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Article

Augmented Reality-Based Laptop Digital Catalog Application

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Abstract: Augmented Reality is a system that supports the real world with virtual (computer-generated) objects that appear together in the same space/place as the real world. One of the uses of Augmented Reality is as a promotional medium. The application of Augmented Reality (AR) in promotional media aims to increase the interest of consumers who are not satisfied with conventional promotional media. With conventional media, the attractiveness of an item is still not maximized. Based on the results of the research and the application made, it can be concluded that the "AR Laptop Catalog" application can help increase consumer interest by knowing the real form of the product and can help determine the desired laptop. The "AR Laptop Catalog" application was created with the aim of introducing Augmented Reality as a new promotional media, with the existence of AR-based promotional media it is hoped that it can be a reference for the development of further promotional media

Keywords: Augmented Reality, Laptop Catalog, Consumer, Media, Promotion

1. Introduction

In this era of globalization, the development in the world of digital information technology is progressing very rapidly [1]. The development of this technology has led to the emergence of new technologies day by day, making technology increasingly necessary for society in various aspects, including information and product marketing. With the rapidly developing technology, various types of technology have emerged for different purposes, including in the field of information technology, specifically technology for sales media [2]. One of the tools that can be used for various purposes is a laptop. A laptop is a very important tool for everyone, especially those still in the education stage. Besides being used to enhance educational productivity, a laptop can also be used as a tool for creating promotional media.

Promotional media itself is a tool or means used for promotion. There are 2 types of promotional media that are currently developing, from conventional media to unconventional media [3]. The marketing technique currently used involves offline media such as brochures and magazines that display two-dimensional images of the offered products. However, this technique still has shortcomings, such as the lack of a full depiction of the product's form being offered, which leads to consumer dissatisfaction when they see it [4]. In the promotion of electronic products, there are several promotional approaches, namely using offline media such as brochures, and using electronic media like Augmented Reality-based digital catalogs.

Augmented Reality (AR) is a combination of real and virtual objects in 3D form that are integrated into the real world in real-time. AR provides users with a visualization of

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the combination of the real world and the virtual world that can be seen in the same place [5]. One of the uses of Augmented Reality is as a promotional medium [6]. The application of Augmented Reality (AR) in promotional media aims to increase consumer interest who are dissatisfied with conventional promotional media. With conventional media, the appeal of a product is still not maximized.

Currently, there are still many SMEs that use print media as their promotional medium, especially in small laptop stores like Saderma Komputer, which is currently being researched [7]. Saderma Komputer is a micro business owned by an individual that sells and services laptops, using print media and word-of-mouth information networks for promotion. Saderma Komputer also offers pre-orders for products that are not yet in stock. The problem faced by Saderma Komputer is the lack of realistic representation of the products currently being promoted. This can cause consumers to lose interest in the promoted product.

Therefore, the author intends to create a Digital Laptop Catalog Application to satisfy consumers so they can see the actual form of the product. In addition to being able to display the actual form, the Digital Catalog Application can also increase consumer interest in purchasing the product [8]. The marker-based Augmented Reality (AR) method can use a 2D image as a point where the AR camera will display a 3D model. The marker used is the image from the laptop brochure. The features included in the application are Rotating, Scaling, and audio features. With the presence of digital promotional media, it is hoped that consumers will feel more interested in the offered products.

2. Materials and Methods

Augmented Reality (AR) technology is a technology that provides features in the form of three dimensions that can visualize these 3D shapes using smartphones, computers, and others [9]. This research basically uses the Study Research method and the Observation method to collect data. At this stage, data is collected by directly visiting the research site to observe the object being studied.

1. MDLC *(Multimedia Development Life Cycle)*

This application is basically developed using the MDLC method. This method is a method that consists of several stages [10].

