

Basic Yoga Movement Guide at Dewata Studio Based on Augmented Reality

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ABSTRACT

Yoga is a meditation activity where someone decides the whole mind to control the five senses and the body. Yoga members at Dewata Studio do yoga with breathing exercises, body exercises, and meditation. All these exercises have benefits in increasing body fitness and overcoming depression. But many yoga members are having trouble understanding basic yoga movements. There are so many reasons why yoga members have difficulty understanding basic movements. One reason is the COVID-19 pandemic, they can't go to the Dewata Studio, so they can't understand and explore basic yoga movements. As we know, basic yoga movement is the most important if we want to learn about yoga. There are 15 basic yoga movements at Dewata Studio that all yoga members must be mastered before moving on to the next stage. This research help yoga members understand and explore basic yoga movement using an android application based on augmented reality. The application is used by each Dewata Studio yoga member and explains each movement. Using this application must be under the supervision of yoga trainers at Dewata Studio. With this application, it is hoped that all yoga members at Dewata Studio can understand and explore basic yoga movements.

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1. INTRODUCTION

Yoga is a meditation activity when someone severs the whole mind to control the five senses and body. By doing yoga, yoga members must know basic yoga movements. The global community, especially yoga members at Dewata Studio, carry out yoga with breathing training, body exercise, and meditation, whose benefits can improve body fitness and overcome depression.

The problem that the authors faced in this research is that yoga member doesn't have any guide to learn basic yoga movement independently, which caused the result of the exercise not to be maximal because yoga member doesn't understand basic yoga movement. Based on this problem, the author develops an application for basic yoga movement based on augmented reality.

Augmented reality is a technology that combines the real world with cyberspace in conveying information to users who can interact directly with the virtual object created. The author aims to build an application for basic yoga movements based on augmented reality so that all yoga members can learn and understand the movement's meaning.

2. RESEARCH METHOD

2.1 Data Collection

Data collection is a research stage where the researcher applies specific scientific methods and techniques to collect data systematically. The author used three ways:

1. Interview

The author directly interviewed a yoga instructor at Dewata Studio to get the information that the author needed for this research. The interview is a meeting of two people to change information or an idea with the question and answer so that it can be reduced to a conclusion or meaning in a particular topic [1]. In the interview results, information and data have obtained from yoga instructors about precise basic yoga movements, which is very important when doing yoga movements.

2. Observation

Observation is one data collection method that uses direct or indirect observation [2]. The author did observation by observing information and data needed in this research. In the observation results, which follow basic yoga movements from a yoga instructor, the author knows how many basic yoga movements are and how to make the basic moves.

3. Literature Study

A literature study is a series activity related to collecting library data, reading, taking notes, and processing research materials [3]. The literature study was done by reading and learning about the topic discussed in this research. The author found five works of literature related to this research from the literature study.

2.2 Literature Review

The first research entitled, "Simulasi Visualisasi Teknik Gerakan Yoga Dengan Metode Pengembangan Multimedia Luther-Sutopo Berbasis Mobile". This research uses mobile simulation media and multimedia visualization to make it easier for users to know basic yoga movements, increasing people's interest. In this research, animation was used in the video, while the android application was formed using eclipse. From the description above, it can be concluded the difference from this research is that the system is built [4].

The second research entitled, "Pengembangan Aplikasi Augmented Reality Markerless Pengenalan Dan Teknik Dasar Bola Basket". In this research, a 3D object is ultimately detected with narration voice in Indonesian [5].

The third research entitled, "Penerapan Teknologi Augmented Reality Pada Aplikasi Media Pembelajaran Mikrokontroler Berbasis Android Dengan Platform ARCore". On this research, as a microcontroller learning media built using latest platform from Google ARCore [6].

The fourth research entitled, "Mesin Penerjemah Interaktif Dengan Animasi 3D Berbasis Augmented Reality". This application shows 3D using the markerless technique in the form of Augmented Reality [7].

The fifth research entitled, "Penerapan Augmented Reality Sebagai Media Pengenalan Tuntunan Sholat di Madrasah Ibtidaiyah Nurul Hidayah Berbasis Android". This research aims to use augmented reality as an introduction media based on Android and become an attractive alternative learning media [8].

2.3 Basic Theory

1. Yoga

Yoga came from the word "yuj," or in English, "to yoke" (unification). Unification, in this case, can be unified into three necessary forms in yoga, which are physically training (asana), breathing (pranayama), and meditation (Dyana) [9].

