Jurnal Teknik Komputer AMIK BSI
Volume 9, No.1, Januari 2023
P-ISSN 2442-2436, E-ISSN: 2550-0120
Akreditasi Ristekdikti, No: 36/E/KPT/2019 (Sinta 4)
DOI: 10.31294/jtk.v4i2

Interactive Application Development Using Augmented Reality Concept for Catalog Tire in Planet Ban Store Pasar Kemis

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Diterima	Direvisi	Disetujui
05-10-2022	17-11-2022	01-12-2022

Abstrak - Saat ini perusahaan berlomba-lomba memaksimalkan peran teknologi dalam berinovasi dan mengembangkan bisnisnya. Salah satunya adalah PT Planet Ban Pasar Kemis dalam hal mempromosikan produk ban terbaru. Dalam hal ini peneliti ingin mengubah cara Planet Ban berpromosi yang selama ini hanya menggunakan katalog ban 2D dengan memanfaatkan teknik AR berbasis Android. Hal ini menyulitkan pelanggan untuk memahami produk ban PT Planet Ban Pasar Kemis. Namun dengan AR, pelanggan hanya perlu memindai Figure katalog 2D dengan Android untuk melihat model ban menjadi bentuk 3D. Metode pengembangan sistem yang digunakan peneliti adalah metode waterfall dimana urutan dan langkah-langkah penelitian telah disusun berdasarkan kondisi PT Planet Ban. Sedangkan untuk System Analysis and Design, peneliti menggunakan metode Unified Modeling Language atau UML, sedangkan desain produk menggunakan blender dan unity untuk mengaplikasikan Figure katalog 2D ke dalam model 3D. Untuk mengukur tingkat keberhasilan aplikasi, peneliti melakukan tahap pengujian menggunakan metode pengujian black box dengan hasil yang sesuai dengan skenario pengujian sehingga aplikasi dapat digunakan sesuai dengan kebutuhan pengguna.
Kata Kunci: Augmented Reality, Android, Aplikasi Seluler

Abstract *- Currently, the company competes to maximize the role of technology in innovating and developing its business. One of them is PT Planet Ban Pasar Kemis in terms of promoting the latest tire products. In this case, researchers want to change the way Planet Ban promotes which has so far only used a 2D tire catalog by utilizing Android-based AR techniques. This makes it difficult for customers to understand the tire products of PT Planet Ban Pasar Kemis. But with AR, customers only need to scan 2D catalog images with Android to see the tire model into 3D form. The system development method used by researchers is the waterfall method where the sequence and steps of research have been structured by the condition of PT Planet Ban. As for System Analysis and Design, researchers use Unified Modelling Language or UML methods, while product design uses blenders and unity to apply 2D catalog images into 3D models. To measure the success rate of the application, researchers conducted a testing phase using the black box testing method with results that match the test scenario so that the application can be used according to the needs of the user.*

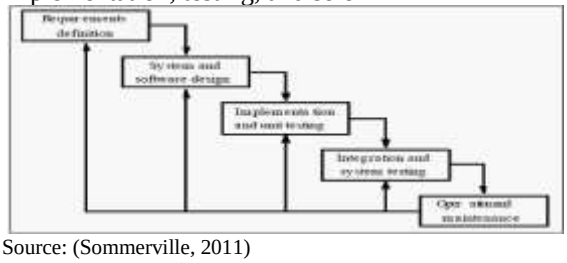
Keywords: Augmented Reality, Android, Application Mobile

INTRODUCTION

The development of graphic design technology in the sales media, making a demand for the way of presentation both through images in catalogs and computer media, such as graphic design applications for promotional media

is in high demand. This can be seen from the promotion of vibrant ads using graphic technology to promote or
attract attention to who is viewing . The application of this graphic technology introduces a generation of designers
to image manipulation with computers and creates three-dimensional images that were previously difficult and time consuming workmanship. Using graphic technology allows designers to see the results of a layout or typography instantly without manual sketches or pens (Alves & Luís Reis, 2020) .
A designer will pour his visualizations to explore ideas in promoting forms and choose tools to complete the technique using a computer. includes visual art, typography, layout, and interaction design. One of the computer graphics technology that is being widely used to produce three-dimensional images is Augmented Reality, This is a method of integrating two-dimensional and three-dimensional virtual objects into a real three-dimensional environment and then projecting those virtual objects into real-time (Chen et al., 2019)(Purwanto, 2014)(Huda et al., 2021)(Nursamsu et al., 2018).
The technology of augmented reality is extremely useful. useful in creating promotional catalogs, in addition to saving operational costs, it can also avoid damage to goods (Bagus & Mahendra, 2016)(Nainggolan et al., 2019).
In a company handling the sales system is one of the very important factors, therefore the company should try to provide attractive promotions to consumers. One way to promote this is by creating a sales catalog to attract consumers from the Planet Ban Pasar Kemis because currently the company is still conducting sales promotions using paper catalogs that are vulnerable to damage and data that is less updated .
Where the current constraints of them are customers are still too dependent on employees to get information about tires. In addressing the problem, researchers researched to build augmented reality-based applications on the Planet Ban Pasar Kemis.

