

## APPLICATION OF AUGMENTED REALITY FOR FURNITURE CATALOGS

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### ABSTRACT

In the current rapidly developing era of technology and telecommunications, promotional media has become a crucial factor in business, particularly for furniture stores. Although the use of sales catalogs in print media is already common, it often leaves customers dissatisfied because it is only two-dimensional and requires a visit to the store. Therefore, more attractive and innovative promotional media is necessary to increase the appeal and sales value of a store. One technology that can be utilized for this purpose is Augmented Reality (AR) technology, which combines the real and virtual worlds in an Android-based catalog. A catalog application with AR technology can display furniture products in real-time and facilitate customers in selecting furniture by presenting a 3D image of the product from various angles. It is expected that customers will be more interested in furniture catalogs that use Augmented Reality technology and increase the store's sales value.

**Keywords:** *augmented reality, furniture, catalog, android, 3-dimension*

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### INTRODUCTION

In the current era, technology and telecommunications are developing very rapidly and there are many uses for this technology, one of which is in the business sector, so many innovations are being developed to attract consumers' buying interest. Promotional media is an important factor in the running of a business.

Currently, many promotional media for furniture shops use sales catalogs, even looking at furniture catalogs are presented in the form of printed media, perhaps they are commonly used to describe furniture products to consumers, promotions use the method of providing catalogs, brochures, and magazines in two-dimensional form and requiring consumers to come directly to the shop often makes consumers dissatisfied with promotional media, good promotional media can increase the appeal to consumers and increase the sales value of a shop. Promotional media in furniture catalogs requires a new promotional media that is more attractive and innovative in consumers' eyes by utilizing current technology without leaving behind existing elements.

One of the current technologies that can be used for promotional media is Augmented Reality (AR) Technology, Augmented reality is a technology that combines the real world and the virtual world, the use of Augmented Reality technology in the form of an Android-based catalog helps in promotional activities so that consumers become more interested. The Catalog Application that uses Augmented Reality technology can display products or goods in real-time. Promotional media in this furniture catalog can make it easier for consumers to select the desired furniture items. This Augmented Catalog application will later display 3D forms of furniture so that consumers can see the product from various sides, both from the inside and the outside. It is hoped that consumers will become more enthusiastic and interested in furniture catalogs that use Augmented Reality technology.

Several previous studies have been carried out by researchers regarding applications or systems that implement augmented reality. In previous research on the formulation of the Augmented Reality Furniture problem with user-defined targets. in the design of this application which is used as a medium to promote furniture in a 3D-based catalog where the catalog will display furniture products. This research improves or penetrates weak points in the marker system and extracts points, lines, angles, textures, and Other features. The difference in system design in this research is the improvement in the markerless system, namely with a user-defined target, where the user can use any image that is easy to obtain as a place for virtual objects to appear which can make it easier to view furniture in three dimensions (Junaidi et al., 2020). Further research includes the formulation of the problem of implementing Augmented Reality in the Android-based Kompas Jati Jepara Furniture Catalog, the marketing of furniture products in the Kompas Jati Jepara store which utilizes Augmented Reality-based catalog media, displays furniture products with the scope of objects displayed only in the form of Product categories such as buffets, table chairs, and cupboards are visualized in 3D, this application was created to connect buyers and furniture craftsmen (Saputra & Budiyanto, 2019).

