ARGYM: AN AUGMENTED REALITY OF GYM EQUIPMENT

A Capstone Project
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In Partial Fulfillment of the Requirements
for the Degree Bachelor of Science in Information Technology
(Specialized in Multimedia Technologies)

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APPROVAL SHEET

In partial fulfillment of the requirements for the degree Bachelor of Science in Information Technology(Specialized in Multimedia Technologies), this capstone project entitled **"ARGym: An Augmented Reality of Gym Equipment"** is submitted by **Arthur C. Azul, Joy Marie D. Manansala, John Ivan Serrano and Rennier P. Epiz** and is hereby recommended for oral examination.

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Adviser

Defended in an oral examination before a duly constituted panel with a grade of _____.

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Lastly, to our classmates, friends, and family for giving us inspiration and support to finish this paper.

DEDICATION

This humble piece of work is dedicated to the authors' family, friends, classmates, and the lord Almighty

Arthur

Rennier

Joy Marie

John Ivan

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ARGym: An Augmented Reality of Gym Equipment

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ABSTRACT

This study entitled, "ARGym: A Mobile Augmented Reality Application of Gym Equipment", is developed to help people know the basic equipment found inside a Gym. The application developed utilized augmented reality (AR) through the use of a print-out image of the equipment. Aside from augmenting gym equipment, it also provides information about the equipment with a video clip on how to use it. It aims to help those who are a hesitant to use the gym equipment more specifically, first time users. Also, it gives an alternative way of viewing the equipment and some entertainment through enhancing its equipment model and putting together the elements of multimedia. This application is created in Unity 3D, Blender, Vuforia and Adobe Photoshop. The programming used is C# language. It is an offline application that can be accessed only by android users.

Keywords: Augmented Reality, Gym equipment, Mobile Application

1.0 INTRODUCTION

Rationale

The effects of technology in people's lives can cause a favorable response which can bring big changes and lots of opportunities to them. [1] Living a life with technology nowadays, make it easier for people to learn a lot around them. This application will provide information that will help a person know the basic gym equipment found inside a Gym.

ARGym (Augmented Reality of Gym Equipment) is a mobile application that provides information on the common gym equipment and be familiar with it even without the use of internet for searching. Also, it has a video clip that demonstrates users on how to use the equipment properly.

This application was proposed based on the researchers' experience of having trouble using the various gym equipment for the first time. Apparently, it takes time and courage to know the different equipment and use it individually. So it is time consuming to use internet to search for gym equipment purpose and function and encounter slow internet connection. Becoming like a fool inside a gym will result to went out immediately that result to never come back.

Goldman (2017) recommends some best fitness books that will help motivate a person to learn tricks and tips and do it in a week of workout. [2] Even though, he is bombarded with many requirements before going to the gym, he still end up being fooled by equipment and it's not worthy of being in disguise of working out. This is where the application called "ARGym" comes in.

ARGym (Augmented Reality of Gym Equipment) is a mobile application that provides information on the common gym equipment and be familiar with it even without the use of internet for searching. Also, it has a video clip that will help in using the equipment.

In developing the application, the researchers utilize Unity 3D for prototype, Blender for creating 3D model, Vuforia for linking the target equipment, Adobe Photoshop for creating the logo and design of the application including the buttons to be used and lastly, the Visual Studio 2017 for coding.

ARGym (Augmented Reality of Gym Equipment) is an offline-based

application that features the information about the gym equipment, with a demo of video clip and its augmentation. It also has a print-out image that is used to augment the equipment. This application, however, is only applicable to android user. This application can be use inside a gym. A gym owner can provide print-out image on each gym equipment so that a first-time user will know each gym equipment.

1.1 Objectives of the Study

This study entitled "ARGym: A Mobile Augmented Reality Application of Gym Equipment" aimed at attaining the following objectives:

1. To develop an augmented reality of gym equipment.
2. To present the user with information on the gym equipment without the help of internet and/or trainer.
3. To demonstrate the use of gym equipment.

