To increase tourism potential, tourism promotion is needed which can attract visitors by using a virtual tour application. Web-based virtual tour applications are widely used as a major promotional tool by hotels, resorts, universities, and tourist attractions across the world [6]. The use of virtual tours is currently widely used for location recognition and promotion because it describes a

simulation of existing locations. A virtual tour is a combination of several panoramic images that are interconnected and displayed with a viewing angle of 360° x 180°. This virtual tour makes the user feel as if they are directly in the environment [7].

By representing information in the form of 360 panoramic images, it can make it easier for users to receive and understand what is being conveyed [8]. By designing application, the benefits of a reservation system can be achieved, such as time saving, 24-hour service, access to information from anywhere, personalized offers for your customers, and more [9].

Android smartphones have a GPS (Global Positioning System) feature and can update locations regularly and automatically. With the Virtual Tour application, it will be useful for prospective visitors so that they can find out direct, interactive, and interesting information about the Tourism Village, and there is a navigation feature that utilizes GPS on an Android device so that it can help visitors find the location of the Tourism Village in Banyuwangi based on the route listed on digital map.

II. METHOD

The research method for application development uses the waterfall Model. The waterfall model is a "model software life-flow approach that begins with analysis, design, coding, and testing in sequence"[10]. The waterfall method is one of the SDLC models, widely used in the development of information systems [11]. The Waterfall method is considered to have a more suitable approach for building new systems. But one of the fundamental weaknesses is that if there is a lack of procedures from the previous stage, then the system development stage must be done from scratch. The development process that will be carried out includes needs analysis, system design, writing program code, program testing, and program implementation. This method must be carried out sequentially if the needs analysis has not been fulfilled then the next step cannot be carried out, and so on.

A. System Design

System design is a step where thoughts and system design are carried out for solutions to existing problems using system modeling tools, use case diagrams, flowcharts, entity relationship diagrams, and application structure design so that it will make it easier to create the system.

1) *Usecase:* The Use Case Diagram describes the functionality, role, and interaction of each actor in the Banyuwangi Tourism Village Virtual Tour application shown in Fig. 1.
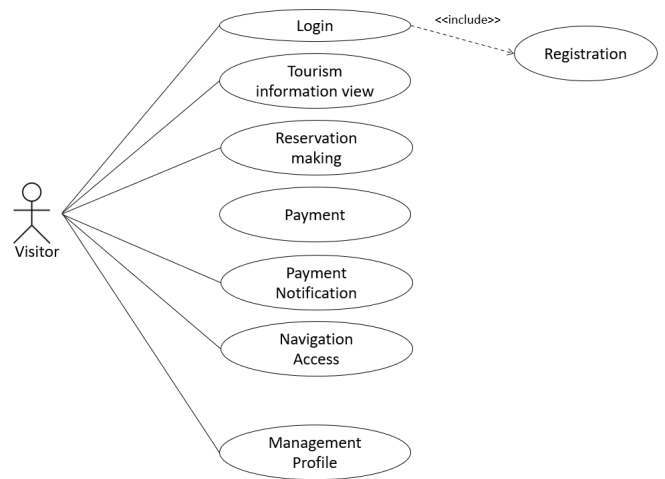

Figure 1. System Usecase
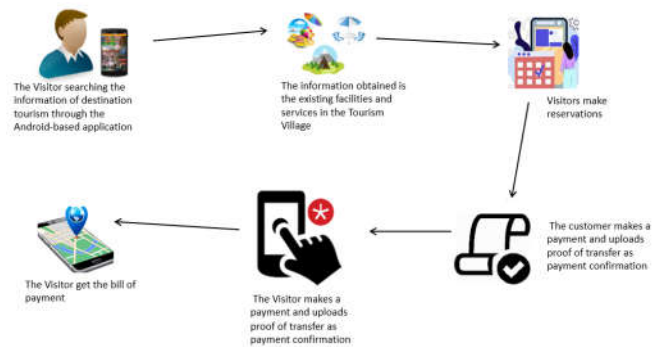
2) *System Design Flow*

Figure 2. System Design Flow

Fig. 2 is the proposed system flow. The Visitors can see detailed information about the facilities provided, homestays, and activities that can be carried out by the Tourism Village. Visitors can choose the tours they need and make reservations online. For payments for orders that have been made using the transfer method, and the end must upload proof of transfer to confirm payment. To search for the location of a tourist village in this application, there is a digital map and navigation feature, making it easier for visitors to find the location of the destination tourist village.