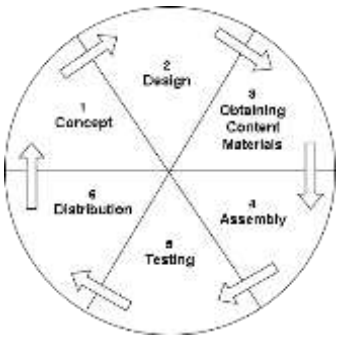


Figure 1. MDLC stages

Figure 1. MDLC Stage, the first stage is Concept, which means creating an application concept according to user needs. The second stage is Design, at this stage the design process of the application will be determined for the comfort or ease of the user. The third stage is Obtaining Content Material, which can be interpreted as gathering materials for the creation of the application. The fourth stage is Assembly, in this stage, everything is gathered starting from the concept, design, and materials for the application development. The fifth stage is Testing, at this stage, when all processes are complete and the application has been produced, the application will be tested to determine whether it runs normally or not. The final stage is Distribution, in this stage the application is distributed to users to receive feedback and suggestions.

2. System Design Stage

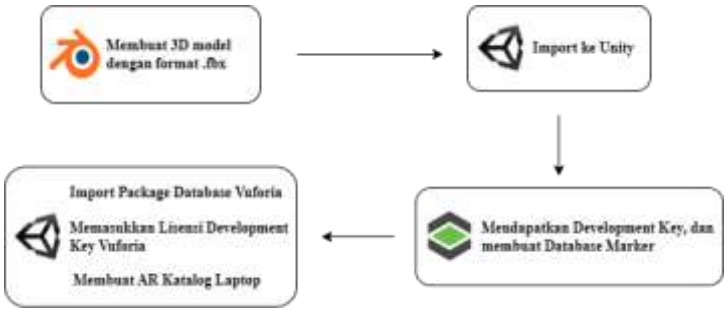


Figure 2. System Design Stage

Figure 2. System Design Stage, is a stage in system design. This system is created by first making a 3D model, then importing the .fbx file into Unity. The third stage involves obtaining the Development Key and creating a Database Marker in Vuforia. After completing these three stages, the next step is to import the Database Marker and Development Key into Unity so that the AR camera can detect the created marker.

3. *Flowchart*

A flowchart is a diagram that displays the steps or problem-solving process of a program in a simple manner [11].

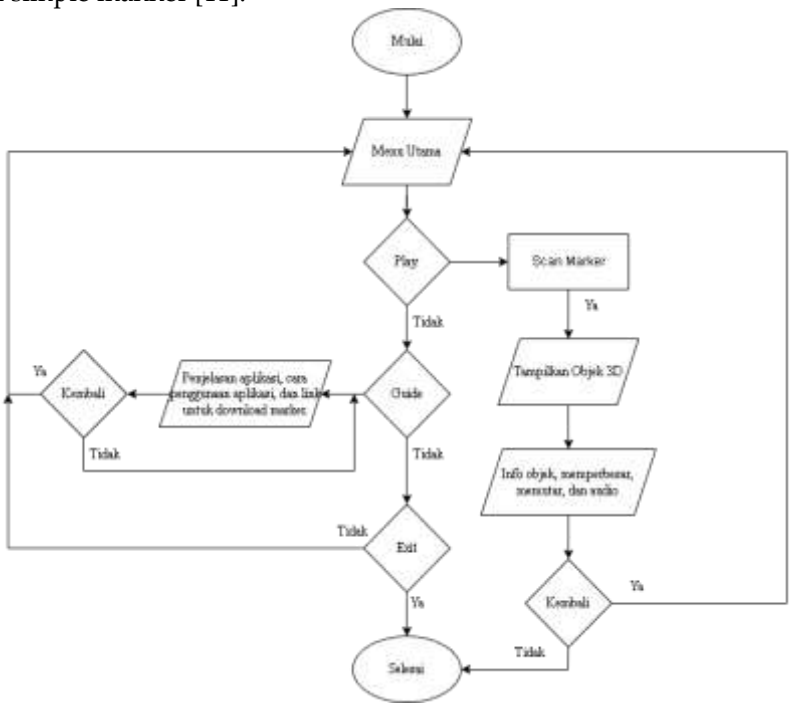


Figure 3. Application Flowchart

Figure 3. Flowchart The application is the flow of the application, the initial stage is when the application is run, and then three menus will appear: Play, Guide, and Exit. In the Play menu, there is an AR camera. By scanning a marker, a 3D object will appear along with the available features, including the Automatic Description feature, Scaling feature, Rotate feature, and Audio feature. In the second menu, there is a Guide menu, where users will be provided with an explanation of the application and how the AR camera works in the application. In this Guide menu, there is also a button to download the marker that is directly linked to Google Drive. The 3rd menu, the Exit menu, is the menu to exit the application. If all three menus can be accessed, then proceed to the final stage, which is completion.