"In the 2nd century BC, Rishi Patanjali in the book Yoga Sutras, there are eight elements of yoga, which is Yama or self-control, Niyama or self-discipline, asana or yoga posture for meditation, pranayama or breathing technique, pratyahara or mastering the feeling, dharna or concentration, Dhayana or meditation, and Samadhi or high level "[10].

Yoga combines an individual's spiritual and physical elements to achieve the ideal state. The harmonization phase of these two elements will cause harmonization with the surrounding environment [11].

Yoga is a sport that can make our life more harmonious and balanced through mind controlling and whole body [12]. Nowadays, many people are interested in exploring another form of yoga to find peace or achieve spiritual growth. More profound serenity can be done by practising yoga movements as a path to self-fulfilment and understanding.

Yoga that develops now differs from what has practised thousand years ago, although the inherited meditation tradition remains the same [13].

As we can see, some benefits are obtained if we are studying and practising yoga in our daily life:

- a. Can overcome health problems, both external organs and internal organs.
- b. Helping to control emotional reactions and mind in a certain condition.
- c. It can increase self flexibility which can help to avoid injuries.
- d. It can increase blood circulation and oxygen all over brain cells and all over the body, thus smoothing the flow of blocked blood.
- e. Lower blood pressure and stress, thereby reducing the tension of muscle nerves.
- f. It can help build stamina, strengthen muscles, and increase body balance.
- g. Increase inner peace with mind focus more peaceful and calmer.

2. Augmented Reality

Augmented reality allows the development of technology that unifies real-time and digital content using a computer with the real world [14]. There are two methods of augmented reality:

- a. Marker Based Tracking
The marker is a rectangle black and white illustration with a bold black border and white background. The computer will know position and marker orientation and create a 3D virtual world with points (0,0,0) and three axes X, Y, and Z.
- b. Markerless Based Tracking
One of augmented reality's developing methods is the markerless-based tracking method. This method doesn't need to use a marker to show digital elements. A tool provided by Qualcomm for creating an augmented reality based on mobile makes it easy to develop a markerless application.

3. Blender 3D

A blender is software that creates a 3-dimension object and makes animation. We can use blender as the game engine, which means that software makes games [15].

4. Unity

Unity is a game engine or game authoring tool that allows creative people like you to build a video game [16]. Unity was developed by Unity Technologies, built-in 2004 by David Helgason, Nicholas Francis, and Joachim Ante. This game engine was built for the concern of the indie developer who can't buy the game engine because too expensive [17].

5. Android SDK

Android SDK is an API (Application Programming Interface) tool that must start developing an Android platform application using Java [18]. Android SDK includes a comprehensive set of development tools. Android SDK consists of the debugger, libraries, handset emulator, documentation, examples of code, and tutorial [19].

6. Library AR Core

AR Core uses 3 key technologies to integrate virtual content with the virtual world through a mobile device camera, which is motion tracking that allows the phone to understand and relative position to the world. Environmental understanding will enable phones to detect size and horizontal surface locations like land or coffee table. Light estimation allows the phone to predict current lighting conditions in the environment [20].

2.4 System Design

In building or developing an application, design is needed so the developed application runs well. In this discussion, we need to do analysis and app design to design a system.

1. Use Case Diagram

Use case diagram is an activity flow and business process performed by an actor [21]. Use case diagram used to know what functions are contained in an information system and who has the right to use these functions [22].

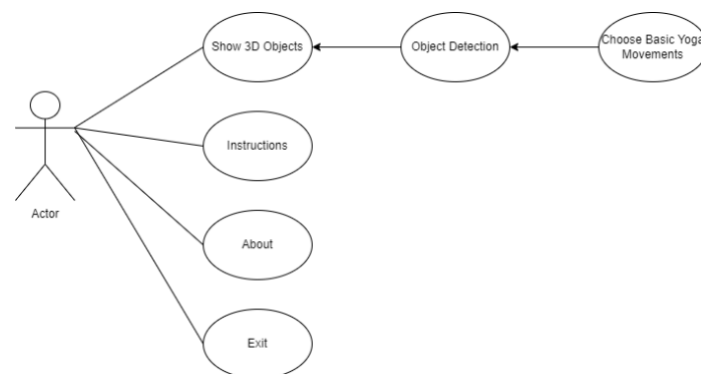


Figure 1. Application's Use Case Diagram

2. Activity Diagram

Activity diagram is a special form of state machine that aims to model computations and workflow that happen inside a system or software under development [23]. Activity diagram also describes workflow or activity from a system, business process, or menu on software [22]. Basic yoga movement guide application activity diagram can be seen in figure 2

