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IMPLEMENTATION OF AUGMENTED REALITY (AR) TECHNOLOGY FOR PRODUCT CATALOG AT GABE CRAFT MSME

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ABSTRACT

UMKM Gabe Craft, as a handicraft business, requires a more interactive promotional medium to increase marketing reach and product appeal. This research aims to design and develop an Augmented Reality (AR) based product catalog application as a modern, informative, and attractive digital promotional solution. The system is developed as a website using WebAR technology that allows users to display 3D product models through QR Code scanning without needing to install additional applications. The development process uses a web based development approach that includes interface design, 3D model integration, AR feature implementation, and system testing. AR technology is implemented using Model Viewer to display 3D product models in real-time, enabling users to view product details such as shape, size, and appearance more interactively. Testing results using the black box method show that all system functions work properly according to requirements, including catalog display, 3D model visualization, and product data management by admin. Based on the research findings, the implementation of Augmented Reality in UMKM Gabe Craft's product catalog has proven capable of improving promotional quality, providing new experiences for consumers, and supporting the digitalization process of MSMEs.

INTRODUCTION

The development of information and communication technology has brought significant changes across various sectors, including economics and business. Digitalization has become an essential factor in improving operational efficiency,

productivity, and the reach of product marketing. For Micro, Small, and Medium Enterprises (MSMEs), technological advancements offer substantial opportunities to expand market access, enhance service quality, and strengthen competitiveness. However, many MSMEs are still unable to keep pace with these developments, as they continue to rely on conventional promotional methods that are not interactive and fail to present product details optimally (Sarif, 2023).

In the context of modern marketing, promotional media based on static images are increasingly abandoned because they do not provide sufficient visual experience for potential buyers. Today's consumers expect digital promotional media that can present products in a realistic, interactive, and informative manner before making purchasing decisions. One of the technologies capable of fulfilling this need is Augmented Reality (AR). AR combines virtual two or three dimensional objects with the real environment in real time through devices such as smartphones or computers. This technology has been proven to enhance user experience, strengthen brand image, and capture consumer interest more effectively (Hidayah, Wulandari, & Wahyudi, 2025).

UMKM Gabe Craft is a small business engaged in handcrafted crochet products, with its main products including amigurumi, lobe accessories, and outerwear made from yarn. Although the products have high quality and unique visual characteristics, the promotional methods used are still limited to static image catalogs on social media. As a result, potential buyers face difficulties in viewing the product details comprehensively, including shape, size, and texture. Therefore, a promotional medium that is more modern, adaptive, and aligned with digital technology developments is required.

The main problems identified in this research are how to design a web-based product catalog that can present products more interactively and how to implement Augmented Reality within the catalog. This study focuses on developing a web-based product catalog supported by 3D product models and AR features that enable consumers to view products more realistically, thereby providing a more effective promotional medium for UMKM Gabe Craft.

The scope of this research is limited to the development of a web-based catalog system displaying three product categories (Amigurumi, Lobe, and Outer), supported by 3D visualization and AR features. The study does not cover stock management, sales transactions, or integration with other information systems. The primary focus is the implementation of AR to display 3D product models interactively.

This research aims to design a web-based product catalog for UMKM Gabe Craft that supports Augmented Reality technology and to implement AR in order to enhance interactivity and visual appeal in product presentation. The benefits of this study

include providing a more attractive and innovative digital promotional medium, offering a new experience for consumers to view product details more realistically using AR and QR codes, and serving as a reference for future studies related to the use of AR in MSME product promotion.

Therefore, this research is expected to contribute significantly to the digital transformation of MSMEs, particularly in optimizing promotional strategies through the application of Augmented Reality as a modern, interactive, and effective promotional tool.

LITERATURE REVIEW

System

A system is defined as a unified entity composed of interconnected components or variables that work together in an organized and interdependent manner. Essentially, a system represents a set of interacting elements designed to achieve specific objectives through a structured sequence of processes or instructions. Regardless of the varying definitions across sources, the underlying meaning remains consistent: a system functions as an integrated network developed to meet user needs and support the understanding of the designed structure (Ipnuwati, 2014).

Application

An application is software designed to execute specific commands from users to produce outputs that meet predetermined needs. Applications function as tools for problem-solving by utilizing data processing and computational techniques. Through integrated capabilities, applications support various activities and operate within a particular system environment (Sari, Syahputra, Zaky, Sibuea, & Zakhir, 2022).

Micro, Small, and Medium Enterprises (MSMEs)

Micro, Small, and Medium Enterprises (MSMEs) represent a crucial sector in Indonesia’s economy. According to the Ministry of Cooperatives and SMEs, MSMEs contribute more than 60% to the national Gross Domestic Product (GDP), absorb a significant portion of the workforce, reduce unemployment, and stimulate regional economic growth (Saragih, Narwastu, Simanjuntak, & HARAHAP, 2025).

However, many MSMEs still face limitations in accessing information technology and digital promotion, which inhibits their growth. Therefore, adopting web-based technological innovations and digital marketing strategies is essential to improve their competitiveness.