2.0 LITERATURE REVIEW

Augmented Reality

According to Pastrana (2018), AR is an advanced technology that can be used by students and apprehensive users compared to virtual reality. The benefits of augmented reality include helping to take a collaborative of student that can use in future technology and support more AR experiences that today technology can't comprehend. [3] Since AR can be adopted by students and other users, the researcher's developed the "ARGym" utilizing augmented reality that augments gym equipment using camera phones. Through this application, a user may experience a unique entertainment through augmenting gym equipment specifically for first time gym users.

AR may not be as great as VR (virtual reality) but it is widely used by people nowadays. Users, experience AR through social media filters, and surgical procedures which gives entertainment and procedures to operate human organs. It is enhanced by direct or indirect viewing of things that uses multimedia elements.[4] The researchers' presented "ARGym" in line with augmented reality application that enables a person to be familiar with the different equipment inside a gym, which is beneficial for first time users. With the use of ARGym application, a person can do the work-out alone and know gym equipment function even on first day at the gym.

Goldie (2017) mentioned that a person can be familiar in AR if they experience and know the game Pokemon Go. Developing AR applications works with smartphone sensor and a horizontal surface that will fix 3D objects around the surfaces. [5] The researcher developed a mobile application suitable only in android phones. It will augment the 3D objects created in Unity 3D through the use of print-out target image and camera. However, it isn't a kind of the usual game but more of a helpful app that will be used inside the gym It will enables the user to know the kind of equipment and its use.

Siegal (2019) discussed the new Google Search as Augmented Reality that features animals. It is available in android phones equipped with ARCore and also in iPhone with ARKit but still features animals that are limited. [6] The researcher's application on the other hand, features gym equipment that are commonly used by people. It is a mobile application that is only available in android phones.

Gym Equipment

According to Waehner (2018), there are many things that a person will encounter first time in the gym. He also gave tips and guides on how to do it by getting some orientation from the gym place. He also provided information of the equipment that are commonly used inside a gym. [7] The researchers' developed an application that will give an easy way for first-time users to be familiar with a particular gym equipment. It has features like information on the equipment, a video clip where the user will be aware of how to use the equipment and an AR view to help the user to become more familiar with it. This application is a guide to have a better encounter and become informed of what gym equipment to use specifically, for a first-time user.

Williams (2019) cited the things that matters in a person who's a first time user at the Gym. She provides basic guidelines and tips on how to use correctly the equipment that benefit mostly beginners. [8] The researchers' developed ARGym for people to be aware of the equipment inside the Gym. It provides a video clip which the viewer will use to avoid being hesitant to use and encounter a gym equipment for the first-time.

According to Lane (2016), the journey of understanding the different gym equipment seems to be daunting in the

beginning. It says that visiting in public nor private gym fitness as a beginner will be like “matrix” where there are dozens of machines that are around the venue making the person will hesitant to conquer them all. [9] ARGym application goal is created to help people become familiar and knowledgeable with a particular gym equipment as well as to teach them to use the equipment. It is a new way of guiding the user without manuals or searching in the internet.

Augmented Application

In an article written in New Gen Apps (2019) the challenges of developing augmented reality applications were discussed. AR has made every industry get better in a way of gaming, mobile application developing and e-commerce. It is said that AR anticipate $15 billion by 2022. [11] As AR become widely used technology, the researchers’ choose to develop ARGym the AR which will augment gym equipment through mobile phones and other use handheld devices. It will be easy for the user to know the equipment as this application is available offline for augmenting equipment.

According to Perdue (2019), AR applications is an evolving technology that has been around for years. It is equipped with GPS, camera, and AR capability that augments its own. It isn’t use only for games or business but also for medical purposes such as surgeries. [10] The researchers came up with the idea of augmented reality to give another way of entertaining the user to view common equipment. Hence, it will not just be helpful for beginners but also for the whole gym users.

