

Conceptual Design of Umrah Learning Media Based on Augmented Reality (AR)

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Abstract

The background of this research is due to the lack of understanding of prospective Umrah pilgrims, which is a challenge in carrying out the Umrah pilgrimage for first-time pilgrims. The relatively high cost of travel and accommodation makes it important for prospective pilgrims to prepare thoroughly so that their worship is valid and in accordance with Islamic law. Furthermore, technological changes can be an opportunity to develop learning media that remain relevant to current conditions. Currently, Umrah learning is carried out through conventional manasik (rituals) by manually constructing the Kaaba. This study aims to formulate a basic concept for developing Augmented Reality (AR)-based Umrah learning media. This research method uses the DDR (Design and Development Research) method, which is a systematic study of the design, development, and evaluation processes with the aim of establishing an empirical basis for the creation of products and learning tools, as well as new or improved models that govern their development. The novelty in this study contributes to Augmented Reality-based Umrah learning media. The novelty of this research lies in the design of an Augmented Reality-based learning media concept for Umrah rituals, which can interactively depict each series of Umrah rituals in the form of 3D objects on the device, thus providing a more immersive, flexible, and easy-to-understand learning experience compared to conventional learning methods.

Keywords: Augmented Reality; Learning Media; Umrah.

Abstrak

Latar belakang dari penelitian ini karena kurangnya pemahaman calon jamaah umrah menjadi tantangan tersendiri dalam pelaksanaan ibadah umrah bagi jamaah yang baru pertama kali akan menjalankan ibadah ini. Biaya perjalanan serta akomodasi yang cukup mahal menjadi hal yang penting bagi calon jamaah untuk mempersiapkan yang matang agar ibadah mereka menjadi sah dan sesuai tuntunan syariat. Selain itu perubahan teknologi dapat menjadi peluang untuk mengembangkan media pembelajaran agar selalu relevan dengan kondisi era sekarang. Selama ini pembelajaran umrah dilakukan dengan cara manasik secara konvensional dengan membuat ka'bah secara manual. Penelitian ini bertujuan untuk menyusun konsep dasar dari pengembangan media pembelajaran umrah berbasis Augmented Reality (AR). Metode penelitian ini menggunakan metode DDR (Design and Development Research) yang merupakan studi sistematis tentang proses desain, pengembangan, dan evaluasi dengan tujuan untuk menetapkan dasar empiris bagi pembuatan produk serta alat pembelajaran serta model baru atau yang ditingkatkan yang mengatur pengembangannya. Novelty pada penelitian ini memberikan sumbangsih kepada media pembelajaran umroh berbasis Augmented Reality. Kebaruan (novelty) penelitian ini terletak pada perancangan konsep media pembelajaran manasik umrah berbasis Augmented Reality yang mampu menggambarkan setiap rangkaian ibadah umrah secara interaktif dalam bentuk objek 3D pada perangkat, sehingga memberikan pengalaman belajar yang lebih imersif, fleksibel, dan mudah dipahami dibandingkan dengan metode pembelajaran konvensional.

Kata kunci: Augmented Reality; Media Pembelajaran; Umroh.

INTRODUCTION

The background to this research is that the lack of understanding among prospective Umrah pilgrims presents a particular challenge for first-time pilgrims. This is due to Indonesia's geographical distance from the Arabian Peninsula, which makes the pilgrimage relatively expensive compared to other forms of worship. This situation also impacts prospective pilgrims' understanding of the technicalities of this pilgrimage.

The relatively high cost of travel and accommodations makes it crucial for prospective pilgrims to thoroughly prepare for their pilgrimage to be valid and in accordance with Islamic law. Without a sufficient understanding of the procedures for performing Umrah, pilgrims are at risk of engaging in activities that invalidate their Umrah. Therefore, educational resources are needed to facilitate prospective pilgrims in learning the procedures for performing Umrah.

Technological changes can be an opportunity to develop learning media so that they are always relevant to current conditions in developing knowledge as an obligation. (Al-Naisābūri, 1424). This change creates a challenge for the world of education to always be able to adapt to the developments of the times. ('Ulyan et al., 2023). So the learning process must be adapted to the conditions of the students by utilizing digital technology in order to facilitate the delivery of learning materials. (Mohammad 'Ulyan, 2022). Learning media makes the learning process easier and more effective (Ulyan, 2020).

Based on a review of literature published in various research journals, studies on Umrah learning technology can be grouped into two types. The first type focuses on conventional visualizations to improve students' cognitive aspects, understanding, learning outcomes, and motivation. (Sugiyanti, 2020), (Heriyanto, 2020), (Saputra et al., 2023), (Putra et al., 2024). While the second type places more emphasis on technical feasibility tests and general media effectiveness. (Abdussalam et al., 2021), (ELOK FUROIDAH, 2022), (Rustyawati & Sholikah, 2025), (ELOK FUROIDAH, 2022)

Media can be in the form of audio, visual, or audiovisual, where its use is adjusted to the level of needs of the learner, as well as the level of learning psychology at their age. (Husna, 2013) Innovation in the use of technology-based learning media is very beneficial and is a solution for creating a more interactive and effective learning atmosphere, including in Islamic education. (Hasan et al., 2025) (Nugroho & Mustaidah, 2019) (Rochmad, 2021). Therefore, media selection is not just a technical decision, it must be adapted to the needs of the user. (Fatchurrohman et al., 2025)

Previous research still has an empty gap because it still focuses on evaluating learning outcomes at the final cognitive level, without further exploring real-time 3D spatial interactions that affect the psychomotor visualization of pilgrims during the manasik process. The research gap in previous research still has a clear gap related to the previous media's dependence on physical markers that limit the flexibility for independent learning. The novelty of this research lies in the design of the concept of learning media for Umrah manasik based on Augmented Reality which is able to depict each series of Umrah worship interactively in the form of 3D objects on the device, thus providing a more immersive, flexible, and easy-to-understand learning experience compared to conventional learning methods.