Other research is also on the Application of Augmented Reality Technology for Housing Catalogs as Marketing Media at PT. San Esha Arthamas, this sales application displays 3D home products of various types, apart from that, users can see the interior, and exterior, zoom in, zoom out, and rotate. To display a 3D house by scanning a housing catalog book, the comparison in this research is that the researcher used the Multimedia Development Live Cycle (MDLC) method. In this research, the 3D visualization model can be seen both interior and exterior so that the 3D visualization is more specific (Fernando et al., 2021). Further research regarding Furniture Catalog Promotion Applications Using Augmented Reality Technology in this research resulted in a furniture catalog application that displays 3D visualization of Android-based furniture products using the Multimedia Development Live Cycle (MDLC) method. The product media is displayed in the form of a cupboard table for comparative television In this research, the application system displays the system in the form of audio (Sutedi et al., 2022). Further research regarding the Introduction to Indonesian Traditional Houses Using Augmented Reality Technology with the Marker Based Tracking Method as a Learning Media. The results of this research are in the form of an application used as a learning medium for elementary school children in introducing traditional houses in Indonesia. The media displayed is a visualization of traditional houses. which is in 3D form by scanning the marker that has been provided and later a 3D object will appear. The comparison in this research is the scan marker system used by researchers using the scan marker method to display visualizations in 3D form (Abdulghani & Sati, 2019). The conclusion from the results of this research study is the development of a system as a promotional medium for furniture catalogs in the form of 3D visualization which can help facilitate promotional activities which can provide information in the application so that they can see details of the product so that it is easier for users to choose the furniture products they will buy.

## **METHOD**

### **MDLC (Multimedia Development Life Cycle)**

MDLC (Multimedia Development Life Cycle) is a method developed by Luther (1994). MDLC (Multimedia Development Life Cycle) is carried out based on six stages, namely concept, design, material collecting, assembly, testing, and distribution (Sutopo, 2003). These six stages do not have to be sequential in each practice, each stage can exchange positions. Even so, the concept stage must be the first stage to be carried out (Nazilah & Saepul Ramdhan, 2021). The following is an overview of the flow of the MDLC (Multimedia Development Life Cycle) which can be seen in Figure 1 below:

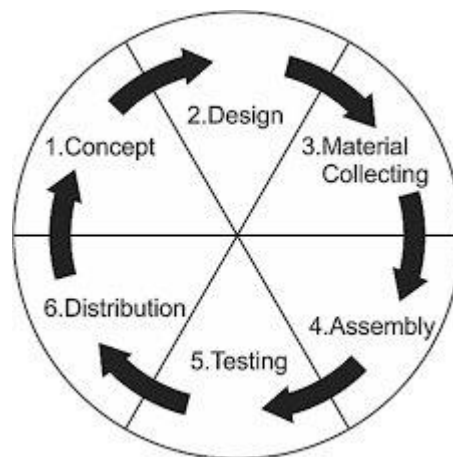


Figure 1. Multimedia Development Life Cycle Method

The following is the definition of the six stages of MDLC (Multimedia Development Life Cycle), including (Hari & Hendrati, 2018):

a. Concept

The conceptual stage is the stage for determining the goals and who the users of the program are (audience identification). Apart from that, determine the type of application (presentation, interactive, etc.) and the purpose of the application (entertainment, learning, etc.). Basic design rules are also determined at this stage, for example, application size, and application target. The output from this stage is usually a narrative document to express the project objectives to be achieved.

b. Design

Design is the stage of making specifications including program architecture, style, appearance, and material requirements for the program.

c. Material Collection

Material collection is the stage of collecting materials that suit the needs being worked on. These materials include clip art, photos, animation, video, or audio. This stage can be carried out in parallel with the assembly stage. However, it is also possible that the material collecting stage and assembly stage will be carried out linearly and not in parallel.

d. Manufacturing (Assembly)

The assembly stage is the stage where all objects or multimedia materials are created. Application creation is based on the design stage.

e. Testing

The testing stage is carried out after completing the assembly stage by running the application or program and seeing whether there are errors or not.

f. Distribution

At this stage, the application will be stored on a storage medium. If the storage media is not sufficient to accommodate the application, compression of the application will be carried out. This stage can also be called the evaluation stage for developing finished products to make them better. The results of this evaluation can be used as input for the concept stage of the next product.