3) *The Systems Map:* The system map displays navigation on the created application as shown in Fig. 3. The system map is useful for displaying the feature can be accessed by the user.
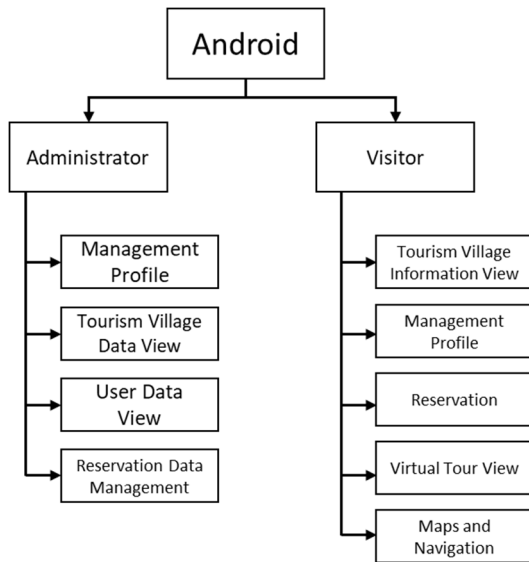
Figure 3. The Systems Map

4) *The Activity Diagram:* Activity diagrams describe the various activity flows in the system being designed, how each flow begins, the decisions that may occur and how they end. Activity diagram designed for this system is shown in Fig. 4.
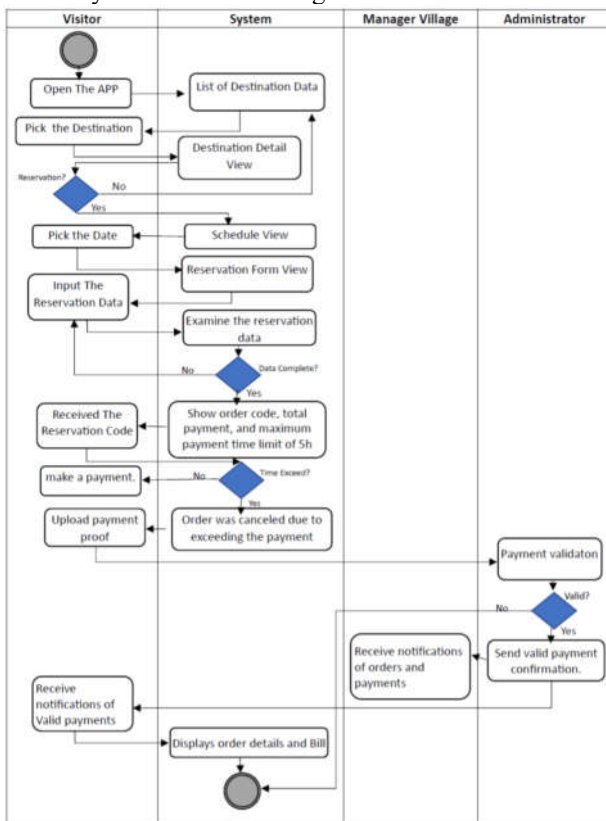

Figure 4. Activity Diagram

5) *Entity Relationship Diagram:* The Entity Relationship Diagram (ERD) is a model for explaining the relationship between data in a database based on basic data objects that have relationships between relations [12]. The ERD that designed for this application shown at Fig. 5.
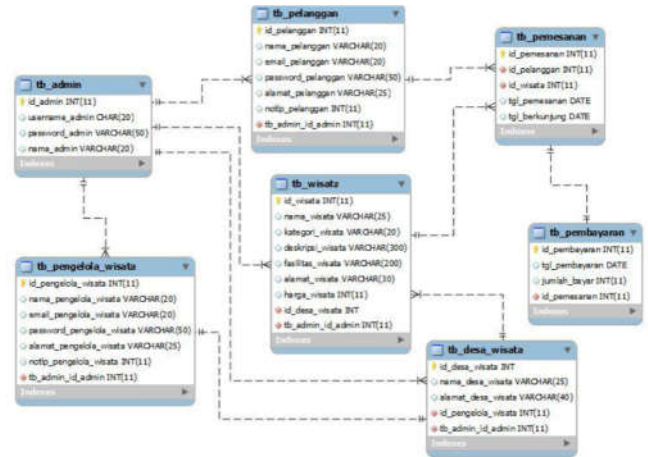