Augmented Reality (AR)

Augmented Reality (AR) is a technology that integrates two- or three-dimensional virtual objects into a real environment in real time. AR enables users to perceive virtual objects as if they coexist with the physical environment, enhancing real-world experiences with additional digital information. AR operates through several integrated components:

1. *Capture*
   A device camera captures real-time visual data.
2. *Processing*
   The system analyzes data using marker-based tracking, SLAM, or GPS.
3. *Rendering*
   Virtual elements (images, animations, 3D models) are digitally generated and aligned with the real world.
4. *Display*
   The combined view is presented through a smartphone or AR glasses.
5. *Interaction*
   Users can interact with virtual objects via touch, gestures, or voice commands.

AR does not replace the real world but enriches it with virtual elements displayed interactively in real time (Maknunah, 2025).

Figure 1 shows an example of Augmented Reality implementation (Putri, Imania, Rahmawati, Saputri, & Fathiyah, 2025).

Figure 1. Sample Augmented Reality

AR has been widely used not only in entertainment but also in broadcasting, education, tourism, healthcare, and business. In the MSME sector, AR provides a modern, interactive promotional medium that enhances consumer experience and product value (Ashidik, Waluyo, & Susanti, 2021).

WebAR

WebAR refers to Augmented Reality experiences that run directly through a web browser without requiring additional application installation. Frameworks such as A-Frame and platforms like 8th Wall facilitate WebAR development by providing tools such as code editors, hosting services, debugging features, project templates, and remote management functionalities (Prestiliano, Jayanto, & Prasida, 2025).

HexaGen3D

HexaGen3D is an innovative text-to-3D generation approach capable of producing high-quality 3D models from textual commands or images. The key challenge addressed is the limited availability of 3D datasets compared to abundant 2D images (Mercier, et al., 2025).

HexaGen3D adapts the Stable Diffusion model to generate six orthographic projections known as Orthographic Hexaview Guidance, ensuring consistent spatial structure without perspective distortion. The system operates through two primary stages:

- Triplanar Representation Learning via variational auto-encoder
- Latent Triplanar Generation using pretrained 2D diffusion models

Additionally, HexaGen3D applies texture baking to enhance surface realism.

Figure 2 shows the HexaGen3D interface.

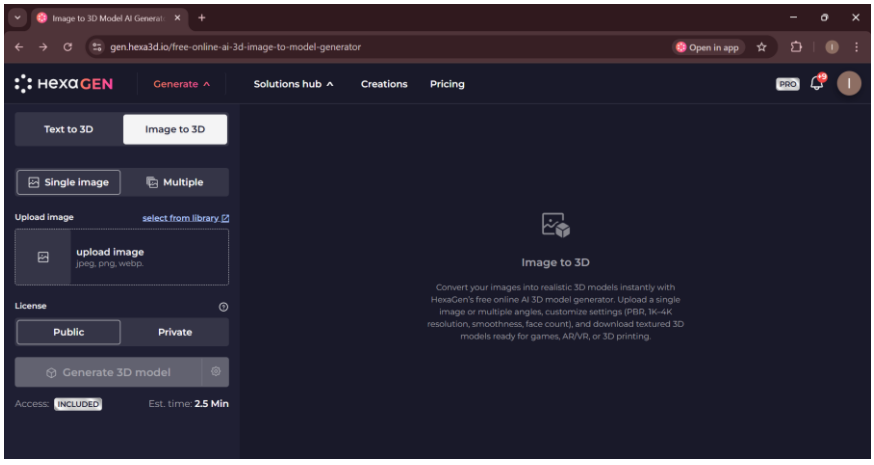

Figure 2. the HexaGen3D interface

Experiments show that HexaGen3D can generate textured 3D meshes within 7 seconds using a single GPU, outperforming earlier methods such as DreamFusion and MVDream.

QR Code (Quick Response Code)

QR Code is a two-dimensional encoding technology used to store textual information, URLs, or other forms of data. It can be quickly accessed via smartphone cameras, making it efficient and widely adopted in various sectors. QR Codes can store numeric, alphanumeric, binary, and kanji/kana characters, with a capacity significantly higher than traditional barcodes (Krisnandela, Maryam, & Kartika, 2023).

In marketing, QR Codes simplify consumer access to product information, enhance promotional effectiveness, and reduce costs, particularly beneficial for MSMEs (Hidayat, Anas, Syahrir, Nasri, & Azwar, 2025).

Figure 3 illustrates a QR Code example.

Figure 3 QR (Quick Respon) Code

3D Object and 2D Image

3D Animation

3D animation is a technique that creates motion in a digital 3D environment by generating sequential frames captured by a virtual camera. Modern 3D modeling methods polygonal modeling, sculpting, and parametric modeling enable realistic visual outputs used in film, games, VR/AR, and interactive media (Zulkifli, Firdaus, Rasim, Sari, & Fazira, 2025).

2D Image

2D images represent visuals on a flat plane defined by two axes (x and y). Unlike 3D models, 2D graphics lack depth and are commonly used in illustration, graphic design, and simple animation (Zefanya & Dirgantara, 2025).

