

# **Augmented Reality Application for Recognizing Cat Identity at the Cat Caffe Shop Through an Android-based QR Code Necklace**

**Merinda Selvi Budianti**  
Department Informatic  
Faculty of Sains & Technology  
University of Technology Yogyakarta

**Wahyu Sri Utami**  
Department Informatic  
Faculty of Sains & Technology  
University of Technology Yogyakarta

## **ABSTRACT**

Caffe Cat is included in one of the business innovations engaged in the commercial sector. The establishment of Caffe Cat is one of the breakthrough innovations in providing competitiveness that is different from other cafes in general. The concept of a cafe surrounded by various types of cats is expected to provide a different experience to customers, especially cat lovers. By referring to the breakthrough of innovation rather than competitiveness against cafes in general, the authors put forward an idea which is to add to the experience of Caffe Cat visitors. The author wants to implement Augmented Reality technology in the visitor experience while playing with the cats in the cat cafe. Implementation of augmented reality technology as a tool to recognize cat names contained in the cafe cat, by utilizing Unity 3D software, Vuforia SDK the author created an augmented reality-based application that was intended to help recognize cat names with the marker-based augmented reality method where the author used a QR Code as a trigger to display a description of the cat which included the cat's name, type of cat, age of the cat, and sex of the cat. The implementation of this research will be implemented in the form of an augmented reality-based Android application.

## **General Terms**

Marker Based Tracking, Augmented Reality.

## **Keywords**

Android, Caffe Cat, Unity 3D, Vuforia.

## **1. INTRODUCTION**

Business is an activity to build goals individually or in groups to get an advantage, one of the fields in business is Commercial Business. Caffe Cat is one of the Business Innovations engaged in the Commercial sector in the form of Caffe Cat. Currently, Caffe Innovation is at stake for the competitiveness of the cafe business. This innovation in Caffe Cat is to feel a different experience where hanging out in a cafe surrounded by various types of cats. The innovation and concept of Caffe Cat is very popular among cat lovers many types of cats will be presented so that it impresses cat lovers to play with cats that have never been owned and adds a distinct impression of hanging out.

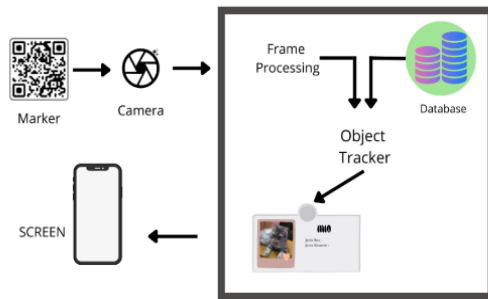
There is a problem in the cafe shop regarding the approach between the customer and the cat which is still not optimal, the approach is not optimal because there is a lack of knowing the name of each cat while the cat will get closer to visitors if he understands and is called the name that suits the owner. Most of the owners of this cat cafe do not explain the name of each cat so it is not optimal in playing with cats in this cat cafe. Not

only cat names, but the types of cats are also very diverse, many people lack knowledge about the types of cat breeds.

This Augmented Reality application was created to help visitors to find out the name of each cat and its type information by simply scanning the camera on the cat necklace that contains a QR Code using this application, scanning this QR code will display the name, type, and age of the cat. This application is also useful for introducing types of cats with direct interaction with children so that children can learn technology and get to know types of cats. For the introduction of this cat, a sound feature is added, where the sound contains the same sentence as the 3d image. This is useful for children who are not fluent in reading.

Several studies have been carried out by previous researchers who have the same fields and themes as the research that will be carried out. Research by Chaulina Alfianti Oktavia, Rosandi Fila Setiawan, and Andrew Christianto (2019), with the title Designing Augmented Reality Applications for Room Recognition Using 3D Object Tracking Markers. This study describes the application of Augmented Reality for Room Recognition Using 3D Object Tracking Able to help New Students of the STIKI Campus in finding the location of the Campus room. The data collection method used is a questionnaire or questionnaire with a Likert scale, so the measured variables are translated into measurable indicators [1]. Research By Christian O. Karundeng, Dringhuzen J. Mamahit, Brave A. Sugiarso (2018), with the title Design and Build Applications for Recognizing Endangered Animals in Indonesia Using Augmented Reality. This study describes the application of introducing endangered animals in Indonesia that can help people get to know them only through the Augmented Reality application [2]. Data collection methods used are questionnaires, literature studies, and interviews. Research by Muhammad Rizky Mubaraq, Helmi Kurniawan, and Alfa Saleh (2018), with the title Implementation of Augmented Reality in Android-Based Fruit Learning Media. This study describes the recognition of the names of fruits using Augmented Reality Technology which can help in the learning of kindergarten children [3]. Research by Adryan Syahputra, Septi Andryana, and Aris Gunaryati (2021), with the Title Application of Augmented Reality (AR) with the Marker Based Method as a Media for Recognizing Land Animals in Early Children using the Fast Corner Detection (FCD) Algorithm. In this study, the application was able to run optimally to introduce land animals to children through the Augmented Reality application [4]. Research by Suroso, Nasron, Ihzany Vilia Devi (2020), with the title Implementation of Augmented Reality in the Android-Based