Figure 5. Entity Relationship

B. Writing Code Program

Writing program code or coding is a design translation into a language that can be recognized by a computer. This stage is a real stage in working on a system. Writing program code using the JAVA programming language. Java is the programming language of choice for programs that need to run on various computer systems. The Android SDK is the tool for Application Programming Interface (API) that is required to develop applications on the Android platform using the Java programming language. Currently, the Android Software Development Kit (SDK) is provided as tools and APIs for developing applications on the Android platform using the Java programming language. The Android SDK is free and freely distributed [13].

C. System Testing

The final stage is where the new system is tested for its capabilities and effectiveness so that the deficiencies and weaknesses of the system are found, which are then reviewed for better and more perfect applications. Testing is done using black box testing. Black box testing makes it easier to find problems that occur in programs because testing is done through the eyes of the user. The programmer acts as a user and tests the system and processes data input and pays attention to the output data.

D. System Implementation

In the final stage, after all the program's functions have been tested so that the results are in accordance with the requirements that have been previously defined, then the next process is how the new system will be implemented on smartphones that use the Android operating system.

III. RESULTS AND DISCUSSION

The Reservation Application and Virtual Tour for the Banyuwangi area that has been made is an android-based application that is used to make it easier for the public to provide information about Tourism Villages in Banyuwangi Regency and to be able to make bookings for tours provided by each Tourism Village online. In this application there is a GPS feature that functions to provide directions to the destination Tourism Village. There are two users in this application, namely Tourism Village Managers and Customers. To view information about the Tourism Village customers do not need to log in first. To place an order, customers must register first if they don't have an account so they can log in. Meanwhile, Tourism Managers can see orders made by customers in each managed Tourism Village. In addition, there is also a Virtual tour feature which is a simulation of several location points in the Tourism Village.

The design of this system uses the waterfall model. The waterfall model has its origins in architecture and manufacturing, to which it owes its strict rigidity. Due to the specific circumstances of the coordination, the model offers very little chance of change, since any change would have a huge cost (think of making changes to a fully erected building). Winston W. Royce, the father of the waterfall model, documented the model in 1970 as a development strategy. In fact, Royce didn't call it waterfall when he first identified and explored it as a programming development strategy.

Regardless of how your team chooses to deliver software, taking your project seriously and preparing it well is a critical skill every organization must have.

A. The Application.

The following is an application resulting from this research. On the main page of the application there is a list of Tourism Villages in which there is information on each Tourism Village. In addition, there is an Event Schedule Menu or activities in the Tourism Village.

Main Page

The main page of a website is the home page where visitors can find hyperlinks to other pages of the website. On the main page is displayed a listview of tour packages along with information on facilities, addresses, and tour package prices. The main page is shown in Fig. 6.

Figure 6. Main Page

Login view

The login view functions for validating access rule for each user, that can enter and operate the application according to their rules. The user validation process is carried out by checking the username and password of the existing user in the database. After logging in, the page will change according to the user's rule access. The results of the login user can be seen in Fig. 7.
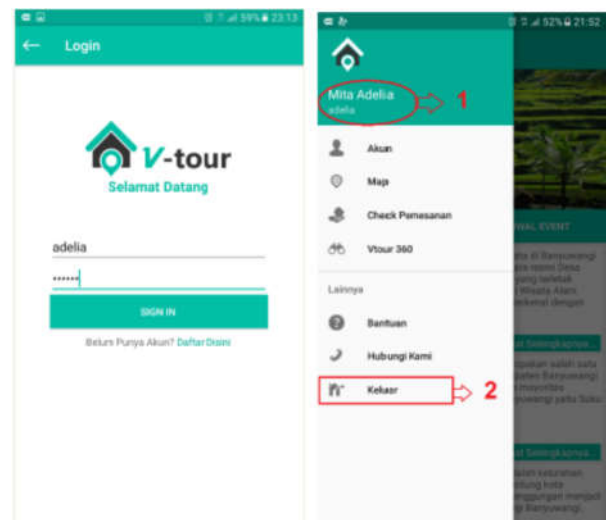