4. *Use Case Diagram*

Use Case Diagram is a simple illustration of the relationship between the user and the system [12].



Figure 4. *Use Case Diagram*

Figure 4. Use Case Diagram, explaining the actor who is the user interacting with the system. Actors can access 3 menus in the system, namely Play, Guide, and Exit. When the actor accesses Play, the system will automatically display the camera as an object scanner to be detected using a marker. After the marker is detected, the 3D object along with its features will automatically be displayed on the device's screen.

5. Support System

The research support system is carried out with the assistance of supporting systems or applications, which include the following:

a. *Augmented Reality* (AR)

According to the research titled Recent Advances in Augmented Reality, Augmented Reality is a system that enhances the real world with virtual objects (computer-generated) that appear simultaneously in the same space/place as the real world [13].

b. Blender

Blender is one of the applications for creating 3D models, Blender has several features including 3D modeling, texturing, bitmap image editing, bones, fluid and smoke simulation, particle simulation, animation, video editing, digital sculpting, and rendering [14].

c. Unity

Unity is a game engine software for creating games. Unity is one of the most widely used game engines today; it can be used to create high-quality 2D and 3D games that run on various platforms [15]. Not only for making games, Unity can be used to create applications such as Augmented Reality applications with the help of the Vuforia extension.

d. Vuforia

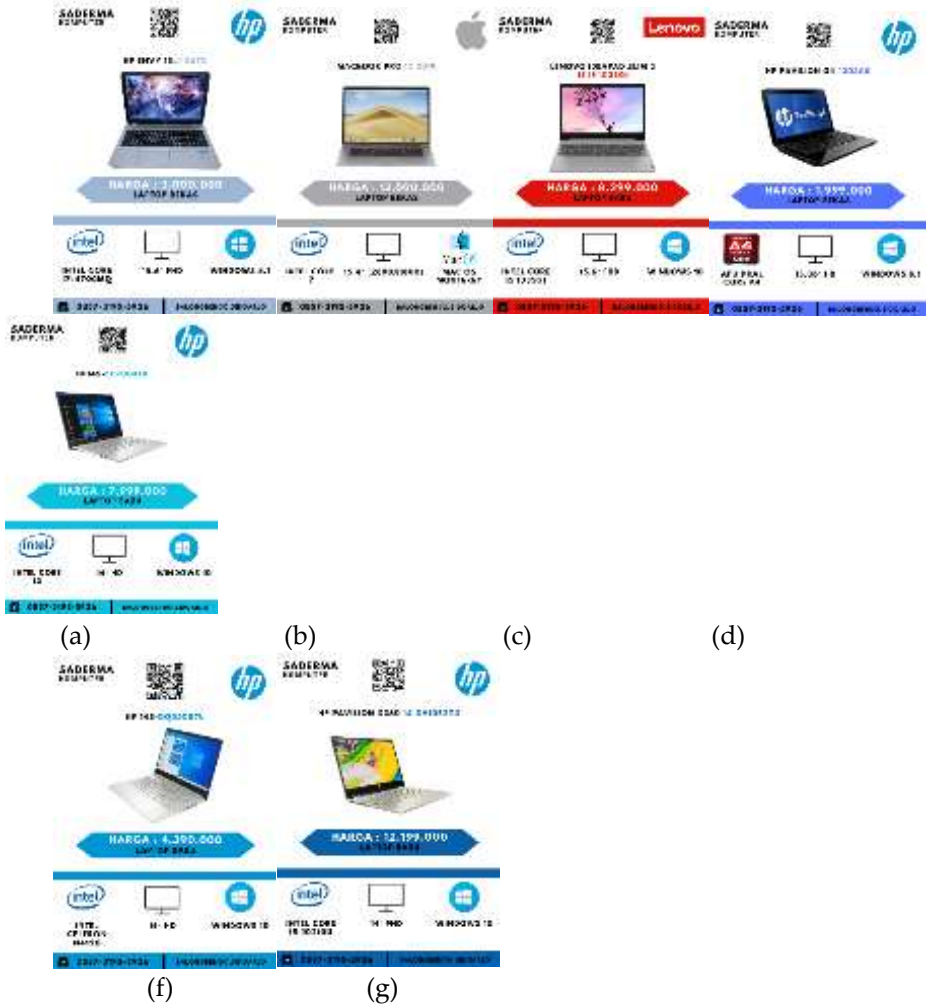
Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of AR applications. In addition, there is a Vuforia extension called Vuforia AR Extension for Unity that can be used to create Augmented Reality in Unity [16].