Hope Application. In this study, they were able to apply the QR Code to their Augmented Reality Applications [5].



## 2. AUGMENTED CONCEPT, METHOD AND DATA

### 2.1 Augmented Reality

Cabero-Almenara and Barroso-Osuna (2016), the relevance of Augmented Reality in the future will be very important because it combines reality with virtuality at the same time and place [6] Augmented reality is a technology obtained from combining real time and digital content using 2D and 3D objects. Augmented Reality, on the other hand, complements the real world with computer-generated content, instead of creating a completely virtual world. Augmented Reality (AR) refers to a direct view of a real-world physical environment whose elements are combined by creating images that produce a mixture of computer realities. Augmentation is usually done in real time and in semantic context with environmental elements. An augmented reality system basically consists of a camera, processor, and display unit. The camera captures the image, and then the AR software system places virtual objects into the image in real time and displays the results (Siltanen, 2012).[7]

### 2.2 Marker Based Tracking

This method uses a black-and-white illustration with a square shape. There is also a thick black border on a white background. The Marker Based Tracking method is designed to help computers recognize marker positions and orientations in creating a three-dimensional virtual world. The position includes the point (0,0,0) as well as the X, Y, and Z axes. This type of AR method is also known as an augmented reality method based on image recognition. This technology performs its function depending on user-defined image identification. Generally, the markers used are in the form of a QR Code or a special logo.

**QR Codes** are matrix codes or two-dimensional barcodes derived from the word "Quick Response", meaning that the contents of the code can be deciphered quickly and precisely. The QR Code work system is by reading several components in the code box. The three large squares in each corner represent code boundaries. While the smaller box is useful for measuring the size of the box.

### 2.3 Android SDK

Android SDK is a software development tool containing a set of libraries and API tools needed to create Android applications. Android SDK is based on the Java programming language, so to use Android SDK, Java is required to be installed on our PC. Therefore yes An integrated development environment (IDE) is possible integrated with the Android SDK to create an application [8].

### 2.4 Marker

Marker is a real environment in the form of real objects that produce virtual reality. Markers are used as a place for Augmented Reality to appear (Aulia, 2018)[9].



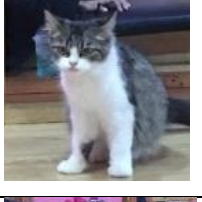


### 2.5 Unity 3D




Unity 3D is an application from Unity Technologies Inc which is capable of creating games, building architecture, and simulation, this application supports 3 languages, namely Java Scripts, C#, and Boo ( Mongu, Lomenta and Sambul, 2018).

## 3. Data

### 3.1 Data Collection




The data used in this study is raw data resulting from observations at the end of 2022. The data source was obtained from D'Meow Cat Caffé as a case study used in this study. The data used can be seen in Table I.






No.	Cat Name	Type	Result
1.	Micky	Persian Anggora	
2.	Ace	Persian	
3.	Cici	Mix Domestic	
4.	Kiky	Persian	
5.	Hima	Himalaya	







6.	Mio	Persian Mix Domestic	
7.	Caca	Mix Domestic	
8.	Chiko	Persian Anggora	



### 3.2 Data Preparation

The raw data obtained from the observation results are processed into a QR Code for Augmented Reality data needs using the Marker Based Tracking Method. The results of this processing can be seen in Table II. In addition to QR Code data, some data will be displayed as a result of scanning a QR Code, which can be seen in Table III.