Website

A website is a collection of digital pages under a domain accessible via the internet using a browser. Websites typically use HTML and HTTP protocols to connect servers with users (Yusuf, Aula, Risnanto, & Farizi, 2025); (Setyaningrum, Setyawati, & Setyawan, 2025).

PHP

PHP is a server-side scripting language used to create dynamic web pages. All PHP syntax runs on the server, while the output is sent to the user via the browser. PHP is widely used due to its open-source nature, flexibility, and integration with HTML (Hermiati, Asnawati, & Kanedi, 2021).

XAMPP

XAMPP is an integrated software package that bundles Apache, MySQL, PHP, and Perl into a single installation, providing a complete local server environment for web development. XAMPP simplifies testing and development processes (Hermiati, Asnawati, & Kanedi, 2021).

UML (Unified Modeling Language)

UML is a visual modeling language used to specify, visualize, construct, and document artifacts in software development. Common diagrams include Use Case, Activity, Class, and Sequence diagrams, which together facilitate system understanding (Setyaningrum et al., 2025; Sumiati et al., n.d.).

Use Case Diagram

Use Case Diagrams model interactions between actors and the system, identifying functionalities from the user perspective. Symbols include Actor, Use Case, Association, Generalization, Include, and Extend relationships (Harlina, Susilowati, Suharni, Herawati, & Atsiilah, 2025).

Table 1 presents Use Case Diagram symbols.

Table 1 *Use Case Diagram* Symbol

No	Simbol	Keterangan
1	 ***Actor***	Merupakan representasi dari peran manusia, sistem lain, atau perangkat yang berinteraksi dengan *use case*.
2	 ***Use Case***	Gambaran abstrak dari hubungan serta interaksi yang terjadi antara sistem dengan aktor.
3	***Association***	Bentuk penghubung yang menggambarkan relasi antara aktor dan *use case*.
4	***Generalisasi***	Menjelaskan adanya spesialisasi pada aktor agar dapat terlibat dalam suatu *use case*.

5	<<include>> ----------> ***Include***	*Include* digunakan untuk menunjukkan bahwa suatu *use case* utama secara eksplisit menyertakan perilaku dari *use case* lain sebagai bagian dari prosesnya.
6	<<extend>> ----------> ***Extend***	*Extend* digunakan untuk menggambarkan situasi ketika sebuah *use case* memperluas atau menambahkan perilaku dari *use case* lain pada titik tertentu yang telah ditentukan.

Activity Diagram

Activity Diagrams visualize workflow, including process initiation, decisions, parallel activities, and termination. They illustrate system behavior and logic flow (Harlina, Susilowati, Suharni, Herawati, & Atsiilah, 2025).

Table 2 presents Activity Diagram symbols.

Table 2 *Activity Diagram* Symbol

No	Simbol	Keterangan
1	***Initial State***	Setiap *activity diagram* memiliki satu kondisi atau status awal yang menjadi titik mulai proses.
2	***Activity***	Aktivitas menggambarkan tindakan yang dilakukan oleh sistem, biasanya dituliskan menggunakan kata kerja.
3	***Decision***	Percabangan menunjukkan adanya lebih dari satu kemungkinan alur aktivitas yang dapat dipilih.
4	***Join***	Penggabungan merupakan proses penyatuan dari beberapa aktivitas yang berbeda menjadi satu alur kembali.
5	***Control Flow***	*Control Flow* digunakan untuk menunjukkan alur atau hubungan antara satu aktivitas dengan aktivitas lainnya dalam sebuah diagram aktivitas.
6	***Swimlane***	*Swimlane* berfungsi untuk membedakan atau memisahkan bagian organisasi atau entitas bisnis yang memiliki tanggung jawab terhadap aktivitas tertentu dalam sebuah proses.
7	***Final State***	Status akhir menunjukkan titik berhentinya seluruh aktivitas dalam diagram, menandakan proses telah selesai.

Class Diagram

Class Diagrams depict classes, attributes, operations, and relationships within a system. They provide structural representation of system components (Harlina, Susilowati, Suharni, Herawati, & Atsiilah, 2025).

Flowchart

Flowcharts visually represent processes using standardized symbols for operations, decisions, inputs/outputs, and flow direction (Purba, Zalukhu, & Darma, 2023).

Business Profile: Gabe Craft

Figure 4 shows the business profile.

Gabe Craft is a creative MSME specializing in handmade crochet products since 2018. Its flagship products include amigurumi dolls, bags, accessories, and home décor. With a focus on craftsmanship and aesthetic value, each product is produced manually with high precision. Gabe Craft consistently develops new designs to meet market interest and strengthen its brand identity.

RESEARCH METHODS

Research Approach

This research is an applied research that aims to implement Augmented Reality (AR) technology in displaying the product catalog of Gabe Craft MSME to make it more interactive and attractive, capable of increasing consumer purchase intention. The approach used is an experimental approach, where the researcher conducts the design, implementation, and testing of a web-based Augmented Reality system to display 3D product models directly without using markers (markerless AR).