3. Results

The result of this research is an application titled "Augmented Reality-Based Digital Laptop Catalog Application," which includes a system to facilitate and increase consumer interest in the promoted products. With the existence of this application, consumers will be able to see the actual form of the product and more detailed product specifications.

A. Marker

In this digital catalog application, there are several markers used for the 3D model detection process using the AR camera.



(a) (b) (c) (d) (e)

(f) (g)

Figure 5. Desain Marker

Figure 5. Marker Design, containing small details about the laptop specifications as well as the condition and price of the laptop. In this marker design, there are also the name, picture of the laptop, and information about the laptop store.

B. 3D Objek

This research uses a 3D model displayed through Augmented Reality by tracking markers.

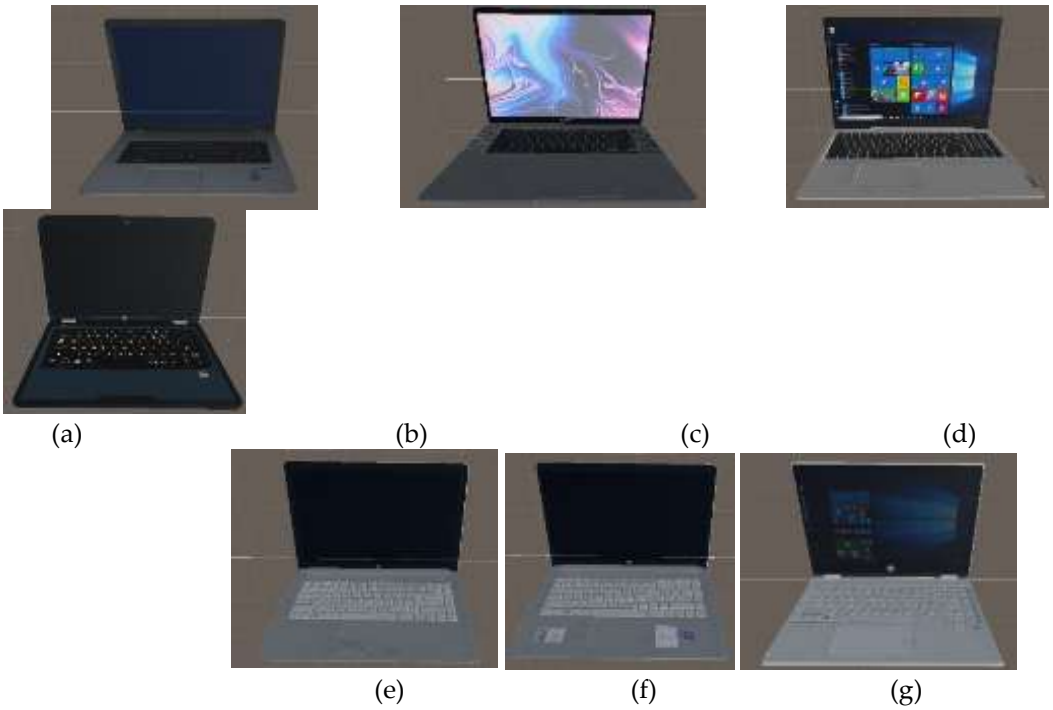


Figure 6. 3D Design of Laptop Model

Figure 6. 3D Laptop Model Design, is a 3D laptop model design created based on the availability of laptops. The 3D model design of this laptop was created using Blender and imported into Unity to be used as an AR object when scanned.

C. Halaman Main Menu



Figure 7. Main Menu Page

Figure 7. Main Menu Page, which is the first page when the application is opened, this main menu page contains 3 buttons: the Play button to enter the AR camera, the Guide button to access the application usage tutorial menu, and the Exit button to exit the application.