## **RESULTS AND DISCUSSION**

In the results and discussion section, we will discuss the process of creating an augmented reality application as a promotional medium for Android-based furniture catalogs and discuss the final results of the application (Arum Sari et al., 2018). The results and discussion of this application system are as follows:

### **Problem Identification**

Based on the background explained previously, the problem formulation in this research was obtained by utilizing technology to create the latest innovations in promotional activities in the furniture shop business so that consumers become more enthusiastic and interested in the product, as well as promotional media that can increase sales of furniture products. Stages of this research

### **Data Collection**

The data sources in this research were obtained from several furniture and furniture shops in the Sleman area, West Ringroad by collecting data sources involving several furniture shop owners who were collected so that sufficient data was obtained to continue with the application design stages. The process of obtaining data in this research was carried out by observing and interviewing various shop owners. The data obtained in this research can be seen in Table 1 below:

| <b>Data</b> | <b>Information</b>   |
|-------------|--|
| Furniture   | Contains furniture products in the form of chairs, cupboards, wall shelves, and flower vases |
| Material    | Selection of the type of material used in making furniture                                   |
| Size        | Contains the size of the product scale   |
| Color       | Contains the colors used and the type of coloring used                                       |

### **Proposed System Design**

#### **Enter Requirements**

This section is needed to identify the system that will be built. The needs required in building this system are adjusted to the needs of the user so that the system can solve existing problems,

so it is necessary to authenticate the needs of the system. The following are the input requirements that are needed in the process of creating this Furniture Catalog Application, namely as follows:

a. Functional Requirements

Android-based AR applications, the application is used by users to select products in furniture stores via an Android device (Yanto & Heryanto, 2022). The appearance of this application is a menu page, about page, category page, catalog page, product information page, and AR camera page.

b. Non-Functional Requirements

1) Android

An Android device is used to run the AR furniture application. The minimum specifications required to run the application are as follows:

- a) Mobile: Android API level 24
- b) OS: OS 6.0 Android (Marshmallow)
- c) Processor: Qualcomm SDM712 Snapdragon 712
- d) Memory: Internal 4GB ROM 64 GB

2) Computer

Computer equipment is used to add furniture products to shops in the form of 3-dimensional objects. The following are the minimum specifications required for the device, including:

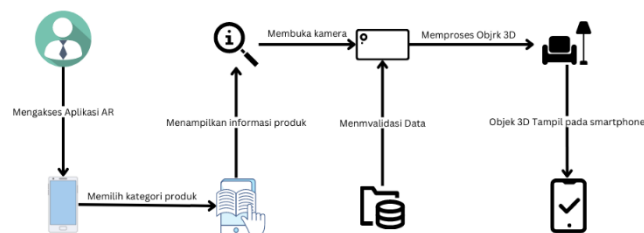
- a) Processor: AMD Ryzen 4800H
- b) VGA: Nvidia Geforce GTX 1650
- c) Memory: 8 GB
- d) HDD: 500GB

**User Design**

User Design is a stage for designing a system that is tailored to user needs. The designs created in this user design process include system architecture, system flowchart, and UML. The following is the user design in this research, namely as follows (Gorbala & Hariadi, 2010):

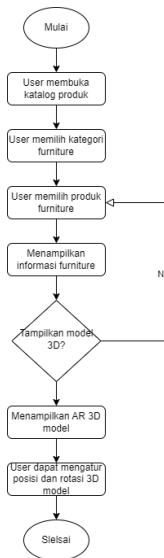
a. System architecture

The system that will be built in this research uses RESTful API technology to exchange data between users, namely patients, and a database that is connected directly to the admin website. The architectural model of the system that will be built by the author is presented in Figure 2 as follows:



**b. System flowchart**

A flowchart is a description of the flow in the system to be built. In the AR application, the 3D furniture catalog is shown as a flowchart in Figure 3.

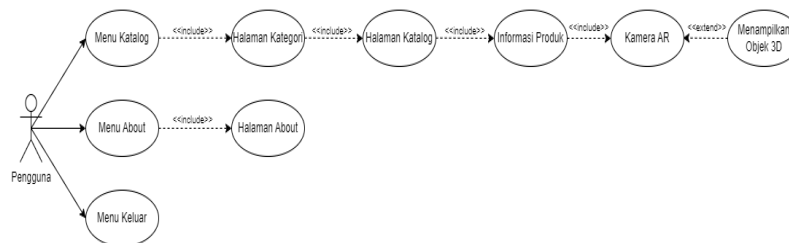


**c. UML(Unified Modeling Language)**

Unified Modeling Language (UML) is a software modeling language that is used as a writing medium for software blueprints. UML can be used to perform visualization, specification, construction, and some system documentation in software (Arifin & Anwariya, 2021; Husniah, 2016). The following is the UML in this research, namely as follows:

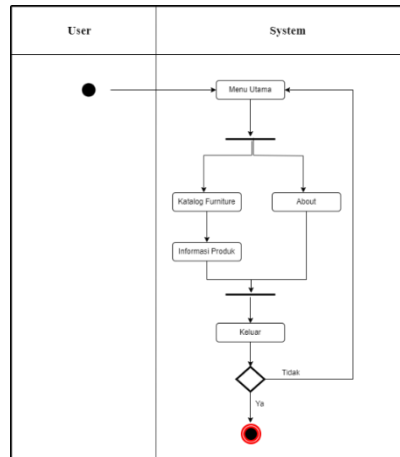
**1) Use Case Diagrams**

Use case diagrams are techniques commonly used in developing software to know the functional requirements of a system. The definition of a use case diagram itself is a depiction process to show the relationship between users and the system that has been designed. The system uses a case diagram can be seen in Figure 4.



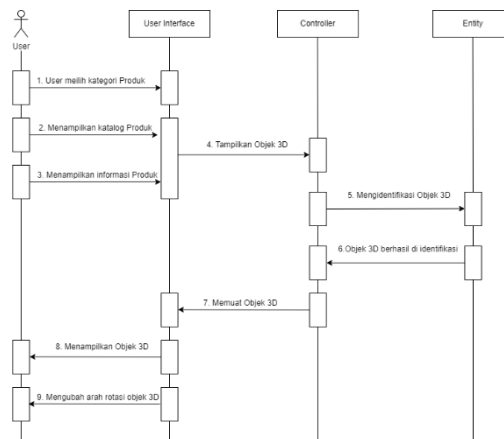
2) Activity Diagram

The Activity Diagram design for the AR furniture catalog system is shown in Figure 5.



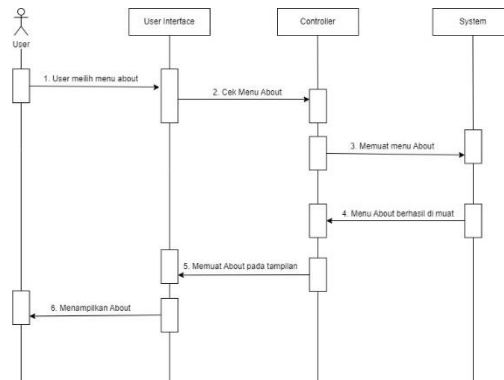
3) Sequence Diagram for Furniture Catalog

The Furniture Catalog system sequence diagram is shown in Figure 6.



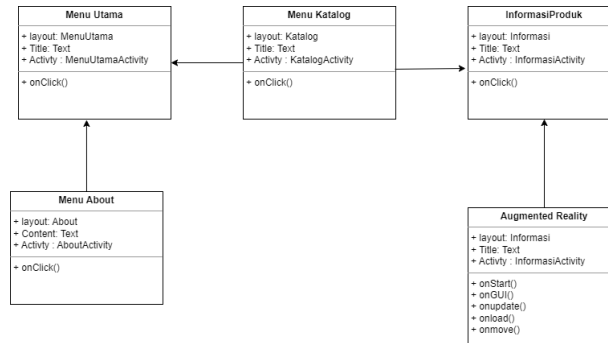
4) Sequence Diagram Menu About

The sequence diagram in the AR system Furniture Catalog Menu About (About) is shown in Figure 7.