3D Product Asset Creation Workflow

The 3D product asset creation workflow is a systematic process designed to transform two-dimensional (2D) product photos into 3D models (.glb) that can be utilized in websites with Augmented Reality (AR) technology. This process combines artificial intelligence (AI)-based image enhancement technology with a 3D conversion

application, namely GenHexa3D. The primary objective of this workflow is to produce realistic, interactive visual assets ready for Augmented Reality integration to support the digital shopping experience for SMEs (Small and Medium Enterprises).

The following are the stages of the 3D product asset creation workflow:

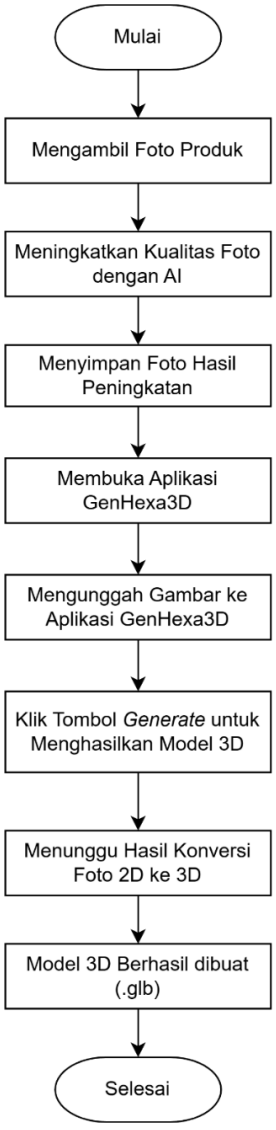

Figure 4 3D Asset Creation Flowchart

Below is an explanation of each process flow shown in Figure 4:

1. Start
   The 3D asset creation process begins.
2. Taking Product Photos
   Capturing images of knitted products using a mobile phone camera to obtain

visual objects.

3. Enhancing Photo Quality with AI
   The original photos are processed using AI technology to produce sharper, high-resolution images.
4. Saving Enhanced Photos
   The quality enhanced images are saved as input for the subsequent process.
5. Opening the HexaGen3D Application
   The user opens the HexaGen3D application as a tool for creating 3D models.
6. Uploading Images to HexaGen3D
   The previously enhanced high-resolution images are dragged and dropped into the HexaGen3D application.
7. Generating 3D Model
   The user presses the "Generate 3D Model" button to initiate the conversion process from 2D images to 3D models.
8. Waiting for Conversion Process
   The system processes the images and converts them into 3D models until the process is complete.
9. 3D Model Successfully Created (.glb)
   The 3D asset is completed and exported in .glb format.
10. End

The 3D asset creation process has concluded.

Storyboard

A storyboard is used to visually and logically illustrate the flow of user interaction with the system before the implementation phase is conducted. The storyboard in this research aims to explain how users interact with the Augmented Reality-based product catalog application at UMKM Gabe Craft.

Use Case Diagram

In the product catalog website system with Augmented Reality technology at UMKM Gabe Craft, the use case diagram illustrates the interaction between two main actors, namely Consumer and Admin, with the system. Consumers can perform various activities such as scanning QR Codes to access the website, entering the website, selecting catalog types, scanning product QR codes, viewing AR products, and contacting the seller. Meanwhile, the Admin has a role in managing products through the login process to manage product data that will be displayed in the catalog.

Figure 5 below shows the relationship between actors and the system in the form of a use case diagram, which demonstrates the main functions available in this Augmented

Reality-based product catalog application.

Figure 5 Use Case Diagram

Activity Diagram

The first process that can be performed by the admin is to log into the account by entering the admin username and password according to the specified requirements. In other processes, the admin can display the overall product management page and manage the catalog easily, such as adding products to the catalog, editing existing products in the catalog, and deleting products from the catalog. To exit the admin panel page, the "Logout" button can be used. This button will redirect back to the login page and then return to the main catalog page.

The process that consumers can perform initially is to scan the QR Code as access to enter the product catalog website, search for knitted products in the search column, and select a category. They can view the details of the desired product, see the product using augmented reality technology, and contact the seller to place further orders, which will directly redirect them to the WhatsApp page.

Class Diagram

This diagram displays the main structure of the software system, including classes,

attributes, and relationships between classes. This design functions to illustrate the interconnections between tables in the database. In the Gabe Craft Product Catalog website, the designed class diagram encompasses several main classes, namely Admin, Products, and Category.

Admin Table Structure

The 'Admin' table is used to store data of users who have administrative access rights in the system. The recorded columns include account identity (username, email), credentials stored in hash format, and account creation data. This table serves as an authorization reference when administrators perform product management or configure system settings.

Products Table Structure

The Products table stores the complete attributes of each product available in the website catalog. The recorded data includes product name, description, price, stock quantity, related category, as well as the file location of images or AR models used for product display. Status indicator columns (active/inactive) and creation and update timestamps assist in managing the product lifecycle and auditing changes.