Figure 7. User Login View

Figure 8. Map View

Map view

The map menu contains a map and several markers from the location of the Tourism Village contained in the system. This map page also makes it easier for users to find Tourism Villages with the user's location. To be able to access the map page the user must activate location data on the smartphone used. The map displayed in the application is shown in the Fig 8. After the user runs the map or map menu, it will generate a map display with several pins for the location of the Tourism Village. If the user selects one of the pins, a marker for the name of the Tourism Village will appear. To be able to see the location and distance of the Tourism Village, the user must press the name of the Tourism Village as shown in Fig. 9.
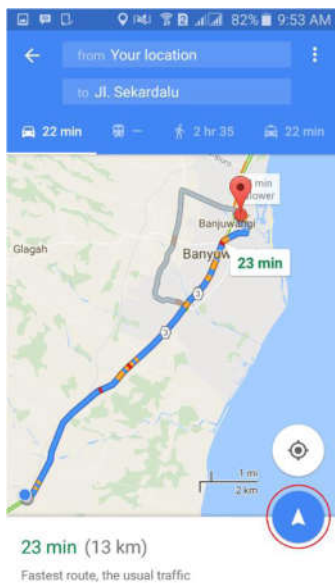

Figure 9. Detail Map View

To bring up directions starting from the user's position to arriving at the location of the Tourism Village the user is going to press the direction button.

The Admin View

Tourist information will appear when the user selects one of the Tourism Villages on the main page. Tourist information contains several tour options offered. The information display for the Tourism Village is shown in Fig. 10.
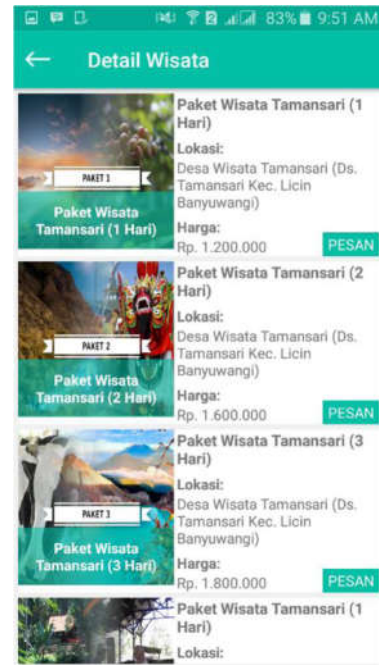

Figure 10. Tourist Information
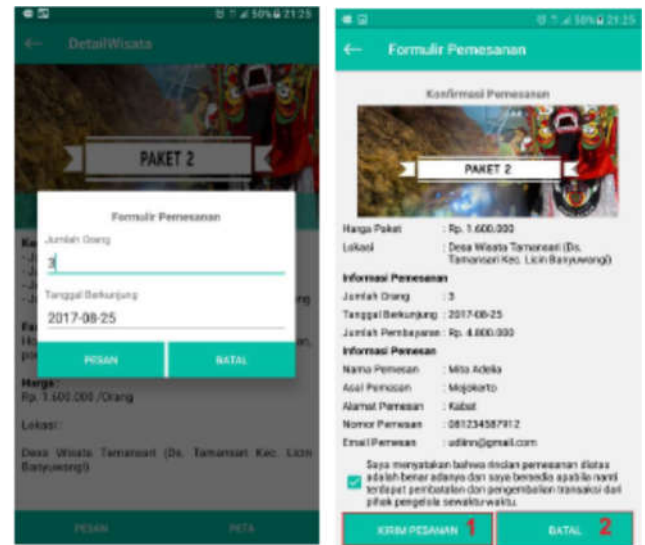
The Reservation forms.

Figure 11. Reservation Form

The Reservation form contains field the number of persons who want to travel, the minimum order is three people, and the

date form is used to fill in the date when the user visits or travels to the destination tourism village.

The Payment validation.

Figure 12. Payment validation.

Uploading proof of payment is done by taking a photo of proof of transfer from the gallery and sending it in the system. When the customer presses the payment confirmation button a dialog box will appear as shown in the Fig. 12. After the admin confirms the payment, if the payment is approved a full notification will appear on the cellphone notification bar. Paid notification notifies the customer that the payment has been successful. The paid notification display is shown in Fig. 13.
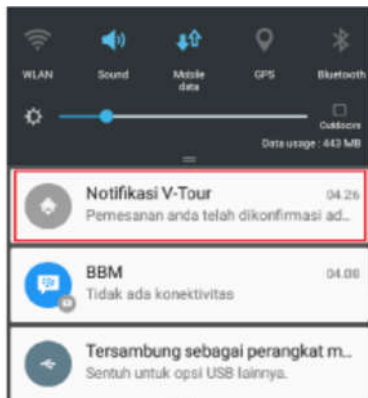

Figure 13. Paid notification

If the payment is paid and the order has been approved by the admin, the status changes to the order has been approved. Customers can show this evidence to the tourism manager when they arrive at the destination tourism village.