No.	Cat Name	Type	Result
1.	Micky	Persian Anggora	
2.	Ace	Persian	
3.	Cici	Mix Domestic	

4.	Kiky	Persian	
5.	Hima	Himalaya	
6.	Mio	Persian Mix Domestic	
7.	Caca	Mix Domestic	
8.	Chiko	Persian Anggora	

No.	Cat Name	Type	Result
1.	Micky	Persian Anggora	
2.	Ace	Persian	
3.	Cici	Mix Domestic	
4.	Kiky	Persian	
5.	Hima	Himalaya	
6.	Mio	Persian Mix Domestic	

7.	Caca	Mix Domestic	
8.	Chiko	Persian Anggora	

## 4. RESULT AND DISCUSSION

After going through the research and application design stages, the results of this study were tested using Black Box Testing which is done to observe the input and output results of the software without knowing the code structure of the software. This test is carried out at the end of making the software to find out whether the software can function properly, so the results are shown in detail as follows:

### 4.1 Main Menu Module

The main menu module is the first module in the Blaxbox test in this study. Where the user only needs to open this augmented reality-based cat identity recognition application. When the user opens, the first time that appears is the splash screen page. When the animation on the splash screen page is finished, the user will be moved to the main menu, which means that if the user succeeds in getting to the main menu, the first module test is declared successful. Following are the results and appearance of the main menu module:

Testing Activity	Expected realization	Test result	Conclusion
Pressing the application logo icon	Can open the application	Open application	In accordance
Enter the Splash Screen	Can display splash screen	An application logo image appears on the splash screen page	In accordance
Switch to Main Menu	After the splash screen page, the user will be redirected to the main menu page	Users can switch to the main menu page, after the splash screen page	In accordance



Picture 1 Main Menu

## 4.2 AR Scan Module

The Scan AR module is the second module in black box testing in this study. This module asks the user to press the "Scan AR" button and then the user will be redirected to the ar scan page, then the user is asked to point the ar camera to the marker that has been prepared. The ar scan module testing table can be seen in the table and displayed below.

Testing Activity	Expected realization	Test result	Conclusion
Pressing the Scan AR button	Can switch pages from the main menu page to the scan ar page	The page switches to the ar scan page	In accordance
Scan Barcodes	When the AR Camera is pointed at the marker that has been prepared it will display information from the cat	Successfully scans barcodes and displays cat information	In accordance



Picture 2 AR Scam Module

## 4.3 My Cat Module

The My Cat module is the third module in this research's black box testing. This module will display information about cats registered in this coffee cat. Scenarios are carried out starting from the user pressing the "My Cat" button which then the user will redirect to the MyCat page where the user can then see various buttons with the names of existing cats, then the scenario user is asked to press the button for the names of the cats which then the user will be redirected to the cat description page from the button pressed. The Mycat module testing table can be seen in the table and displayed below:

Testing Activity	Expected realization	Test result	Conclusion
Pressing the My Cat button	Can switch pages from the main menu page to my cat page	The page redirects to my cat page	In accordance
Pressing the name selection button - cat name	Can switch to the description page which displays a description of the selected cat	Successfully displays and moves to the description page	In accordance



Picture 3 My Cat

#### 4.4 About module

The About module is the fourth module in black box testing in this study. this module will display Brief Description information about D'Meow Cat Caffe. The scenario in this module starts with the user pressing the "About" button, which then the user will be redirected to the About page. The About module testing table can be seen in the table and displayed below:

Testing Activity	Expected realization	Test result	Conclusion
Pressing the About button	Can switch pages from the main	The page switches to	In accordance