Categories Table Structure

The Categories table contains classifications or groupings of products to facilitate navigation and filtering within the catalog. Each entry includes the category name, slug (for URL purposes), brief description, and creation timestamp information. With the categories table in place, administrators can organize products systematically, making it easier to search for and display products on the user interface.

User Interface Design

Main Page

The main page of this website is designed as a navigation hub for users when they first access the system. At the very top, there is a header element containing the logo and main navigation menu. The logo is positioned on the left side as the visual identity of the system, while on the right side, several menu items are provided, such as Home, AR Catalog, and an Admin Login button displayed with a distinctive button style to make it easily recognizable to system administrators.

The main area of the page consists of a spacious and clean display area that serves as a container for presenting information or primary content. The spacious layout arrangement in this section aims to allow users to focus more on the core information presented without visual distractions.

At the bottom of the page, there is an additional element in the form of a logo placed

in the center. This section serves to reinforce the application's identity while also functioning as a closing element for the main page display. Overall, the main page is designed with a simple and easy-to-understand structure, enabling users to explore available features without difficulty.

AR Catalog Page

The AR catalog page displays several product categories that users can select. At the top, there is a header containing the logo and navigation menu such as Home, AR Catalog, and the Admin Login button.

The main section of the page contains three types of categories: Amigurumi, Lobe, and Outer, which are displayed for easy access. Each category can be clicked to view products according to its type. The display is designed to be concise so that consumers can find their desired category quickly and easily.

AR Viewer Page

The user interface design for the product view page, which is designed to display Augmented Reality-based products. At the top, there is a main area for displaying AR objects, equipped with a close icon in the upper right corner. On the right side, there are four interactive elements in the form of action buttons. This design aims to provide an interactive visual experience while remaining easy for users to operate.

Admin Login Page

The user interface design for the admin login page, which is designed to facilitate access for users with special privileges. The main elements consist of a logo at the top, two input fields for entering username and password, and an action button to enter the Admin Panel system.

Admin Panel Page

The user interface design for the admin panel page, which functions as a control center and product management hub in the catalog. There are logo elements, data summaries in the form of information boxes, and a list of items equipped with two action buttons. This design is arranged to facilitate administrators in managing content and performing actions efficiently.

Add and Edit Product Page

The design for the add and edit product page. There are several input fields for entering product data. At the bottom, there are two action buttons for saving or canceling changes to product data.

RESULTS AND DISCUSSION

Overall System Description

The system developed in this research is an Augmented Reality-based product catalog website (WebAR) implemented for the MSME Gabe Craft. This system aims to provide consumers with a new experience in viewing product details interactively through three-dimensional (3D) object displays that can be accessed directly through a browser without the need to download additional applications.

Users can scan QR Codes displayed on the product catalog to view products using Augmented Reality technology. It is expected that the promotion and marketing process for MSME products can become more attractive, informative, and efficient.

This system has two main roles:

1. Admin (UMKM Gabe Craft): Functions to manage product data, images, and 3D models that will be displayed in the system.
2. Consumer: Can access the product catalog, view price information, descriptions, and view products using augmented reality technology.

System Implementation

The system is implemented as a website using a combination of HTML, CSS, and JavaScript, as well as integration of the AR.js library to display 3D product models in real-time. The 3D models created using the HexaGen3D 2D-to-3D generation website are imported in .glb format and then displayed through the browser.

Several main system interface results are as follows:

Main Page Interface

The main page displays the Gabe Craft brand identity at the top through a logo and navigation menu, consisting of Home, AR Catalog options, and an Admin Login button.

The middle section of the page functions as an introduction area, displaying the title "Gabe Craft" and a brief description of the website's main features, where consumers can view knitted products through Augmented Reality technology before making a purchase. The page design is modern and attractive to visitors.

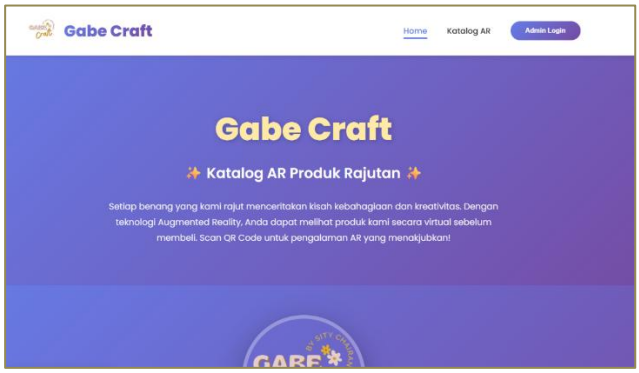

Figure 6 Main Page Interface

AR Catalog Page Interface

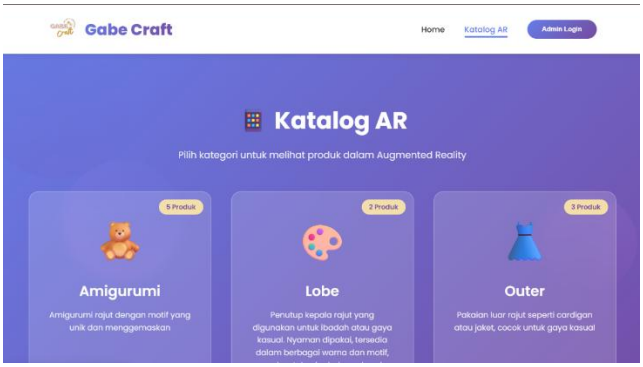

Figure 7 AR Catalog Page Interface

The AR Catalog page displays a list of product categories that can be viewed through the Augmented Reality feature. On this page, each category is shown in the form of cards containing icons, category names, number of products, and brief category descriptions. The interface is designed to be simple and informative so users can easily select categories before viewing product models in AR. This page serves as the initial gateway for users to familiarize themselves with the types of products available in the catalog.