RESEARCH METHODS

This research uses the Design and Development Research (DDR) method. This method is a systematic study of the design, development, and evaluation processes with the aim of establishing an empirical basis for the creation of new or improved learning products and tools, as well as models governing their development. (Richey & Klein, 2007)

This research designs the application, the scope or object of this research is the basic concept of developing an augmented reality-based Umrah learning application, the main materials and tools, places, data collection techniques using a library approach, operational definitions of research variables, and analysis techniques using.

The research phase began with a preliminary meeting to determine the division of tasks. Each team was assigned tasks based on their respective areas of expertise. Afterward, they sought out literature sources to strengthen the research concept. The next step was to develop objectives and materials/content for the AR-based Umrah application. Once the materials were compiled, the next step was to design the application's appearance using a user interface/user experience (UI/UX) design application to facilitate user use. Validation was then conducted with experts in each field, both for the material and the appearance. However, this research focused on strengthening the basic concept of the AR-based Umrah application so that when it was developed, the application would have a strong foundation.

RESULTS AND DISCUSSION

Umrah pilgrimage

Umrah is often interpreted as a pilgrimage. Terminologically, umrah is defined as visiting the House of Allah (the Kaaba) to perform a series of acts of worship, including *tawaf* (circumambulation), *sa'i* (circumambulation), and shaving the head (*tahallul*), in order to gain Allah's approval and reward. Scholars differ on the ruling

on umrah, with some believing it to be sunnah, while others believe it is obligatory. (Dirjen Penyelenggaraan Haji dan Umrah Kementerian Agama, 2023)

The pillars of Umrah are Ihram (intention), Tawaf, Sa'i, Tahallul (shaving hair), and Orderly. The pillars of Umrah cannot be abandoned. If one of these pillars is not fulfilled, then a person's Umrah is invalid. (Dirjen Penyelenggaraan Haji dan Umrah Kementerian Agama, 2023)

It is obligatory for Umrah to be performed in ihram from the miqat. If this obligation is abandoned, then the person's Umrah remains valid, but must pay a fine or fee. Apart from that, it is mandatory to perform Umrah by avoiding prohibited actions when performing Umrah or *Muharramat*.

Before carrying out the intention of Umrah, it is sunnah to cut nails, moustache and other hair, take a bath, use perfume, comb hair, and pray two rak'ahs. (Muqit & Djuwairiyah, 2016)

There are several things that are prohibited when carrying out the Umrah pilgrimage. Men are prohibited from wearing clothes with seams (cups), wearing shoes/footwear that cover the ankles, covering the head, such as with a songkok/hat. Women are prohibited from wearing gloves and covering their faces (veil). The prohibitions for men and women are wearing perfume during ihram, cutting, shaving or removing hair and other body hair, cutting nails, marrying, marrying off, and being a guardian in marriage, hunting or killing land animals in any way, making out or having sexual intercourse (*rafas*), swearing, fighting, or uttering dirty words (*fusuk* and *jidat*). (Muqit & Djuwairiyah, 2016)

Umrah pillars

Ihram

Ihram is the first step in performing Umrah. *Ihram* is mandatory, as it is a pillar of Umrah. If one does not enter *Ihram* before performing Umrah, it is invalid. The intention to enter *Ihram* for Umrah can be made throughout the year. The wording for the intention for Umrah is as follows:

نَوَيْتُ الْعُمْرَةَ وَأَحْرَمْتُ بِهَا لِلَّهِ تَعَالَى

I intend to perform the Umrah pilgrimage for the sake of Allah Ta'ala.

لَبَّيْكَ اللَّهُمَّ عُمْرَةً

I fulfill Your call, O Allah, by performing Umrah (Muqit & Djuwairiyah, 2016)

Ihram is closely related to the term *miqat*. *Miqat* means boundary, while in terms of terminology, *miqat* means the place or time to begin worship, which consists of *miqat zamani* and *miqat makani*. (Muqit & Djuwairiyah, 2016)

Miqat Zamani is the time limit specified for the Hajj or Umrah pilgrimage. The Umrah pilgrimage can be carried out at any time throughout the year, while the miqat for the Hajj starts from Shawwal, Dzul Qa'dah, and the ten days at the beginning of the month of Dzul Hijjah. (Muqit & Djuwairiyah, 2016)

While miqat makani is the boundary of the place or area where a person must enter ihram before entering the Haram land to perform Hajj or Umrah. There are 5 places to start ihram. Everyone who will perform the Hajj or Umrah pilgrimage, must enter ihram from one of the 5 places, namely the Dzul Hulaifah Mosque / Bir 'Ali (residents of Medina / who pass through Medina), Al-Juhfah (Syria, Lebanon, Undun, Palestine, Mahribi, Egypt, Africa, and those who pass through it), Qornul Manazil / al-Sailul al-Kabir (Najd, Kuwait, Imarat, and those who pass through it), Yalamlam (al-Sa'diyah) or King Abdul Aziz Airport Jeddah (Yemen and others who come from Asia, as well as for those who pass through it), and Dzatul 'Irqin / al-Dharibah (Iraq, Iran, Ahlul Masyriq, and those who pass through it).