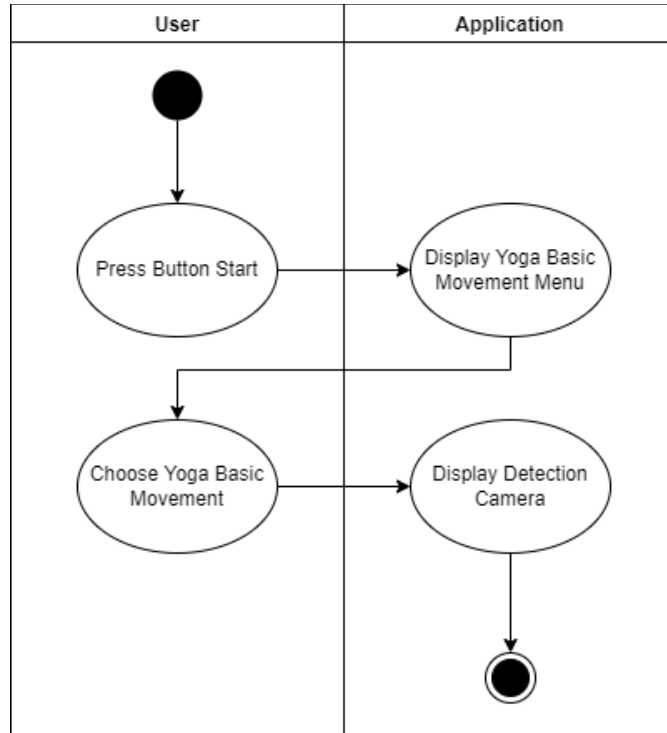


Figure 2. Application's Activity Diagram

3. Flowchart

Flowchart is a collection of symbolic diagram notations showing the data flow and the sequence of operations in the system [24]. Flowchart is a chart for the whole system including manual activities and flow or document flow used in the system [25]. Basic yoga movement flowchart can be seen in figure 3.

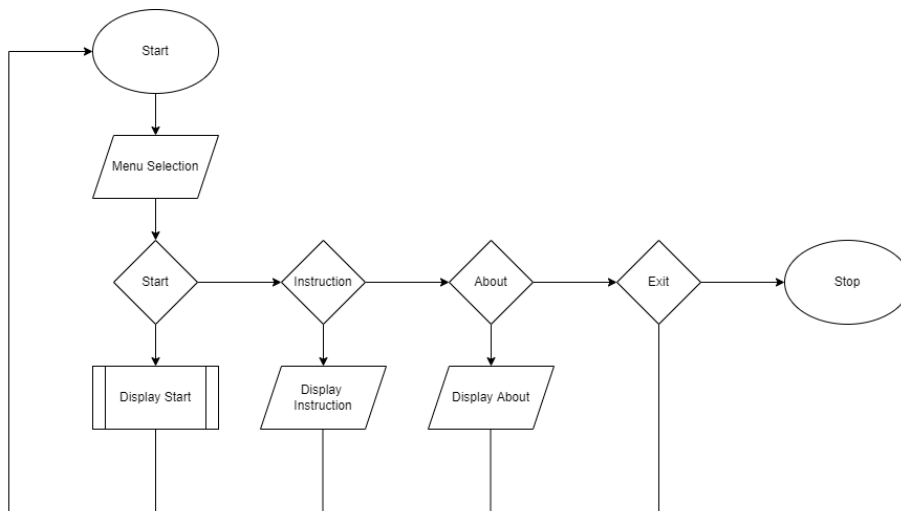


Figure 3. Application's Flowchart Diagram

3. RESULTS AND ANALYSIS

3.1 Main Menu Interface

The main menu interface shows an image and 5 buttons: button start, button information, button instruction, button about, and button exit. Main menu interface can be seen in figure 4.



Figure 4. Main Menu Interface

Button start is a button if the user wants to start the application. After the user clicks the button, the user will be brought into basic yoga movements. There are 15 basic yoga movements that users can choose. Each exercise has an explanation, and every action has a step on how to do it right.

3.2 3D Animation Display

3D animation display is a camera that displays a 3D object and consists of text, the yoga movement name, and 2 buttons, which is description and exit. 3D animation display can be seen in figure 5.