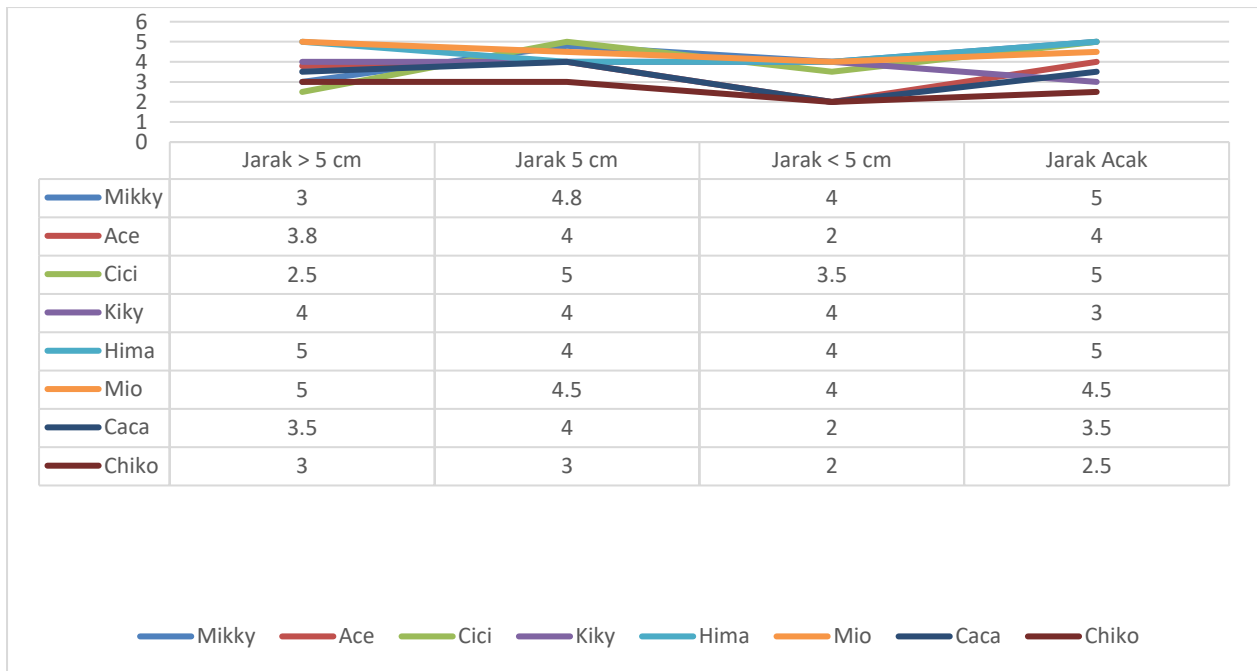
	menu page to the About page	the About page	
See the description of D'Meow Cat Caffe	Can see information and description of D'Meow Cat Caffe	Managed to view information and description	In accordance



Picture 4 About Module

#### 4.5 Test Results Based on Distance

The results of this test are obtained from testing from a distance that is calculated to prove at what distance the marker can be detected or not, the following are the results of the tests that have been carried out:



Picture 5 Result

From the results above, several cat markers are not detected properly. This may be a slightly specific resemblance to the QR code used.

## 5. CONCLUSION

Through research with the title "Augmented Reality Application of Cat Identity Recognition in Cat Caffe Shop Through QR Code Necklaces based on Android" it can be concluded that the Android-based Augmented Reality Application of Cat Identity Recognition has succeeded in Detecting Markers and Presenting 3d Explanations but still has deficiencies in several Markers during distance testing and the Android-based Cat Identity Recognition Augmented [1]at D'Meow Cat Caffe, Namely Lack of Cat Identification for Customers to know. Applying a Scan Marker can help Get to Know the Types of Cats with Technology.

## 6. REFERENCES

- [1] C. A. Oktavia, R. F. Setiawan dan A. Christianto, "Perancangan Aplikasi Augmented Reality Untuk Pengenalan Ruangan Menggunakan Marker 3D Object Tracking," *Jurnal Ilmiah Teknologi Informasi Asia*, 2019.
- [2] C. O. Karundeng, D. J. Mamahit dan B. A. Sugiarsa, "Rancang Bangun Aplikasi Pengenalan Satwa Langka di Indonesia Menggunakan Augmented Reality," *Jurnal Teknik Informatika*, p. 3, 2018.
- [3] M. R. Mubaraq, H. Kurniawan dan A. Saleh, "Implementasi Augmented Reality Pada Media Pembelajaran Buah-buahan Berbasis Android," *IT Journal*, 2018.
- [4] Y. E. Saputra, "Augmented Reality (AR) Untuk Pembelajaran Struktur dan Fungsi Tumbuhan Berbasis Android," p. 15, 2021.
- [5] Suroso, Nasron dan I. V. Devi, "Implementasi Augmented Reality Pada Aplikasi Hope Berbasis Android," *Jurnal Teknik Informatika dan Sistem Informasi*, 2020.
- [6] A. A. -Valencia, D. Burgos dan J. W. -Bedoya, "Influence of Motivation and Academic Performance in the use of Augmented Reality in Education. A systematic review," *Frontiers in Psychology*, 2022.
- [7] D. A. Winstanley dan D. J. McDonald, "Collaborative Augmented Reality," *ERASMUS MUNDUS*, 2014.
- [8] M. D. Juliansyach, "Aplikasi Augmented Reality Pengenalan Hewan Untuk Anak usia dini berbasis Android," *Sibatik Jurnal*, 2023.
- [9] A. A. Mahfudh, S. Nur'aini, N. C. H. Wibowo dan C. Kusananto, "Aplikasi media pembelajaran Klasifikasi Hewan Vertebrata Menggunakan Augmented reality dengan Marker Based," *Walisongo Journal of Information Technology*, 2022.