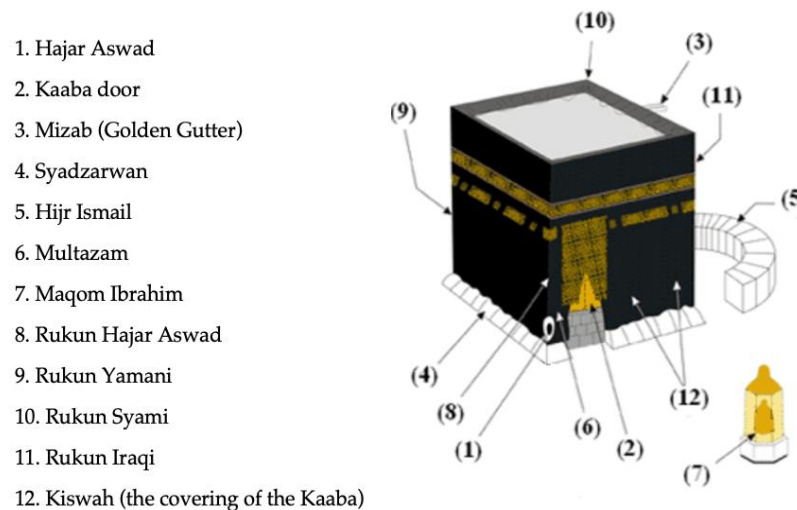
Thawaf

Thawaf linguistically means "ad-Dauran," or circumambulation. It involves circling the Kaaba seven times, jogging or walking, with the intention of worshipping Allah. It is recommended to jog for the first three laps, then walk normally for the next four. After completing the seventh lap, it is recommended to perform two rak'ahs of sunnah prayer. (Zainuddin, 2016)

The guidelines for tawaf include performing idhthiba', which involves wearing the ihram (pilgrimage) with the center of the cloth under the right armpit and both ends over the left shoulder, leaving the right shoulder uncovered. During the tawaf, one should frequently remember Allah and speak only about good or necessary things. Furthermore, one should always maintain purity from hadas (impurities) and najis (impurities). (Zainuddin, 2016)

To better understand the technical aspects of performing Thawaf, you can see the layout of the Kaaba in the following image:

Figure 1. Ka'bah (Zainuddin, 2016)



The procedures for tawaf include:

- a. When you want to perform Tawaf, stand between the Pillars of the Black Stone and the Pillars of Yamani while facing the Kaaba. After that, walk around the Kaaba by positioning the Kaaba on the left. Perform the intention of performing the Umrah pilgrimage while at the Pillars of the Hajar Aswad.
- b. When you are at the pillars of the Black Stone, do istislam or wipe the Black Stone, if this is not possible you can also use hand gestures while saying bismillahi allohu akbar.
- c. Things that need to be paid attention to when performing tawaf are that no part of the body should enter the circle of the Kaaba, including Hijr Ismail and the foundation of the Kaaba (Syadzarwan), because this can make the tawaf invalid.
- d. When you arrive at Rukun Yamani or the corner of the Kaaba that leads to Yemen, it is recommended to do istislam or to wipe it with your right hand if you can, but if you can't, then just give a signal with your hand.
- e. After passing through the Yamani pillar before reaching the Hajar Aswad pillar, it is recommended to pray "rabbanaa aatina fiddunya hasanah, wafil aakhirati hasanah, waqina 'adzaabannaar, wa adzkhilna al-jannata ma'al abraar, yaa 'aaziiz, ya ghaffaar, ya rabbal 'alaamiin". This prayer is recited every round when passing between the Yamani pillar and the Hajar Aswad pillar.
- g. When you have reached the harmony of the Black Stone song, then make a gesture to the Black Stone while saying Bismillahi Allahu Akbar.
- h. Then, after completing 7 rounds of tawaf, end at the Hajar Aswad pillar by moving a little further forward to the direction of the door of the Kaaba. (Zainuddin, 2016)

After completing the series of tawaf, it is sunnah to perform two rak'ahs of sunnah prayer in a position behind Maqam Ibrahim.

Sa'i

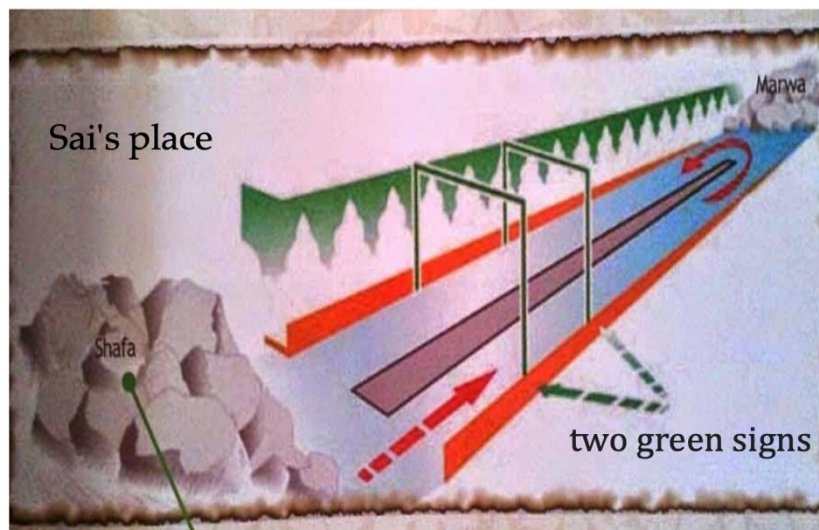
After performing the entire series of tawaf, then continue with performing the Sa'i worship. Sa'i is walking or jogging for men seven times from Bukit Shafa to Bukit Marwah and vice versa.