Product Page Interface in AR Catalog

The Product Page in the AR Catalog displays a list of products based on the category selected by the user. Each product is displayed in the form of a card containing a photo, product name, category, and price. At the bottom of the card, there is also a QR Code that can be scanned to view the product model in Augmented Reality display. The presentation of information on this page is made concise and structured so users can quickly identify products before switching to the AR feature to view product details. This page functions as a bridge between the category catalog and the more interactive AR visual experience as shown in Figure 8.

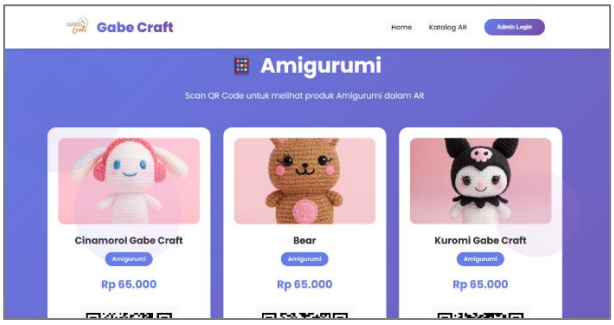

Figure 8 Product Page Interface in AR Catalog

AR Viewer Product Page Interface

Figure 9 shows the Product display in the AR Catalog through a mobile device equipped with the product name, product price, and QR Code. Consumers will scan the QR Code on the catalog, which will then direct them to the AR Viewer page to view the product with interactive product details that can be rotated in all directions and zoomed in and out. The AR Viewer page is also equipped with a voice-over of the product description, and when scrolled down, there are 4 functional action buttons: reset, play/pause, contact, and share.

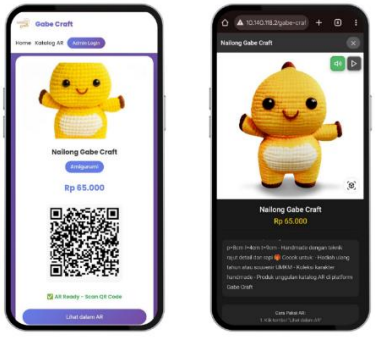

Figure 9 AR Viewer Interface

Admin Login Page Interface

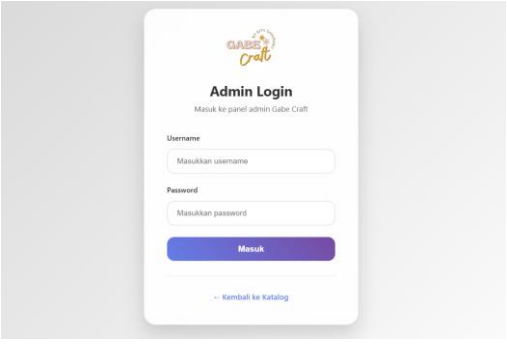

Figure 10 Admin Login Page Interface

The admin must first complete the login process before entering the admin panel page to manage product data in the catalog by entering the predetermined Username and Password as shown in Figure 10.

Admin Panel Page Interface

After entering the correct Username and Password, the admin will be directly directed to the admin panel page to perform product management that will later be displayed in the product catalog. Actions that the admin can perform include adding, editing, and deleting product data, which can be seen in the display in Figure 4.6. The interface is designed simply to be easily used by MSME practitioners without a technical background.