Waterfall Models
Waterfall models According to (Sommerville, 2011), is the process of activity of specifications, develop, validate, and evolution and represents processes like specification requirements, software design, implementation, testing, and so on



Source: (Sommerville, 2011)
Figure 1. Waterfall Model according to Ian Sommerville.

Here is an explanation of these stages:
1. Analyzing and Defining Requirements.
It is a stage in Planet Ban Pasar Kemis that involves deciding features, constraints, and system goals, as well as analyzing needs such as functional, non-functional, hardware, software, and brain ware through consultation with system users.

2. System and Software Design.
In this stage will be formed modeling for the system (UML), determine the design of the database, as well as create a prototype (design) system.
3. Implementation and System Testing.

The outcomes of the software design will be realized or implemented as a series of programs or program units at this level. Each device will be checked to see if it meets the specifications.
4. Integration and System Testing.

Each program unit will be implemented and reviewed as a whole system at this point to ensure that the system meets the current requirements. Testing of this system is done using black-box testing

5. Operation and Maintenance.
In this stage, the system is installed and started to be used. It also fixes errors not found in the build stage. In this stage also carried out system development such as the addition of new features and functions.

Unified Modeling Language
UML (Unified Modeling Language) is a common language used for design, defining, and building applications. In object-oriented systems, UML is a oat technique and also a tool for supporting system development(Destriana et al., 2019).

RESEARCH METHODOLOGY

Types of Research
At this stage, the researchers conduct analysis and collect documents and data related to the title of the study, as for the process includes:

1. Data Collection
In completing this research, both in the collection of data and information needed to obtain the correctness of the discussion, researchers obtained the desired data.

2. Interview Method
This method is done by interviewing employees who understand their fields or having discussions with company owners who understand the subject matter to obtain input materials and supporting data in the preparation of this thesis. At this stage, the researchers interviewed Mr. Gilang as the store owner to obtain the data needed in the creation of the application.

3. Observation Method
Researchers conducted observations directly to Planet Ban Pasar Kemis, to study and obtain information about the current system. This observation was conducted in July 2020 at Planet Ban Pasar Kemis.

Analysis Methods

This study's methodological approach is based on Object-Oriented Analysis (OOA) or UML Object Oriented Analysis approach. On the basis of the results of the data collection stage, To obtain the specification of system requirements, a research method involving interviews, observation, and literature will be developed. The technical research done in the analysis phase are (Sukamto & Shalahuddin, 2015).
1. Analyzing data and operating information systems. Procedures, documentation, les, and a printout of the system that was already up and running were all reviewed.
2. Functional, non-functional, and user analysis of needs. Functional speci cations modeling defines the role of the framework of the user involved as well as any functionality that is possible gained by a Usecase Diagram was used to model each user
3. Method of behavior Analysis. An overview of the action of a system-generated and modeled with an operation diagram and a sequence diagram at this point. Model Use case process operation diagram that runs in the method, while model messaging (message) sequence diagram between object and chronology.

Systems Development Method

In the waterfall method of device construction, for the development of applications. The steps are performed:

a. Analysis.
Analysis for the Current System The condition that is currently running on Planet Ban Pasar Kemis is still using catalog manually so that when there is a change in data in the catalog it must be done manually which takes time so it is not effective and efficient.

b. Design.
In the design phase that the researchers do is;
• Designing a system that is easy to use by the user.
• Create an application that can replace the system manual
• Construct application is user-friendly so that all users can easily use it.

c. Coding.
This coding phase is built using tools:
• Java programming language.
• Photoshop cs6
• Android Development Tools
• Unity3D and Vuforia (Bagus & Mahendra, 2016)
• Blender

d. Testing.
At this stage, testing is conducted against customers and admins of the tire catalog users.

e. Maintenance.
At this stage, improvements are made related to the user's need for the contents of the tire catalog.

System Testing Methods
In this test, black box testing was used to observe the execution outcomes using test data and the software's functional control.