Etymologically, sa'i means walking or striving. Terminologically, sa'i is defined as the act of walking from Safa to Marwah, then returning to Safa seven times, starting at Safa and ending at Marwah, under certain conditions.

The conditions for Sa'i are that it begins with tawaf, starting from the hill of Shafa and finishing at the hill of Marwah, completing seven journeys from the hill of Shafa to Marwah and vice versa, counted as one journey, and is carried out at the place of Sa'i. (Kementerian Agama, 2023)

To get a better idea of the implementation of Sa'i worship, you can see the picture below:

Figure 2. Shafa and Marwah (Zainuddin, 2016)



When performing Sa'i worship, it is sunnah to:

- Recite "*Innashafaa wal Marwata minsya'aairillaahi, abdau bimaa bada Allahu bihi*" when approaching Mount Safa.
- Walk normally when passing the path between Mount Safa and Mount Marwah. This is except for male pilgrims, who are sunnah to jog or walk quickly when passing the green light, while female pilgrims are not sunnah to jog.
- When climbing Mount Safa, face the Qibla and recite:

اللَّهُ أَكْبَرُ، اللَّهُ أَكْبَرُ، اللَّهُ أَكْبَرُ، لَا إِلَهَ إِلَّا اللَّهُ وَحْدَهُ لَا شَرِيكَ لَهُ، لَهُ الْمُلْكُ وَلَهُ الْحَمْدُ وَهُوَ عَلَى كُلِّ شَيْءٍ قَدِيرٌ، لَا إِلَهَ إِلَّا اللَّهُ وَحْدَهُ، أَنْجَزَ وَعْدَهُ وَنَصَرَ عَبْدَهُ، وَهَزَمَ الْأَحْزَابَ وَحْدَهُ
- Read verses from the Koran or pray for the safety of the world and the afterlife when walking between Mount Safa and Hill Marwah.

- e. Carrying out the procedures of sa'i in sequence or muwalat without stopping unless there is an excuse or obstacle. (Kementerian Agama, 2023)

Tahallul

Tahallul is shaving/cutting the hair on the head as a sign that a person is permitted or halal to do things that were previously not permitted during the ihram period. (Kementerian Agama, 2023) Shaving can be done by shaving baldly (Tahliq) and this is more perfect or can also be shortened (Taqshir). For women, when tahallul it is enough to just cut your hair to the length of your fingertips. Apart from that, it must be cut by another woman or her mahram, such as her husband, child or other mahram. Apart from that, it is also not permissible to cut it by a man who is not the mahram. (Zainuddin, 2016)

Tartib

The final pillar of Umrah is *tartib* or sequence. Orderliness means performing the pillars of Umrah as mentioned above, in sequence, starting with ihram, tawaf, sa'i, and then tahallul. Once these are completed, the Umrah ritual is complete. Pilgrims may remove their ihram garments and put on their normal attire.. (Zainuddin, 2016)

Augmented Reality as an alternative learning medium

Learning media is constantly evolving over time. The use of learning media significantly assists the process of religious learning. (Hartawan et al., 2021) Technology makes it possible to blend the real world into the computer world through Augmented Reality (AR). Augmented Reality (AR) is a technology used to simultaneously bring a virtual world into the real world.(Alfitriani et al., 2021)

Augmented Reality was popularized by Thomas Preston Caudell, a Boeing researcher, who built an AR application for the industry that was used to view assembly diagrams. (Arena et al., 2022). Simply, AR is physical reality accompanied by the appearance of virtual elements. It's a combination of the real world and the virtual world. (Arena et al., 2022).

Recently developed Augmented Reality has several types. Some applications of Augmented Reality technology include marker-based AR (image recognition); AR not based on markers (such as GPS, digital compass, speedometer/location); AR based on projections; and AR based on overlaps. (Arena et al., 2022)

The application of Augmented Reality technology is also expected to help students to provide a more easily understood picture at school. (Arena et al., 2022)

One application of Augmented Reality technology is in Umrah learning. Saputro's research attempts to apply Virtual Reality (VR)-based Umrah learning to facilitate students' immersion in Mecca performing the Umrah pilgrimage. (Saputro et al., 2023) Animra developed Umrah learning media with VR through the MilleaLab

platform. (Animra & Ahmad, 2025) Virtual Reality is a digital space that previously contained data and objects that were formed virtually so that they match the original objects. (Yaqin & Tholib, 2022)

Setiawan said VR technology can increase effectiveness when compared to conventional methods. (Setiawan et al., 2024) Meanwhile, Shofiyuddin is more focused on developing an Augmented Reality module to help effectively learn Umrah material. (Shofiyuddin et al., 2024) Overall, the AR module not only enriches the Islamic learning process, but also increases students' readiness to utilize digital technology effectively in everyday life. (Shofiyuddin et al., 2024)

Augmented reality-based learning differs from conventional learning models like lectures or presentations, which are less engaging because students cannot directly observe what the teacher is explaining. This makes it difficult for participants' or students' imaginations to align with the images presented. (Sya'roni & Yanuar, 2022) Augmented reality allows students to experience interacting with three-dimensional objects in a more immersive, realistic way, as if they were in a real environment. This makes Umrah material easier for students to remember. (Shofiyuddin et al., 2024) In addition, the integration of Augmented Reality into learning makes learning more dynamic, creative and experience-based as well as student engagement. (Shofiyuddin et al., 2024)