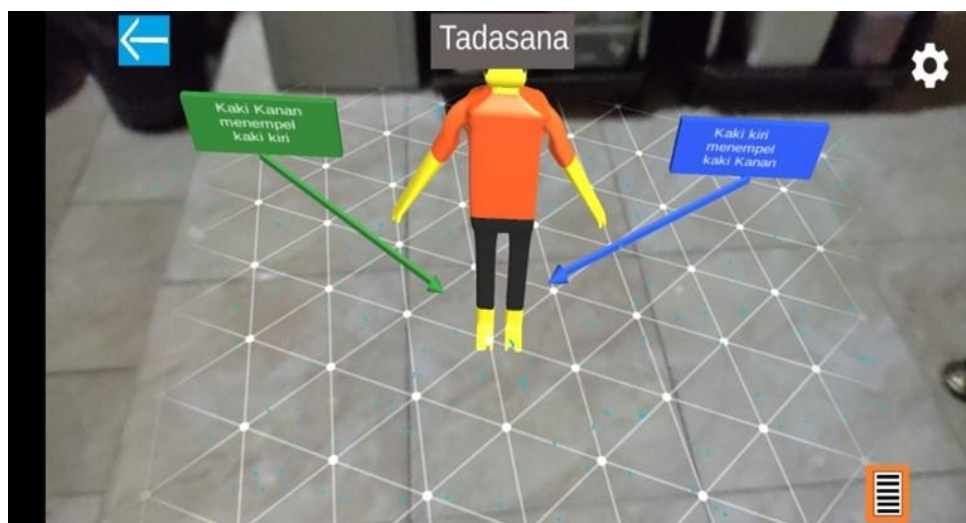


Figure 5. 3D Animation Display

Figure 5 shows a 3D animation display from the yoga movement's tadasana after pressing the screen that is already tracking. Animation has the form of a female object wearing a short orange sleeve and black trousers. When the object appears, an object can move according to the movement of the tadasana, and there is a narration procedure for doing the tadasana movement.

3.3 Light Intensity Test

The light intensity test is done by testing a 3D animated object display using sunlight, bright light, dim light, and no light at all. Table 1 shows the results from the light intensity test.

Table 1. Light Intensity Test

Test Scenario	Test Action	Expected Result	Test Result
Sun Light	Show 3D Animation Object with Sun Light	Show 3D Animated Object	Succeed
Bright Light	Show 3D Animation Object with Bright Light	Show 3D Animated Object	Succeed
Dim Light	Show 3D Animation Object with Dim Light	Show 3D Animated Object	Succeed
No Light	Show 3D Animation Object without Light at all	Show 3D Animated Object	Succeed

3.4 Distance Test

The distance test is done by the distance between the user and the point where the animated object runs. This test is tested with the distance of 1 meter, 2 meters, 3 meters, 4 meters, and 5 meters. Table 2 shows the results of the distance test.

Table 2. Distance Test

Test Scenario	Test Action	Expected Result	Test Result
1 Meter Distance	Show 3D Animation Object with 1 Meter Distance	Show 3D Animated Object	Succeed
2 Meters Distance	Show 3D Animation Object with 2 Meters Distance	Show 3D Animated Object	Succeed
3 Meters Distance	Show 3D Animation Object with 3 Meters Distance	Show 3D Animated Object	Succeed
4 Meters Distance	Show 3D Animation Object with 4 Meters Distance	Show 3D Animated Object	Succeed
5 Meters Distance	Show 3D Animation Object with 5 Meters Distance	Show 3D Animated Object	Succeed

3.5 Tracking Object Type Test

A tracking object type is an object used for detecting the surface by the camera so that it can be used for 3D animation display. This test uses wood, cement, glass, ceramic, short grass, long grass, and rocks surface. Table 3 shows the results from the tracking object type test.

Table 3. Tracking Object Type Test

Test Scenario	Test Action	Expected Result	Test Result
Tracking Object with Wood Surface	Show 3D Animation Object with Wood Surface	Show 3D Animated Object	Succeed
Tracking Object with Cement Surface	Show 3D Animation Object with Cement Surface	Show 3D Animated Object	Succeed
Tracking Object with Glass Surface	Show 3D Animation Object with Glass Surface	Show 3D Animated Object	Succeed

Tracking Object with Ceramic Surface	Show 3D Animation Object with Ceramic Surface	Show 3D Animated Object	Succeed
Tracking Object with Short Grass Surface	Show 3D Animation Object with Short Grass Surface	Show 3D Animated Object	Succeed
Tracking Object with Long Grass Surface	Show 3D Animation Object with Long Grass Surface	Show 3D Animated Object	Succeed
Tracking Object with Rocks Surface	Show 3D Animation Object with Rocks Surface	Show 3D Animated Object	Succeed

4. CONCLUSION

Research from the basic yoga movement guide at Dewata Studio based on Augmented Reality can be concluded as follows:

1. Research from a basic yoga movement guide at Dewata Studio based on Augmented Reality has been successfully carried out by testing the application.
2. On testing, the application can detect object from light density, distance, and object type tests.
3. Using this application can help yoga members, especially beginners, understand and explore basic yoga movements more.
4. Members no longer face difficulties in doing basic yoga movements.
5. This application becomes teaching media for all yoga members and yoga trainers, and it can be done at home if members can't come to the studio.