D. PLAY Page

1. When Marker Has Not Been Detected

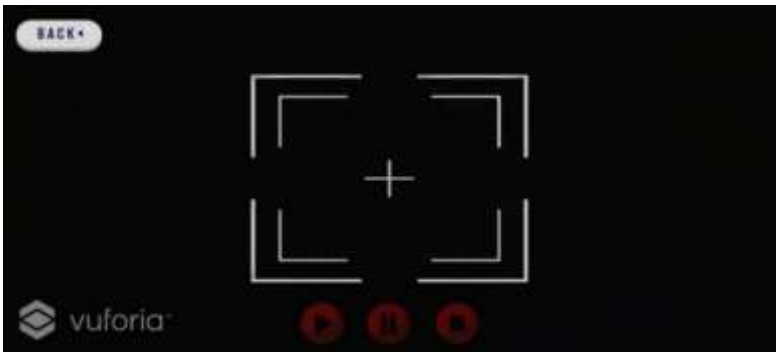


Figure 8. PLAY Page

Figure 8. The PLAY page, which is the page from the PLAY menu. When the marker has not been detected, the application will automatically display the AR camera with a back button in the top left corner, a marker indicator, and an audio feature that is not yet accessible.

2. When Marker is Detected



Figure 9. When Marker is Detected

Figure 9. When Marker is Detected, it will automatically display the 3D model along with its name and description according to the marker. At the same time, the audio button can also be accessed.

3. Rotate Feature



Figure 10. Rotate Feature

Figure 10. Rotate Feature, allows objects to be rotated horizontally. To use this feature, simply swipe left and right on the screen.

4. Scaling Feature (Zoom in/Zoom out)



Figure 11. Scaling Feature

Figure 11. Scaling Feature, makes objects can be enlarged or reduced by pinching or pinching the screen. With this feature, users can see small and difficult to see details

5. Audio Control Feature



Figure 12. Audio Control Feature

Figure 12. Audio Control Feature, this audio control feature has 3 buttons, namely the Play, Pause, and Stop buttons. In the early stages when the new marker is first scanned, only the Play button is lit, but the Pause and Stop buttons are still not lit.

- Play Audio Button



Figure 13. Play Audio Button

Figure 13. Play Audio Button, when this button is pressed, it will automatically make the button transparent and at the same time audio about the product description will start based on the marker or product being scanned.

- Pause Audio button



Figure 14. Pause Audio button

Figure 14. Pause Audio button, has a function to stop the audio that is currently playing. At the same time if the Play button is pressed again while in pause mode, the

audio that starts will continue from the last time it was paused and only the Pause button will be transparent.

- Stop Audio button



Figure 15. Stop Audio button

Figure 15. Stop Audio button, this stop audio button is different from the Pause button, if the Stop button is pressed it will automatically stop the audio that is currently playing, and all buttons will return to their original state where if the audio is played it will start from the beginning again.

E. GUIDE page



Figure 16. GUIDE page

Figure 16. GUIDE page, in this GUIDE page there is information about the application and a tutorial on how to use the application. There is no special coding for this page except for the Back button and download marker.

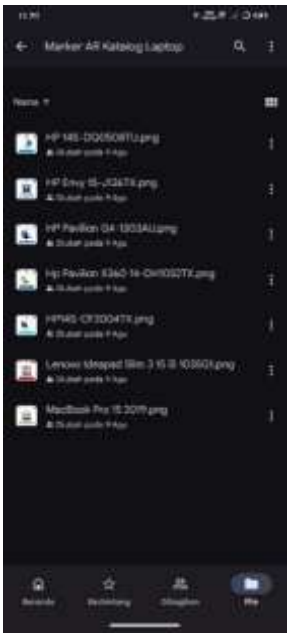


Figure 17. When the Download Button is Pressed

Figure 17. When the Download Button is Pressed, if the download button on the GUIDE page is pressed, it will switch to Google Drive which contains markers of available products.

F. Back Button



(a) (b)

Figure 18. Back Button

Figure 18. Back Button, is a button to return to the Main Menu. The Back button is on the PLAY menu and the GUIDE menu to help return to the main menu when finished.

G. EXIT Menu



Figure 19. EXIT Menu

Figure 19. EXIT Menu, this EXIT menu is on the Main Menu page where when this menu is pressed it will automatically close the application.

H. System Testing

This stage contains application testing using the Black Box method. With this testing, the following results were obtained.