Firmanda attempted to create an Umrah learning application using Android Studio using an HTML menu display. This application allows for the display of images, text, animations, and audio to aid understanding. (Firmanda et al., 2016)

The basis of using AR is the connection between user interaction and devices, both in the real world and the virtual world generated by the interaction of electronic devices. (Arena et al., 2022) For example, in Munawir's research, he combined Islamic jurisprudence learning with the help of Augmented Reality-based e-books that combined two-dimensional objects with three-dimensional objects. (Munawir, 2025)

In the era of globalization, media limitations can be addressed by utilizing cutting-edge technology such as augmented reality in various functions, including providing learning experiences that help bring objects that are difficult to visit in cyberspace into the real world in real time. (Faisal & Fakhrunnisaa, 2025) Several methods such as User Centered Design (UCD) are used to design multimedia applications according to user needs. (Utomo, 2019).

AR-based Umrah Application Design Concept

Augmented Reality-based Umrah applications are undergoing considerable development from various perspectives. This is crucial to ensure the application has a strong foundation and is easy for users to understand. Therefore, the basic concept

must be thoroughly refined through a gradual process. This research focuses on the design of an Augmented Reality-based Umrah application.

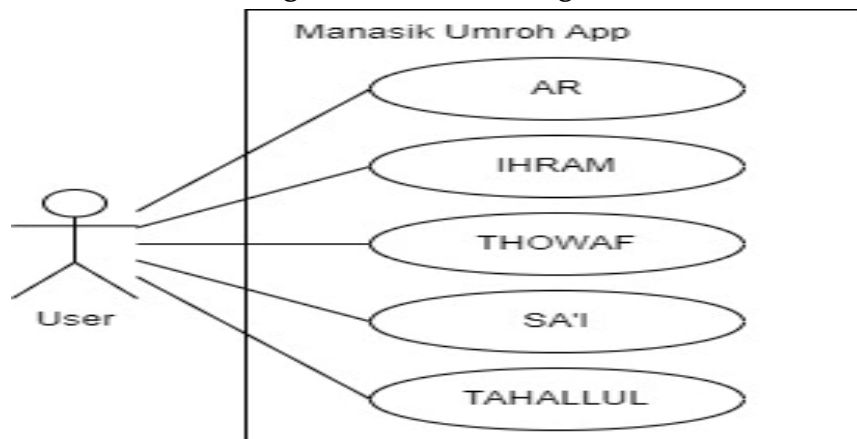
Augmented Reality is an application that tries to present physical reality and users can also access virtual reality. (Arena et al., 2022) In other words, Augmented Reality can insert virtual objects into the real world using devices like webcams, computers, or mobile phones. This display can help users obtain more comprehensive and realistic information, as if the object were actually present in front of them. For example, someone performing the tawaf (circumambulation) appears as if they were directly in front of the Kaaba. (Utami & Nadziroh, 2019)

After gathering all the data, the researchers designed an application that complies with the procedures and pillars of Umrah. The steps included creating use case diagrams, activity diagrams, sequence diagrams, flowcharts, application design, 3D modeling, marker creation, and processing in the Android application.

1. Creating use case diagrams, activity diagrams, sequence diagrams and flowcharts, they are made using the website. <https://app.diagrams.net/>.