### 5) Class Diagrams

The Class Diagram of the system is shown in Figure 8

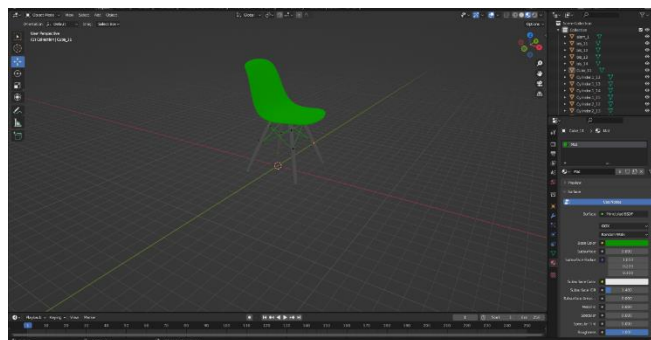


### Construction

At this construction stage, the system that was planned in the previous stage is implemented through a coding program. This construction stage is: creating 3D assets and creating an interface and furniture catalog mobile application. The following are the stages of construction, namely as follows (Nasution et al., 2023):

#### Creation of 3D Assets

Making 3D assets is a stage in the implementation of creating visualizations of furniture products, in the stage of making furniture objects in this study using Blender Software by adding 3D assets textures are added to the 3D assets so that the object has a color that matches the color of the product - furniture products. The stages of creating 3D objects are shown in

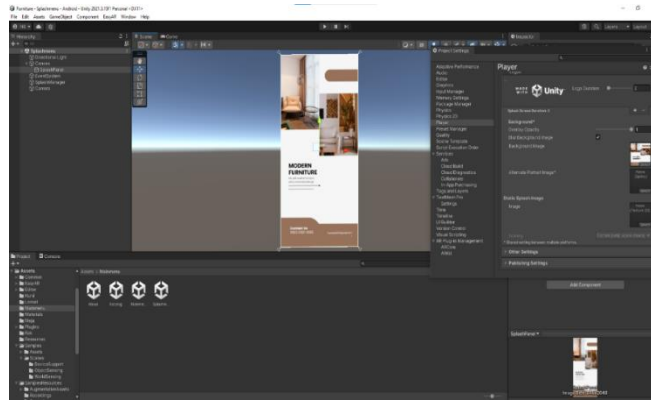


### Interface Creation

The interface is a display on the Furniture Catalog Application that uses augmented reality which will later be used by the user. The following are the stages in creating the interface for the furniture catalog application (Rustam, 2021; Wibowo, 2021).

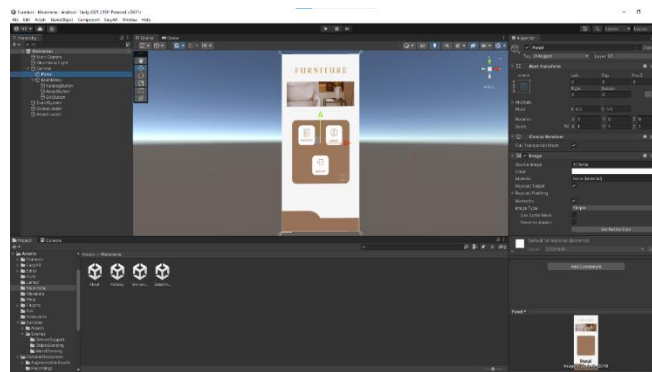
#### a. Splash Screen Page Display

The Splash Screen display is the initial page display or loading screen before entering the main menu page. The following displays the Splash Screen page of the Furniture Catalog Application which can be seen at



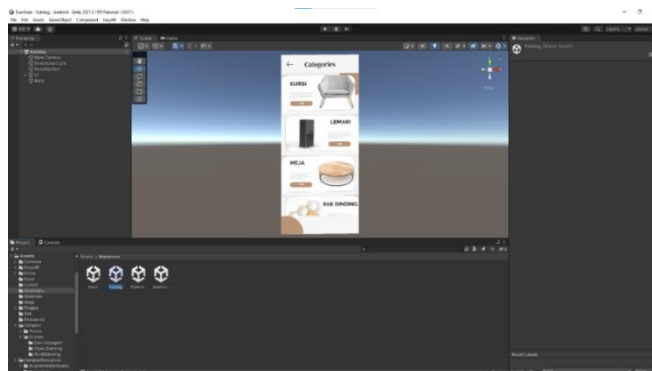
**b. Main Menu Page Display**

The main menu display is a page display that contains menus in the form of a catalog menu, an about menu, and an exit menu. The following displays the main menu page in the furniture catalog application which can be seen in the figure below