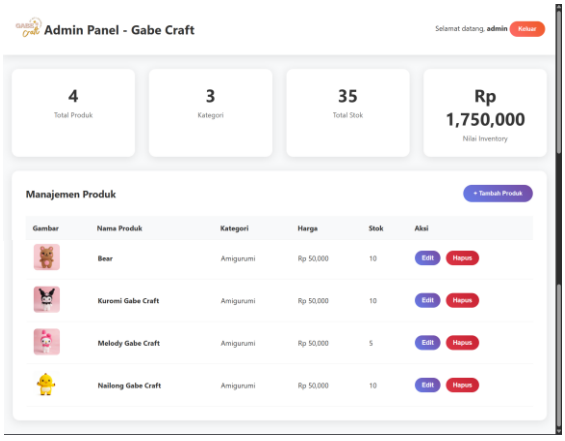

Figure 11 Admin Panel Page Interface

Add and Edit Product Page Interface

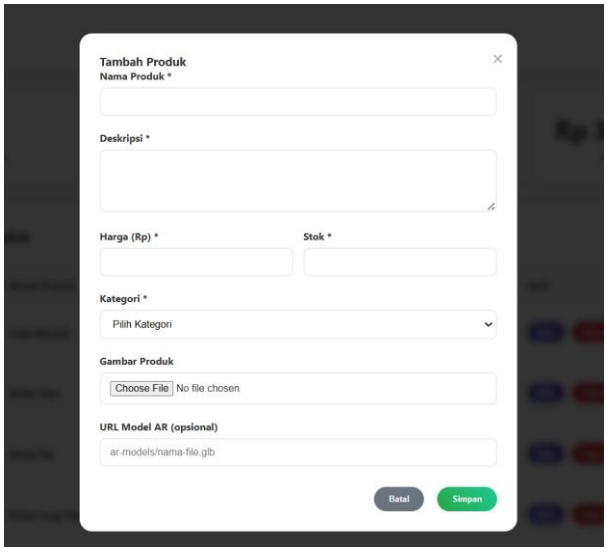

Figure 12 Add and Edit Product Page Interface

The admin can add products and also edit products by inputting several product data items, as well as uploading product images and AR files that have been created in their respective appropriate columns on the add product interface, which can be seen in Figure 9.

System Testing

The testing process was conducted using the Black Box Testing method to ensure that each system function operates according to the designed system specifications.

Testing Objectives

The testing objective is to ensure that all system components that have been created function correctly and users can use the features available in the system without technical constraints.

System Testing

Testing was conducted using the Blackbox Testing method, focusing on testing the main system functions as shown in Table 3.

Table 3 BlackBox Testing

No	Feature Tested	Expected Result	Test Result
1	Main page display	Home display appears correctly	Success
2	AR Catalog	Catalog Category display appears	Success
3	Products in Catalog Category	Displays products with QR Code to access products with AR technology	Success
4	AR Feature	Model appears and can be rotated	Success
5	Page responsiveness	Display adapts to screen size	Success

Results Analysis

Based on the implementation and testing results, the system has functioned according to user needs. Augmented Reality technology has been successfully integrated and provides a positive impact on how UMKM Gabe Craft displays its products.

Several analysis points:

1. The AR feature increases user interest in products because they can see the shape, size, and surface details more realistically.

2. The WebAR system is effectively used because it does not require the installation of additional applications.
3. Limitations were found in unstable internet connections, which can affect the smoothness of 3D model loading.

CONCLUSION

Based on the research findings and discussions conducted regarding the implementation of Augmented Reality technology in the product catalog of Gabe Craft MSME, the following conclusions can be drawn:

1. The design of a website-based product catalog for Gabe Craft MSME has been successfully accomplished using a web-based system development approach. This system is designed to display product information interactively, including category data, descriptions, prices, and product images. Additionally, the system is equipped with a user-friendly interface that enables administrators to manage product and category data. With this digital catalog, the promotion process and dissemination of Gabe Craft MSME's product information have become more efficient and easily accessible to consumers online.
2. The implementation of Augmented Reality (AR) technology in the Gabe Craft MSME product catalog has successfully provided users with a new experience in viewing and interacting with products. Through the AR feature, users can display 3D product models directly, making it easier for potential buyers to understand the shape and size of products more realistically. The implementation of Augmented Reality technology not only enhances the visual appeal of the catalog but also serves as an innovative marketing strategy that is relevant to current digital technology developments.

Overall, the implementation of a website-based product catalog integrated with Augmented Reality technology has successfully improved promotional effectiveness, expanded market reach, and supported the digital transformation of Gabe Craft MSME toward a more modern and interactive marketing system.

Although the developed system has functioned according to the research objectives, there are still several aspects that can be improved to optimize the system. The recommendations that can be provided include the following:

1. Development of advanced features. It is recommended that the system be developed by adding purchase transaction features (e-commerce) so that users can not only view products but also place orders directly through the website.

2. Optimization of mobile device display. The system needs to be adjusted so that the display and Augmented Reality functions can be accessed properly on various screen sizes and smartphone types.
3. Expansion of product variety and categories. The number of products displayed in the catalog is still limited. Therefore, future development can increase the number and categories of products so that the system encompasses all of Gabe Craft MSME's creations.
4. Enhancement of three-dimensional models. Product 3D models can be created with higher detail, including textures, lighting, and more realistic proportions, to make the visual display more attractive.

Through these developments, it is hoped that this system can become a digital promotional medium that is not only informative but also capable of expanding market reach and supporting the economic growth of MSMEs in the era of digital transformation.

REFERENCES

ashidik, J. P., Waluyo, S., & Susanti, I. (2021). Penerapan Teknologi Augmented Reality Berbasis Android Dengan Menggunakan Metode Marker Based Tracking Sebagai Media Pemasaran Produk Pada Haus Coffee. *Skanika*, 51–57.

Harlina, M. S., Susilowati, E., Suharni, S., Herawati, M. S., & Atsiilah, M. F. (2025). Pemodelan Sistem Rancangan Website Toko Ummi Cookies Menggunakan Uml (Unified Modelling Language). *Jurnal Teknologi Dan Sistem Informasi Bisnis*, 7(3):364-371.