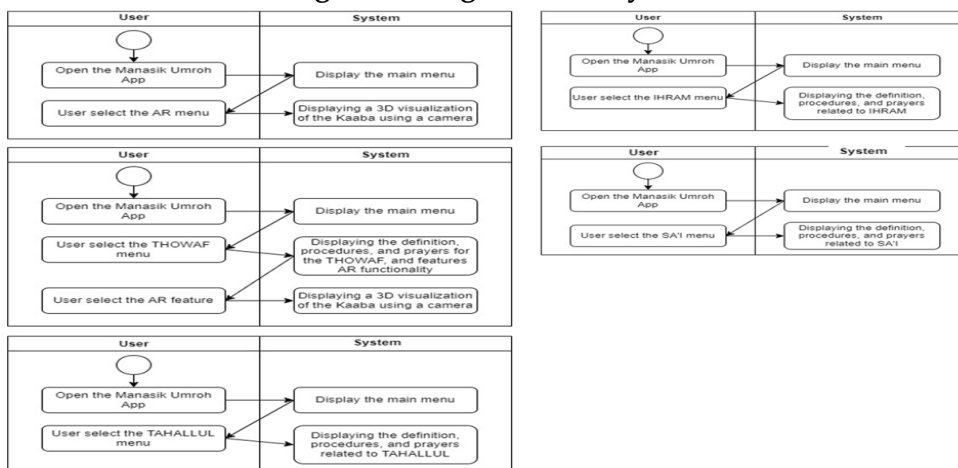
a. Use Case Diagram

Figure 3. Use Case Diagram



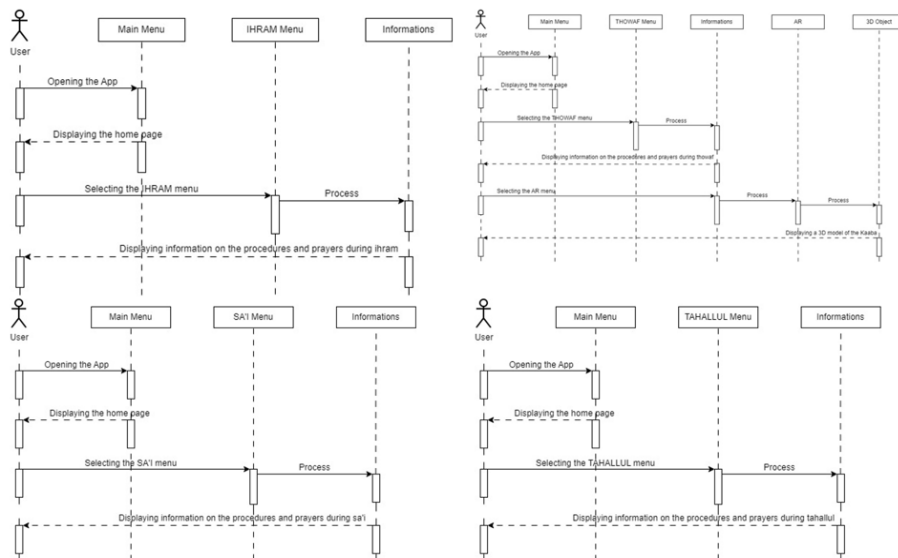
b. Diagram Activity

Figure 4. Diagram Activity AR



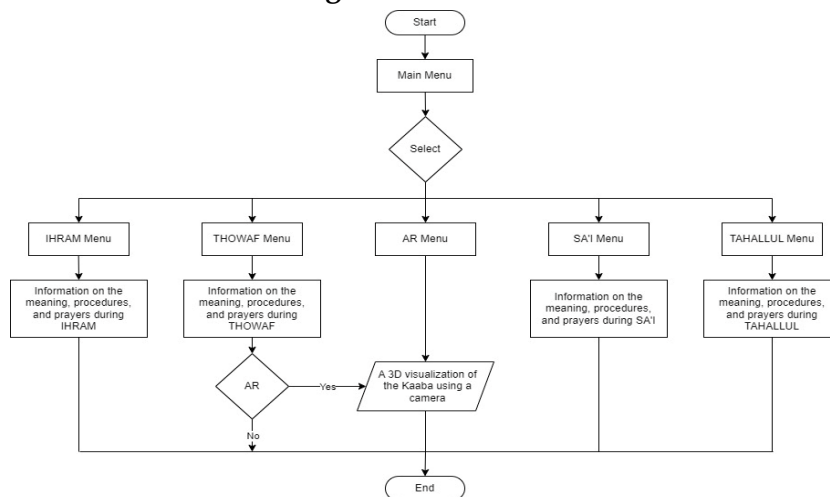
c. Sequence Diagram

Figure 5. Sequence Diagram



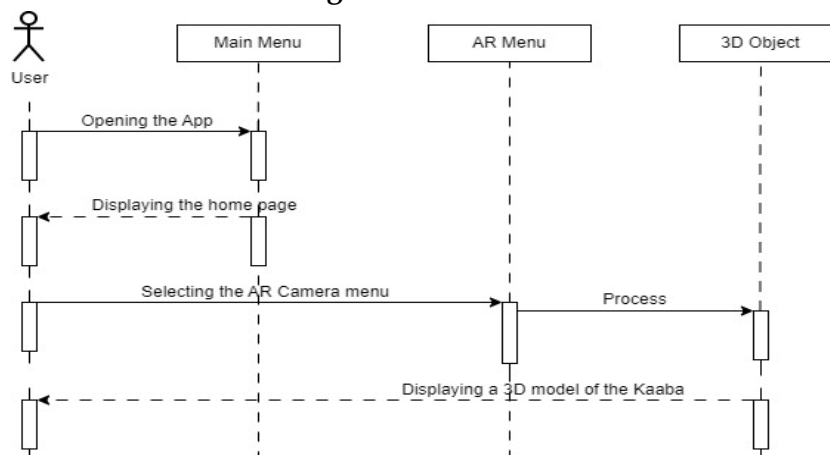
d. Flowchart

Figure 6. Flowchart



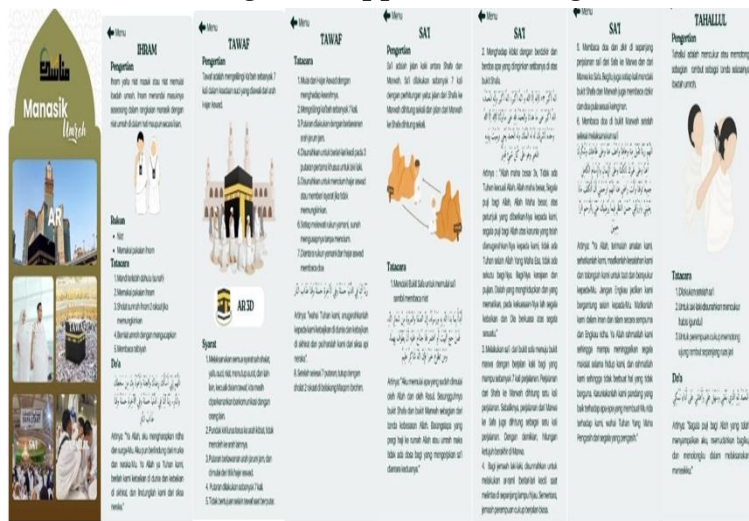
e. AR Menu

Figure 7. AR Menu



- The design of the Umrah pilgrimage application was created using Canva software which will later be realized in programming code.