RESEARCH METHODOLOGY

Method of Analysis and Design Using UML
System design on Use Case Diagrams. Use Case Diagrams can be used to collect data during the analysis process system requirements and to recognize how the system should work. During the design stage, the use case diagram sets the behavior of the system when implemented. In a model, there could be one or more use case diagrams. A use case diagram contains actor, use-case, the interaction between actor and use case.
Source: Penelitian Mandiri 2021

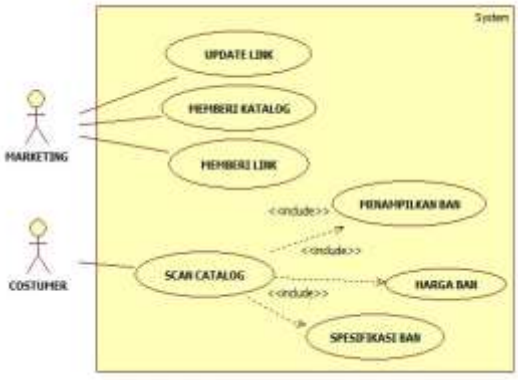
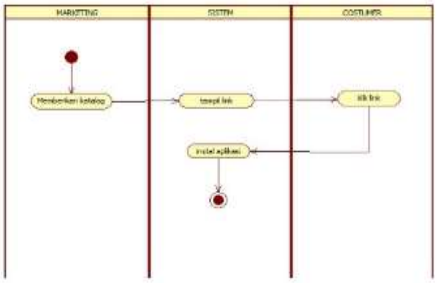


Figure 2. Use Case Diagram.

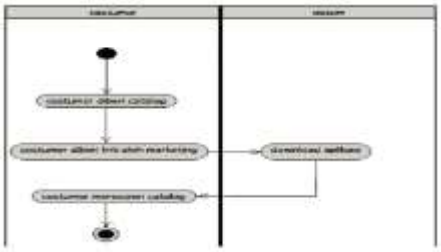
- Design of the proposed system in the Activity Diagram. Activity diagrams describe business processes and sequences of activities in a process, which will be used in business modeling to help understand the process as a whole.
  a. Tire Catalog Marketing Diagram Activity



Source: Penelitian Mandiri 2021

Figure 3. Tire Catalog Activity Diagram.

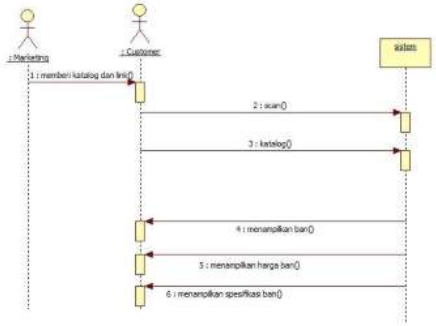
b. Activity Diagram Customer On Planet Ban



Source: Penelitian Mandiri 2021

Figure 4. Activity Diagram Customer On Planet Ban.

- Design of the proposed system in the Sequence Diagram. A sequence diagram is a diagram that explains an object's interaction and indicates communication between them. The diagram here presents the communication between Planet Ban users and augmented reality applications. Based on the figure sequence diagram above, researchers provide some information, namely:
  1. Two actors are involved in the system, namely customers and marketing.

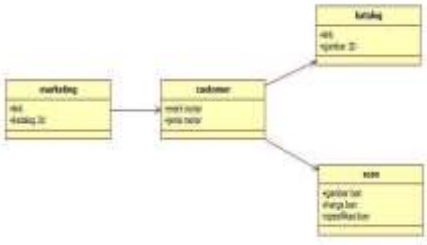


Source: Penelitian Mandiri 2021

Figure 5. Sequence Diagram of Tire Promotion Process on Ban Planet

  2. One system that connects customers with the application.
  3. Six messages become specifications of communication between objects by containing information about the activities that occur

- Design of the proposed system in the Sequence Diagram. A sequence diagram is a diagram that explains an object's interaction and indicates communication between them. The diagram here presents the communication between Planet Ban users and augmented reality applications.



Source: Penelitian Mandiri 2021

Figure 6. Class Diagram of proposed Tire Promotion Process on Planet Ban.

- We can see the display of the augmented reality-based tire catalog information application, such as

Source: Penelitian Mandiri 2021

Figure 6. Class Diagram of proposed Tire Promotion Process on Planet Ban.

- In the 2D catalog, some markers can be scanned to display 3D models. B.This application can display tire type, tire specification, and tire price.

Source: Penelitian Mandiri 2021

Figure 8. Catalog scan view.

CONCLUSION

The conclusion of the study with the object "Designing a Catalog of Tires Based on Augmented Reality on Planet Ban Pasar Kemis is as follows: 1) In the 2D catalog, some markers can be scanned to display 3D models to make it easier for customers to view the catalog. 2) This application can display the type of tires, tire specifications, and tire prices according to what is desired by the customer. 3) With this application, customers get a new experience in viewing a tire catalog along with details of the tires to be purchased

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