Fig. 14. Paid payment view

The order check menu is used to view orders for each Tourism Village. To access this menu, the user must first log in as a Tourism Village Manager. After that the Tourism Village Manager can select the order check menu in the application drawer as shown in Fig. 15

Figure 15. List of Reservation

Vtour 360 View

The Virtual Tour display is a simulated view of the existing locations in the Tourism Village in the form of a panoramic image. When the user selects the Vtour 360 menu, the display shown in Fig. 16.
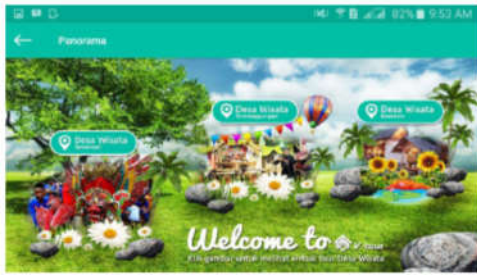
Figure 16. Vtour 360 view

Panoramic View

Display Virtual Tour, if the user can press one of the images if they want to see a location simulation using a panoramic image as shown in Fig. 17.
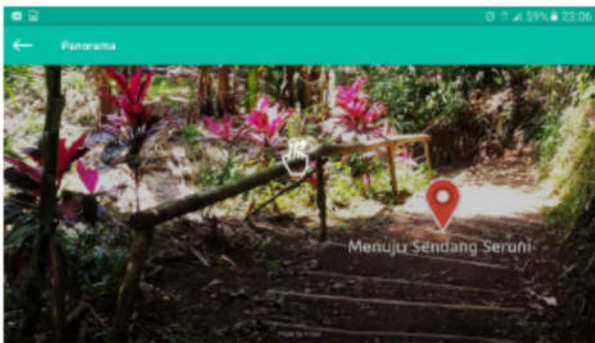

Figure 17. Panoramic area view

In Fig. 17 is a panoramic view of the location which was created using a combination of several panoramic images. To see the whole picture, users can swipe using a finger on the smartphone screen. Virtual tours are used to introduce locations by depicting various panorama-based images from several photos taken from one point of view, this aims to promote Tourism Villages so that they attract more visitors. The camera and lens are rotated around the point directly behind the lens where the light converges. To create a Virtual Tour, several steps are needed is,

1) *Understand the Wide Coverage of Cameras and Lenses*

A 360 panoramic photo is a photo with a 360-degree viewpoint, the smaller the scope of the camera and lens, the more photos needed to make a 360 panoramic photo. The use of the panoramic photo feature on cellphones is very precise making.

Figure 18. Panoramic photo

2) *Finding Midpoint Locations*

The main concept of 360 panoramic photos is the shooting point, this is intended to avoid differences in point of view from one image to another. Therefore, it is necessary to have this center point so that all the pictures taken do not experience a shift in the angle of view when the camera is rotated.

Figure 19. Finding midpoint locations

In the panoramic image above, the center point is focused on the aisle, so that all locations can be seen. The starting point is taken from the corner of the Temenggungan Tourism Village entrance, while the ending point also stops at the entrance. Calculation of the angle, the focal point of taking a photo is very important, because the location of the success of a 360 panoramic photo lies in that aspect.

3) *Taking a Photos*

When taking 360 panoramic photos, it is better to use a tripod by utilizing the panorama feature on the camera to make it more flexible in taking pictures. Be sure to use manual exposure settings, this is to minimize the different light readings by the camera in each shooting direction. There are many applications on Android that can be used to get panoramic 360 photos, such as Google Camera

4) *Processing images*

So that the resulting photos are better, the right step is to further process the image quality such as contrast or lighting. Edit photos can use Photoshop software. Photo processing is very important, correcting the lack of light in the photo is the most important thing and maximizing the photo so that the starting point to the end of the photo can be connected properly.