Figure 8. Application Design

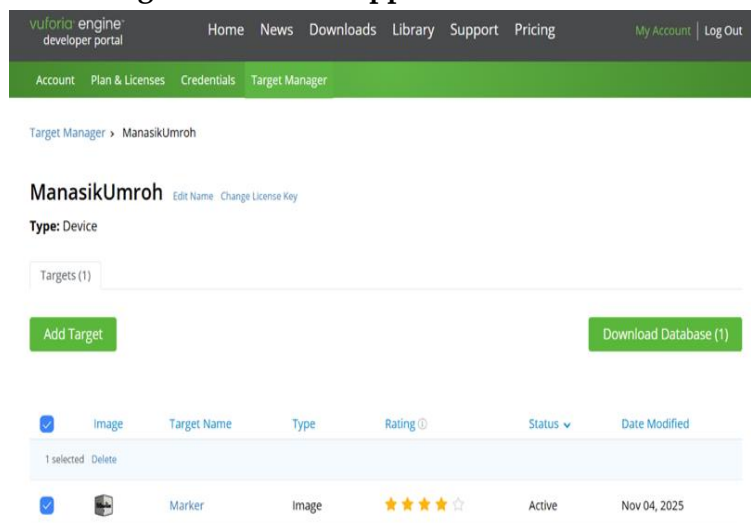


- Augmented Reality in the Umrah pilgrimage application is created using Unity 3D software which requires the Vuforia SDK package so that the application can recognize images as markers.

The first step in creating an AR Umrah ritual is to create a marker or target image from an image uploaded to the website <https://developer.vuforia.com/> on the target manager menu and generate database.

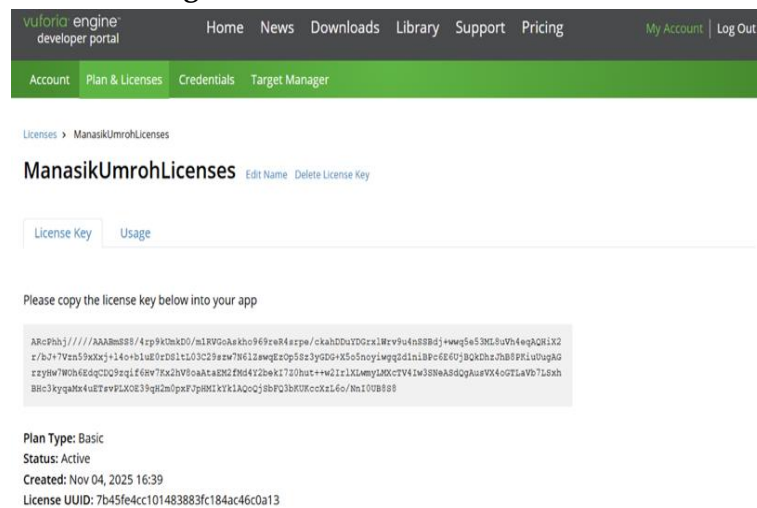
After creating the database, next upload the image that will be used as an AR marker.

Figure 9. Vuforia Application Initial View



After the package is finished being created, next download the database package and go to the plan & licenses menu to create a license for the Umrah manasik database.

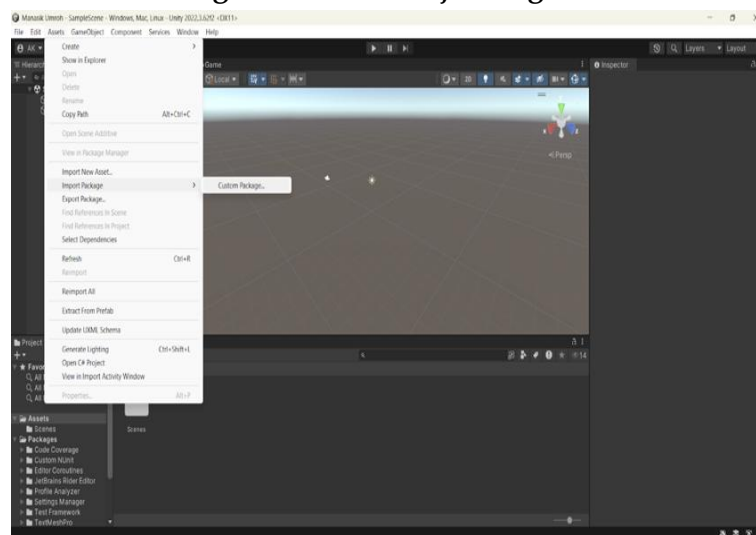
Figure 10. Menu Plan dan Licences



4. Creating Augmented Reality in the Unity 3D application

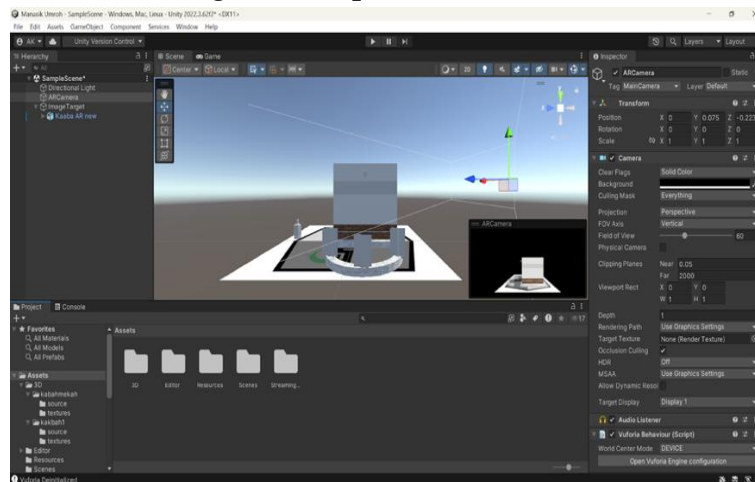
The first step is to create a new 3D project in Unity 3D. Open the project, then import the Vuforia SDK package file and the database you created to detect images as markers, and import the 3D Kaaba model assets.