REFERENCES

- [1] P. Sugiyono, "Metode penelitian kombinasi (mixed methods)," *Bandung Alf.*, vol. 28, pp. 1–12, 2015.
- [2] Y. Riyanto, "Metodologi Penelitian Pendidikan Surabaya," *Penerbit SIC*, 2010.
- [3] M. Zed, *Metode peneletian kepustakaan*. Yayasan Obor Indonesia, 2004.
- [4] P. A. Nanda, "Simulasi Visualisasi Teknik Gerakan Yoga Dengan Metode Pengembangan Multimedia Luther-Sutopo Berbasis Mobile," *JURIKOM (Jurnal Ris. Komputer)*, vol. 7, no. 2, pp. 207–213, 2020.
- [5] B. H. A. P. I. Gst, I. G. M. Darmawiguna, and S. Kom, "Pengembangan Aplikasi Augmented Reality Markerless Pengenalan Dan Teknik Dasar Bola Basket," *KARMAPATI (Kumpulan Artik. Mhs. Pendidik. Tek. Inform.)*, vol. 6, no. 3, pp. 247–355, 2017.
- [6] I. Huda and Y. Fuadi, "Penerapan Teknologi Augmented Reality Pada Aplikasi Media Pembelajaran Mikrokontroler Berbasis Android Dengan Platform ARCore," *FAHMA*, vol. 17, no. 1, pp. 57–66, 2019.
- [7] A. H. Nasution, Y. Rizki, S. Nasution, and R. Muhammad, "Mesin Penerjemah Interaktif Dengan Animasi 3D Berbasis Augmented Reality," *IT J. Res. Dev.*, vol. 4, no. 1, pp. 28–39, 2019.
- [8] S. Anugrah, A. Sadikin, and E. Fernando, "Penerapan Augmented Reality Sebagai Media Pengenalan Tuntunan Sholat di Madrasah Ibtidaiah Nurul Hidayah Berbasis Android," *J. Process.*, vol. 12, no. 2, pp. 82–2528, 2017.
- [9] K. Yuliana, "Amazing Yoga Sehat, Cantik, Awet Muda." Yogyakarta: Solusi Distribusi, 2015.
- [10] R. Hajir, "Easy Yoga–Sehat dan Fit dengan Yoga Praktis," *Jakarta: Penerbit Bukune*, 2010.
- [11] E. Lebang, "Yoga Atasi Nyeri Backpain," *Pustaka Bunda: Jakarta*, 2015.
- [12] R. Rohimawati, *Sehat dan bahagia dengan yoga*. Kawan Pustaka, 2008.
- [13] D. Asmarani, *Yoga untuk Semua+ DVD*. Gramedia Pustaka Utama, 2011.
- [14] I. Efendi, "Pengertian Augmented Reality (AR)," *IT Jurnal*, <https://www.it-jurnal.com/pengertian-augmented-realityar>, vol. 17, 2017.

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- [15] A. Zaki, *Animasi Karakter Dengan Blender Dan Unity*. Jakarta: PT. Elex Media Komputindo, 2016.
- [16] R. H. Creighton, *Unity 3D game development by example: A Seat-of-your-pants manual for building fun, groovy little games quickly*. Packt Publishing Ltd, 2010.
- [17] R. Roedavan, "Unity Tutorial Game Engine Modeling, Animation, and Game Design." Bandung: Penerbit Informatika, 2014.
- [18] N. Safaat, "Rancang Bangun Aplikasi Multiplatform," *Bandung Inform.*, 2015.
- [19] I. Y. Supardi, *Belajar coding android bagi pemula*. Elex Media Komputindo, 2015.
- [20] "ARCore Overview." <https://developers.google.com/ar/discover> (accessed Feb. 25, 2019).
- [21] I. Putu and A. E. Pratama, "Sistem Informasi dan Implementasinya," *Bandung Inform.*, 2014.
- [22] R. A. Sukanto and M. Shalahuddin, *Rekayasa Perangkat Lunak (Terstruktur dan berbasis objek)*. 2016.
- [23] A. Nugroho, *Rekayasa perangkat lunak berorientasi objek dengan metode USDP*. Penerbit Andi, 2010.
- [24] D. Mardi and M. Si, "Sistem Informasi Akuntansi," *Cetakan ke-2. Ghalia Indones. Bogor*, 2014.
- [25] Mulyadi, *Sistem Akuntansi*. Yogyakarta: Sekolah Tinggi Ilmu Ekonomi YKPN, 1993.