5) *Loading image*

Displaying photos in a virtual tour 360 menu requires the jquery panorama viewer plugin. This plugin functions to rotate photos into 360, so photos will never break. With this plugin it is very helpful and makes it easier to display panoramic 360 photos in the menu

Figure 20. Access the plugin

The image storage location is made into a folder according to the call to "img src" according to the storage location and image name.

Figure 21. The picture loading

6) *Displaying Images on Android*

Set the configuration of the virtual tour web page storage location, so that it can load images on Android.

Figure 22. Virtual tour configuration

To call a web page so that it can be displayed on Android using the webview function. Webview is a system component created to allow Android applications to display web pages without having to open a web browser.

Figure 23. Webview initialization

Initialize *webview* in layout to customize view. Next set the pixel scale, in Figure 23 the scale is 100 pixels on the webview. To display a web virtual tour on Android, use the load website using the name according to the configuration.

B. Application Testing

Application testing is an important stage in making applications because it functions to find out whether the application functions as expected or not. Application testing, also known as verification and validation, it is the process of checking that a software solution meets the original requirements and specifications and fulfills its intended purpose. In fact, verification is the process of evaluating software to determine whether the product of a particular development stage satisfies the conditions set at the beginning of that stage. Verification is the process of evaluating software during or at the end of the development process to determine whether it meets specified requirements [14]. The method used in this test is the Black box testing method. Black box testing is testing that is carried out only by observing the results of execution through test data and functional checking of the software. Testing this application is carried out using a Samsung Galaxy S4 mobile device with the following specifications:

1) Model : Samsung Galaxy S4 I9505

2) Operating System : Android v5.0 Lollipop (minimum requirement)

3) Memory : 16GB, 2GB RAM

4) Screen Dimensions: 136.6 x 69.8 x 7.9 mm

5) Display : 5 inches, 1080 x 1920 pixels

6) Connectivity : Wi-Fi 802.11 a/b/g/n/ac, Bluetooth v4.0 with A2DP

The test results use the blackbox method by specifying the test steps and expected results, providing test results with appropriate status. So, the application made can be used and applied to tourist villages to carry out digital promotions using virtual tours.

TABLE I
SCENARIO BLACK BOX TESTING

Scenario Testing	Test Case	Expected Result	Testing Result	Status
Login. Open the app 1. Click the Login button 2. Enter username and password	1. Username: (Blank) Password: (Blank) 2. Username: (admin) Password: (Blank) 3. Username: admin (true) Password: 1234 (wrong) 4. Username: admin (True) Password: admin (True)	1. The system will deny access login and display message "Please complete the form" 2. The system receives login access and displays the admin page	appropriate	Valid

In addition to black box testing, this application was also tested by application to respondents who are prospective application users by giving a questionnaire. Based on the analysis of the data obtained from the questionnaire, the following is a recapitulation of the results of quality testing based on the four aspects of software quality according to ISO 9126 [15] which can be seen in the following table.

TABLE II
SOFTWARE QUALITY LEVEL

Aspect	Actual Score	Ideal Score	% Actual Score	Criteria
Functionality	152	200	76%	Good
Reliability	151	200	75,5%	Good
Usability	218	300	72,7%	Good
Efficiency	123	150	82%	Good
total	641	850	75,4%	Good

Based on the table above, it can be concluded that the overall application quality level is in the good criteria, with a percentage of 75.4%. The functionality Aspects is the ability of the software to provide functions as needed when used under certain conditions have scored 76%. The Reliability Aspects is the ability of the software to maintain a certain level of performance when used under certain conditions have scored 75,5%. The Usability aspect is used to assess how easy the interface of a system is to use and improve ease of use during the design process have scored 72,7%. The highest quality aspect is the Efficiency Aspect is the ability of the software to provide appropriate performance relative to the number of resources used at that time have scored 82%.

IV. CONCLUSION

Based on the discussion that has been described previously regarding the Reservation Application and Android-Based

Virtual Tour of Banyuwangi Regency Tourism Village, it can be concluded that The Banyuwangi Regency Tourism Village Reservation and Virtual Tour application can assist tourists in finding information about Tourism Villages that can be accessed anywhere. Whereas Customers can reserve tour packages offered by each Tourism Village as desired. To confirm payment for a tour package order is done by uploading proof of payment which is then confirmed by the administrator. Tourism Village Managers can easily promote managed Tourism Villages. The application shows the area tour through the panoramic view that called a virtual tour, so the visitor feels real village tourism.