Table 1. Black Box Testing Results

No	Modul	Testing Form	Expected Output	Result
1	Main Menu	PLAY Button	Move to AR camera page	Successful
		GUIDE Button	Move to Guide page	Successful
		Exit Button	Exit application	Successful
2	PLAY	Back Button	Move to Main Menu page	Successful
		Automatic Description Appears	Show product description	Successful
		Object Rotate	Rotate object horizontally	Successful
		Object Scaling	Zoom in and out of object	Successful
		Audio Play Button	Start Audio	Successful
		Audio Pause Button	Pause Audio	Successful
		Audio Stop Button	Stop Audio	Successful
3	GUIDE	Back Button	Move to Main Menu page	Successful
		Download Marker Button	Move to Google Drive	Successful
4.	EXIT		Exit Application	Successful

Table 1. Black Box Test Results, is an application test using the Black Box method. From the test results above, it can be concluded that all menus and features can run smoothly, this shows that the application runs according to the designer's wishes.

Table 2. Compatibility Test

No	Device Name	Android Version	Results
1	Vivo T1	14.0	An incompatible notification appears, but the application can be run normally and smoothly

2	Infinix Note 40	14.0	An incompatible notification appears, but the application can be run normally and smoothly
3	Xiaomi Redmi Note 9	12.0	The application runs smoothly

Table 2. Compatibility Test, is a test on several different devices. The table above shows the results of compatibility testing on several versions of Android. It can be concluded that the application had given an incompatible notification on Android above Android 12, but even so the application could run smoothly and according to the initial design.

4. Discussion

The development of the "Augmented Reality-Based Digital Laptop Catalog Application" successfully integrates AR technology to enhance user interaction and provide a more engaging experience when viewing laptop products. This application allows users to visualize 3D laptop models in real-time by scanning markers, offering detailed information such as product names, specifications, conditions, and pricing. The presence of interactive features like object rotation, scaling, and audio descriptions further improves the user experience by making the product exploration process more intuitive and informative.

System testing using the Black Box method demonstrated that all functionalities, including marker detection, menu navigation, and audio controls, performed as intended without critical errors. The compatibility tests also revealed that although some devices running Android version 14 displayed a compatibility warning, the application still ran smoothly, indicating that the app is stable across multiple Android versions. This suggests a high level of usability and reliability for potential consumers.

Overall, the combination of AR technology and intuitive design elements in the application offers a novel and effective way for users to interact with digital product catalogs, potentially increasing user interest and decision-making confidence when purchasing laptops.

5. Conclusion

The use of Augmented Reality can be applied to promotional media. By using Augmented Reality, promotional media becomes more engaging with interaction with 3D objects. Based on the research results and the application created, it can be concluded that the "AR Laptop Catalog" application can help increase consumer interest by allowing them to see the actual form of the product and helping them determine the desired laptop. The "AR Laptop Catalog" application was created with the aim of introducing Augmented Reality as a new promotional medium. With the presence of this AR-based promotional medium, it is hoped that it can serve as a reference for the development of future promotional media.

REFERENCES

[1] L. Y. Siregar and M. I. P. Nasution, "Perkembangan Teknologi Informasi Terhadap Peningkatan Bisnis Online," *HIRARKI J. Ilm. Manaj. dan Bisnis*, vol. 02, no. 01, pp. 71–75, 2020, [Online]. Available: http://journal.upp.ac.id/index.php/Hirarki%0APERKEMBANGAN.

[2] W. A. Jati, F. Nugrahanti, and S. Riyanto, "Aplikasi Katalog Pakaian Sebagai Media Pemasaran Berbasis Augmented Reality," *Semin. Nas. Teknol. Inf. dan Komun.*, pp. 321–329, 2021.

[3] D. Muttaqin, I. Hafizh Arrosydi, and Saprudin, "Perancangan Sistem Promosi Berbasis Web Pada O'El.Net Menggunakan Metode Scrum," vol. 1, no. 6, pp. 908–922, 2024, [Online]. Available: https://jurnalmahasiswa.com/index.php/biikma.

[4] Y. Nugroho, "N, Yogi Rancang Bangun Aplikasi Pemasaran Elektronik Berbasis Augmented Reality Menggunakan Metode Waterfall," *J. Bina Komput.*, vol. 2, no. 1, pp. 66–73, 2020, doi: 10.33557/binakomputer.v2i1.761.