Figure 11. New Project Page



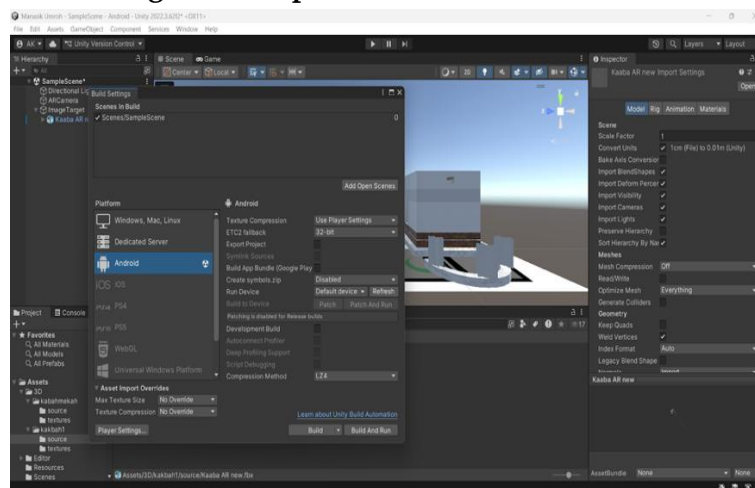
After that, input the AR camera on the work page, then input the marker and 3D Kaaba model assets on the target image that will be displayed in AR, then adjust the size and position of the image and AR camera.

Figure 12. Input AR Camera



- Export and build the AR file that has been created as an apk file that will run on the Android operating system.

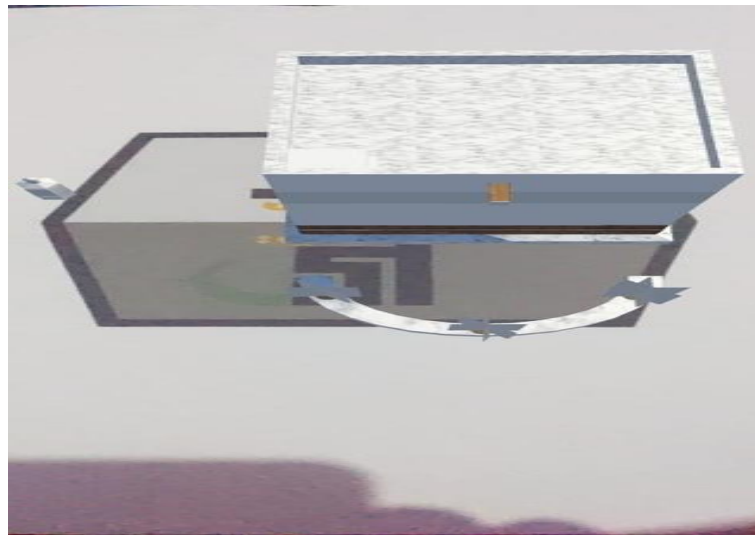
Figure 13. Export and Build AR Files



- Once the application is built, it will generate an Android package (APK) file. This APK file is ready to be installed and used on Android-based devices.

Figure 14. APK File

Name	Date modified	Type	Size
.vscode	10/11/2025 23:36	File folder	
Assets	11/11/2025 02:44	File folder	
Library	11/11/2025 02:45	File folder	
Logs	11/11/2025 02:34	File folder	
Packages	10/11/2025 23:53	File folder	
ProjectSettings	11/11/2025 02:44	File folder	
QCAR	11/11/2025 00:26	File folder	
Temp	11/11/2025 02:44	File folder	
UserSettings	11/11/2025 02:34	File folder	
ARproject.sln	11/11/2025 02:44	SLN File	1 KB
Assembly-CSharp	11/11/2025 02:34	C# Project Source ...	64 KB
Assembly-CSharp-Editor	11/11/2025 00:27	C# Project Source ...	70 KB
ManasikUmroh.apk	11/11/2025 02:44	APK File	59,512 KB

Figure 15. Kaaba Image Output

Thus, after all the processes have been input, a limited trial is carried out on respondents. The evaluation results from the trials then become input for developing and improving the application so that it becomes even better and meets user needs.

CONCLUSION

This research contributes to an application that is able to describe each series of Umrah pilgrimages interactively in the form of 3D objects on the device, thus providing a learning experience that is more immersive, flexible, and easy to understand compared to conventional learning methods. The limitation of this research is that it is only in the design stage, not yet at the creation and implementation stage in the field. Recommendations for further research include developing AR and Virtual Reality (VR) based Umrah applications to make it easier for prospective Umrah pilgrims to understand the concept of worship easily so that they can carry out the worship easily and without experiencing difficulties in the holy land. This research contributes to the development of Islamic applications, making it easier for Muslims to learn the procedures for the Umrah pilgrimage. A limitation of this research is that the application has not yet been fully developed.

AI USE DECLARATION

This section states that during the preparation of the article, the author used Grammarly for writing layout. After using this tool/service, the author reviews and edits the content as needed and takes full responsibility for the content of the publication.

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