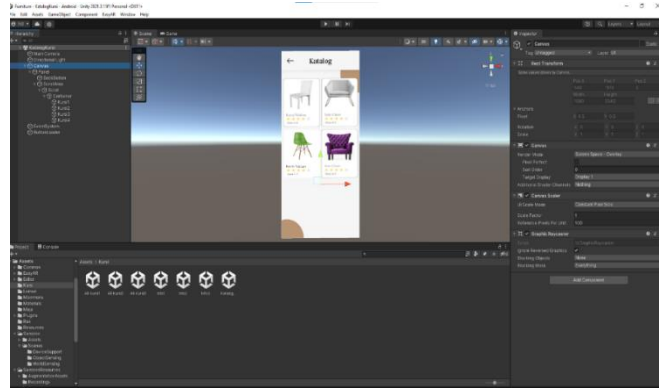
**c. Category Page View**

The category page display is a page containing 4 categories of items in the form of chairs, cupboards, tables, and wall shelves. The following displays the category page in the furniture catalog application which can be seen in the figure below



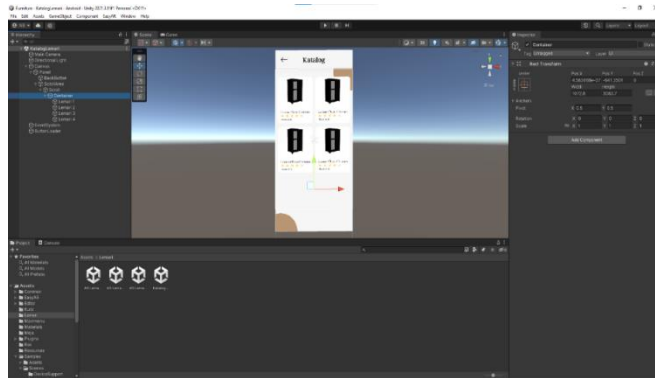
**d. Chair Catalog Page Display**

The catalog page display is a page of several products from the selected category. The following displays the catalog page in the furniture catalog application which can be seen in the figure below



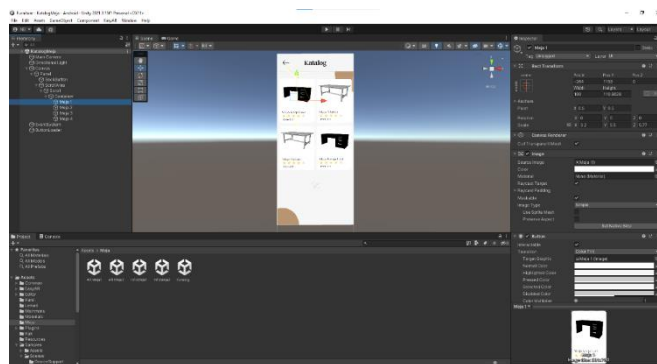
e. Wardrobe Catalog Page Display

The catalog page display is a page of several products from the selected category. The following displays the catalog page in the furniture catalog application which can be seen in the figure below



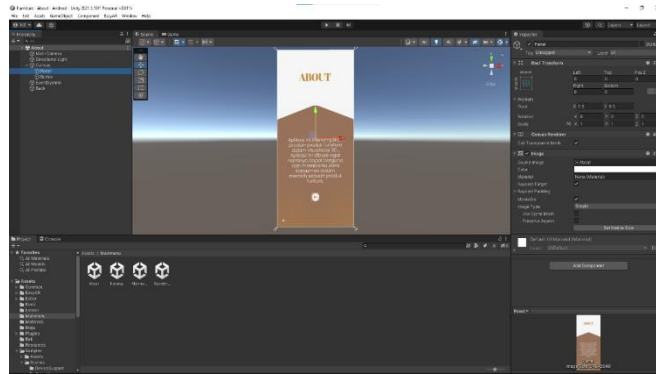
f. Table Catalog Page Display

The catalog page display is a page of several products from the selected category. The following displays the catalog page in the furniture catalog application which can be seen in the figure below