[5] Y. Fernando, I. Ahmad, A. Azmi, and I. Borman, "Penerapan Teknologi Augmented Reality Katalog Perumahan Sebagai Media Pemasaran Pada PT. San Esha Arthamas," *J. Sains Komput. Inform. (J-SAKTI*, vol. 5, no. 1, pp. 62–71, 2021.

[6] P. B. A. A. Putra, "Implementasi Augmented Reality Pada Media Promosi Penjualan Rumah," *J. Teknol. Inf. J. Keilmuan dan Apl. Bid. Tek. Inform.*, vol. 14, no. 2, pp. 142–149, 2020, doi: 10.47111/jti.v14i2.1163.

[7] M. Surohadi, H. Hindarto, and H. Setiawan, "Prediksi Produksi Dompet Kulit Sintetis Menggunakan Metode Fuzzy Mamdani," *J. Inform. Polinema*, vol. 9, no. 2, pp. 207–214, 2023, doi: 10.33795/jip.v9i2.1239.

[8] M. F. Mahesa Ijlal, U. Chotijah, and D. Aditama, "Perancangan Aplikasi Katalog Produk PT Petrosida Gresik Berbasis Android," *J. Komtika (Komputasi dan Inform.*, vol. 6, no. 1, pp. 39–48, 2022, doi: 10.31603/komtika.v6i1.6997.

[9] S. W. Maulana, R. Dijaya, C. Taurusta, and I. R. I. Astutik, "Penerapan Augmented Reality Dalam Replikasi Tata Letak Studio Foto," *JURIKOM (Jurnal Ris. Komputer)*, vol. 10, no. 2, p. 404, 2023, doi: 10.30865/jurikom.v10i2.6003.

[10] D. Septian, Y. Fatman, S. Nur, U. Islam, and N. Bandung, "Implementasi MDLC (Multimedia Development Life Cycle) Dalam Pembuatan Multimedia Pembelajaran Kitab Safinah Sunda," *J. Comput. Bisnis*, vol. 15, no. 1, pp. 15–24, 2021.

[11] A. D. A. N. Pemrograman, "Pseudocode," *Definitions*, 2020, doi: 10.32388/tf77dy.

[12] T. Arianti, A. Fa'izi, S. Adam, and M. Wulandari, "Perancangan Sistem Informasi Perpustakaan Menggunakan Diagram Uml (Unified Modelling Language)," *J. Ilm. Komput. Tera[an dan Inf.*, vol. 1, no. 1, pp. 19–25, 2022, [Online]. Available: https://journal.polita.ac.id/index.php/politati/article/view/110/88.

[13] A. Harahap, A. Sucipto, and J. Jupriyadi, "Pemanfaatan Augmented Reality (Ar) Pada Media Pembelajaran Pengenalan Komponen Elektronika Berbasis Android," *J. Ilm. Infrastruktur Teknol. Inf.*, vol. 1, no. 1, pp. 20–25, 2020, doi: 10.33365/jiiti.v1i1.266.

[14] Y. Irawan, "APLIKASI ANDROID SEBAGAI MEDIA PEMBELAJARAN ORGAN TUBUH MANUSIA DENGAN MENERAPKAN AUGMENTED REALITY (Studi Kasus: SDN 005 Makmur Pangkalan Kerinci)," *J. Ilmu Komput.*, vol. 9, no. 2, pp. 102–106, 2020, doi: 10.33060/jik/2020/vol9.iss2.173.

[15] R. Efendi, "Rancang Bangun Aplikasi Augmented Reality Untuk Deteksi Pengenalan Tanaman Obat Berbasis Android," *IKRA-ITH Inform.*, vol. 4, no. 1, pp. 35–45, 2020, [Online]. Available: rizalefendi248@gmail.com.

[16] J. P. Ashidik, S. Waluyo, and I. Susanti, "Penerapan Teknologi Augmented Reality Berbasis Android Dengan Menggunakan Metode Marker Based Tracking Sebagai Media Pemasaran Produk Pada Haus Coffee," *Skanika*, vol. 4, no. 1, pp. 51–57, 2021, doi: 10.36080/skanika.v4i1.1936.