When developing Android-based applications, the programmers definitely need an SDK because it allows to create complex and versatile applications so that they can build applications as intended. This is because the SDK provides the components (plug-ins) needed to build Android-based applications without having to build them from scratch.

For some projects with limited time or budget, the waterfall method can still be useful. Additionally, the technique narrows the focus for a more complete picture of all software output and sets expectations from the start. Stage gates between each step also guarantee that each stage is completed before moving on to the next stage with limited customer involvement which can lead to delays in the development process.

The results of application testing from several questions posed answers to 10 respondents on the questionnaire sheet that the overall level of application quality is in the Good criterion, with a point 75.4%.

REFERENCES

[1] Online literature, "Banyuwangi Genjot Pengembangan Desa Wisata", *http://blh.banyuwangikab.go.id/page/news/banyuwangi-genjot-pengembangan-desa-wisata*, accessed january 6th 2023.

[2] Darmawan, E. W., & Sanawiri, B. "Dampak Video Promosi Wonderful Indonesia A Visual Journey Through Banyuwangi Terhadap Perubahan Persepsi Citra Destinasi Banyuwangi". *Jurnal Administrasi Bisnis (JAB) administrasibisnis.studentjournal.ub.ac.id*, vol 62(2), 53–61, 2018.

[3] Online literature, "Pencanangan Desa Wisata Percontohan di Daerah Kawasan Strategis Pariwisata Kuta-Sanur-Nusa Dua", [Serial Online], *http://www.kemenpar.go.id/asp/detil.asp?c=16&id=2589*, accessed Desember 12th 2022.

[4] Dewi, Fandeli, & Baiquni. "Pengembangan desa wisata berbasis partisipasi masyarakat lokal di Desa Wisata Jatiluwih". *Journal Kawistara* Vol.3 ISSN 2355-5777., 2013

[5] Jannah, B. et al. "Pengaruh City Branding Dan City Image Terhadap Keputusan Berkunjung Wisatawan Ke Banyuwangi". *Jurnal Administrasi Bisnis (JAB).* Vol. 17 No. 1, Desember 2014.

[6] Riyadi Slamet, nurhaida Ida Nurhaida, "Aplikasi Sistem Virtual Tour E-Panorama 360 Derajat Berbasis Android Untuk Pengenalan Kampus Mercu Buana", *Jurnal Teknologi Informasi dan Ilmu Komputer*; Vol 9, No 1: Februari 2022.

[7] H. W. Wulur, "Aplikasi Virtual tour Tempat Wisata Alam di Sulawesi Utara" *Jurnal Teknik Informatika Universitas Sam Ratulangi*, vol. 6, no. 1, 2015

[8] Steven Sentinuwo, Brave Sugiarso, "Aplikasi Virtual tour Tempat Wisata Alam di Sulawesi Utara Hera Wulan ratu Wulur", *E-journal Teknik Informatika*, Volume 6, No. 1, ISSN : 2301-8364 1, 2015

[9] Bharadi, V. A., Ranjan, V., Masiwal, N., & Verma, N. "e-Restaurant: Online restaurant management system for android". *International Conference & Workshop On Advance Computing*. Mumbai, 2013.

[10] Sukamto, R. A., & Shalahuddin, M. "Rekayasa Perangkat Lunak". *Publisher Bandung: Informatika*, 2018.

[11] Wahid, Aceng Abdul. "Analisis Metode Waterfall Untuk Pengembangan Sistem Informasi." *Jurnal Ilmu-ilmu Informatika dan Manajemen STMIK*, 1-5., November 2020.

[12] Indrajani, Pengantar dan Sistem Basis Data , *Elex Media Komputindo*, Jakarta, 2011.

[13] H, Nazrudin Safaat. "Pemrograman Aplikasi Mobile Smartphone dan Tablet PC Berbasis Android". *Publisher Bandung:Informatika*, 2011.

[14] IEEE-STD-610, "A Compilation of IEEE Standard Computer Glossaries", *IEEE Standard Computer Dictionary*, 1991.

[15] ISO/IEC TR 9126-4:2004, Rekayasa perangkat lunak — Kualitas produk — Part 4: *Kualitas dalam metrik penggunaan.* 2004.