Hermiati, R., Asnawati, A., & Kanedi, I. (2021). Pembuatan E-Commerce Pada Raja Komputer Menggunakan Bahasa Pemrograman Php Dan Database Mysql. *Jurnal Media Infotama*, 54–66.

Hidayah, S. N., Wulandari, E., & Wahyudi, M. (2025). Mengintegrasikan Augmented Reality (Ar) Dalam Menciptakan Bisnis Yang Inovatif Di Era Digital Untuk Meningkatkan Kepuasan Pelanggan. *Jurnal Riset Sistem Informasi*, 2(1), 96–105.

Hidayat, M. R., Anas, A. S., Syahrir, M., Nasri, M. H., & Azwar, M. (2025). Desain Ui Qr Code Sebagai Solusi Digitalisasi Katalog Produk Untuk Meningkatkan Pemasaran Ikm. *Jmh: Jurnal Mengabdi Dari Hat*, 1-8.

Ipnuwati, S. (2014). Perancangan Sistem Informasi Penjualan Pada Toko Minak

Singa. *Explore – Jurnal Sistem Informasi Dan Telematika*, 12-20 Doi: 10.36448/Jsit.V4i2.536.

Krisnandela, V. A., Maryam, D. A., & Kartika, D. S. (2023). Teknologi Tepat Guna (Ttg) Berupa Qr Code Sebagai Media Informasi Desa Sambirejo Kabupaten Jombang. *Jurnal Pemberdayaan Publikasi Hasil Pengabdian Kepada Masyarakat*, 71-77.

Maknunah, L. U. (2025). Augmented Reality And Information Marketing: Digital Transformation In Increasing Consumer Experience. *Jurnal Ilmiah Manajemen Kesatuan*, 13(4), 2427–2438.

Mercier, A., Nakhli, R., Reddy, M., Yasarla, R., Cai, H., Porikli, F., & Berger, G. (2025). Hexagen3d: Stablediffusion Is Just One Step Away From Fast And Diverse Text-To-3d Generation. *Ieee/Cvf Winter Conference On Applications Of Computer Vision (Wacv)* (Pp. 1247-1257). Usa: Tucson.

Prestiliano, J., Jayanto, L. R., & Prasida, T. A. (2025). Perancangan Webar Sebagai Media Hybrid-Education Mengenai Tujuan Ke-13 Dari Sdgs. *It-Explore: Jurnal Penerapan Teknologi Informasi Dan Komunikasi*, 4(1), 1–15.

Purba, S., Zalukhu, A., & Darma, D. (2023). Perangkat Lunak Aplikasi Pembelajaran Flowchart. *Jurnal Teknologi, Informasi Dan Industri*.

Putri, A. U., Imania, K., Rahmawati, A., Saputri, E. W., & Fathiyah, N. T. (2025). Inovasi Digital Dalam Pemberdayaan Umkm: Implementasi Augmented Reality Pada Produk Kue Basah Khas Palembang. *Mitra Mahajana: Jurnal Pengabdian Masyarakat*, 6(3), 394-359.

Saragih, A., Narwastu, R., Simanjuntak, H. T., & Harahap, L. M. (2025). Peran Umkm Dalam Pertumbuhan Ekonomi Indonesia: Perspektif Teori Schumpeterian. *Moneter-Jurnal Ekonomi Dan Keuangan*, 3(2), 1-8.

Sari, I. P., Syahputra, A., Zaky, N., Sibuea, R. U., & Zakhir, Z. (2022). Attribution-Sharealike 4.0 International Some Rights Reserved Sistem Informasi. *Jurnal Teknik 1*, 1-7.

Sarif, R. (2023). Peran UMKM dalam Meningkatkan Pertumbuhan Ekonomi di Indonesia. *Maliki Interdisciplinary Journal (Mij)*, 68-73.

Setyaningrum, M., Setyawati, E., & Setyawan, A. A. (2025). Sistem Informasi Penjualan Berbasis Website Menggunakan Framework Codeigniter (Studi Kasus: Msglow Banyumas). *Jotika Journal In Management And Entrepreneurship*, 99-112.

Yusuf, M., Aula, R. F., Risnanto, T., & Farizi, F. (2025). Transformasi Digital Umkm Batik Melalui Penerapan Teknologi It Berbasis Sistem Katalog. *Jurnal Jtik (Jurnal Teknologi Informasi Dan Komunikasi)*, 1098-1102.

Zefanya, M., & Dirgantara, H. (2025). Pengembangan Gim Edukasi Kebersihan Lingkungan Untuk Kesadaran Masyarakat Akibat Pencemaran: Indonesia. *Kalbisiana Jurnal Sains Bisnis Dan Teknologi*, 166-174.

Zulkifli, A., Firdaus, M., Rasim, Sari, F. B., & Fazira, I. (2025). Prinsip Animasi 3d Komputer Dalam Film Animasi Dan Implementasinya: Sebuah Kajian Literatur. *Nirmana*, 152 – 164.