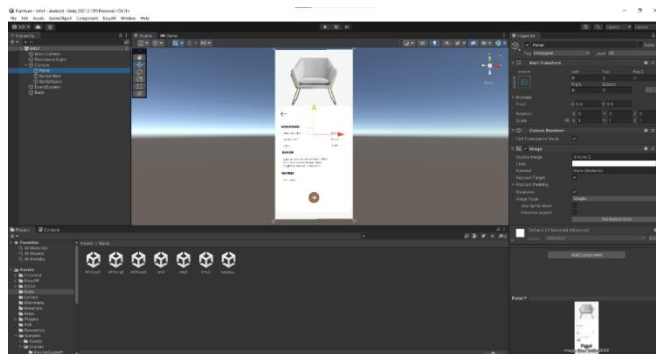
g. Wall Shelf Catalog Page Display

The catalog page display is a page of several products from the selected category. The following displays the catalog page in the furniture catalog application which can be seen in the figure below



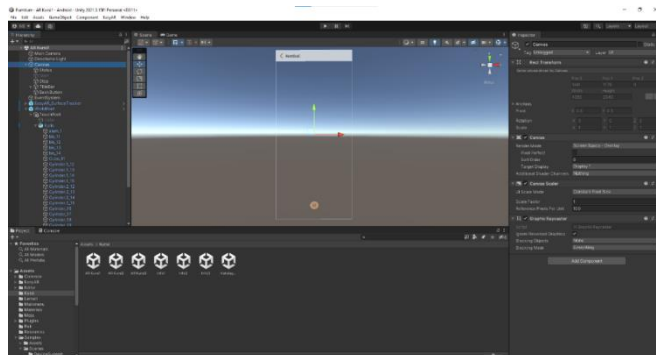
**h. Information Page Display**

The information page display is a page of furniture product information that displays information in the form of specifications, materials, and colors. The following displays the information page in the furniture catalog application which can be seen in the figure below



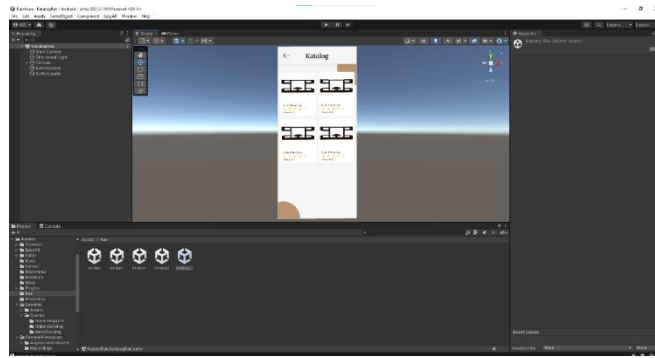
**i. Camera AR Page View**

The AR camera page display is a page that will display 3D furniture visualization objects via a smartphone camera. The following is a view of the AR camera page in the furniture catalog application which can be seen in the figure below



**j. About Page Display**

The About page display is a page that will display information about the furniture catalog application. The following displays the About page in the furniture catalog application which can be seen in the figure below



## Testing

This testing stage is intended to see whether the system runs well and there are no problems so that the user will be comfortable when using the application. In this research, system testing was carried out using the Black Box testing method. This black box testing method aims to show that the application that has been developed by this researcher is by the development objectives and can meet the needs of application users. Testing on the system is carried out to see how the system runs when there are no errors when moving pages and it runs well.

## CONCLUSION

Based on the results of research conducted by researchers regarding the title Implementation of Augmented Reality as a Promotional Media in Android-Based Furniture Catalogs, it can be concluded that a Furniture Catalog Application has been created using Android-based augmented reality technology to increase consumer interest in promotional activities. The application The Furniture Catalog uses Android-based augmented reality technology to make it easier for consumers/potential buyers to choose furniture products by looking at the 3D visualization of furniture products so that consumers don't have to go to a furniture shop. The furniture catalog application that uses Android-based augmented reality technology can only be run on the system. Android 8.0 'Oreo' (API Level 24) and above. The application can display 3D objects that can be rotated and moved at bright light intensity.

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