According to Jansen (2018), AR is a futuristic technology that has been around for years. He discussed the things that are part of AR such as gamut that is from map overlays and virtual showrooms where it is a battle of multiplayers. Pokemon Go is the most common familiar AR application where it uses GPS to mark location and move the in-game avatar. [12] The most common by AR developed are games that gives entertainment and reason for people to go out in real world. Hence, the researcher’s application was developed through AR not just to augment equipment but to give entertainment to users and also find their way to learn gym equipment.

In the previous study by De Castro, Enriquez, Galicha and Maala (2018), they developed an application aimed to provide

another way of learning by giving entertainment to students specifically, those who take chemistry. [13] On the other hand, the researchers developed ARGym to help people specifically first time users to be familiar with the common gym equipment and give entertainment that will benefit not just the beginners but the gym users as well. It is also a new way of familiarizing oneself with the gym equipment that will help users improve their daily exercise or workout.

In the previous study by Albano, Almazen, Formelejo, Morada (2017), they developed on the study guide and recipe sheet for CITHM students of LPU-Batangas taking culinary arts and other programs as well. This application gave interactivity of experience to teach the students and also other persons who are interested in cookery. [14] The researchers' application on the other hand, enhanced the way of viewing gym equipment and provided information that can help the user, know some common equipment with a video clip on how to use it. It is not only gave interactivity to students who want to learn how to use a gym equipment but also some entertainment while viewing it.

3.0 METHODS

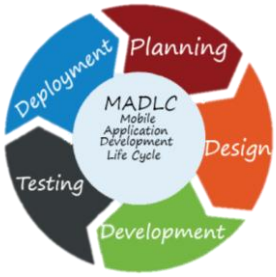

Figure 1: Mobile Application Development Cycle

To build and develop an application isn't easy. It involves pre-planning where the goal is for the application to function and achieve the satisfaction of the user. The researchers used AR, an application which augment the common gym equipment and has other features such as information about the equipment and a video clip on how to use it.[15] To build the application, the researchers used a cycle through Mobile Application Development Life Cycle (MADLC). Since the goal is for the app to function and achieve the layout chosen, the researchers follow the step by step process which consists of planning, design, development, testing, and deployment.

Planning

In this phase, the researchers had a brainstorming of what application to

develop that can help the users. They asked previous groups who experienced doing a capstone. They also conducted research in the library to have an idea about the topic. After creating the concept of “ARGym”, the researchers consulted their adviser, Mrs. Melody Dimaano. During the consultation, the researchers and their adviser discussed the pros and cons of the proposed topic. Also they identified who will be the user as well as the specs of the hardware and the software to be used. It took them time to consider the approval of their adviser. After the consultation with their adviser, the group submitted the topic to the Dean, Mrs, Roselie B. Alday for approval.

Next, the researchers conducted an interview with the Gym coordinators and owners of Aesthetic Fitness. The interview was conducted by the group to have an idea of what features to be included in the application.

Design

In this stage, the researchers created the background that would fit in the application, buttons for gym equipment and the about button that will be put on the application prototype. The researchers used Adobe Photoshop software for creating the background and buttons and Unity 3D for creating 3D images that will be used for augmentation of the equipment.

Development

Next, the researchers created the application through Unity 3D. The group made a prototype of the application and put together the created background and buttons and started to code using the software Visual Studio and C# for coding. The application can be used offline and is available for android users only.

Testing

The prototype testing is performed on an emulator or simulator and it is often provided in SDK. If the application is already done, it would be the last phase where the researchers attempted to debug the whole program to determine the errors and complications. They also did some tests to distinguish if it is working properly in different android phones. All the features inside the application must be in good working condition.

Deployment

Once the testing is done, the application is finished and can now be deployed to customer.

4.0 RESULTS AND DISCUSSIONS

Flowchart

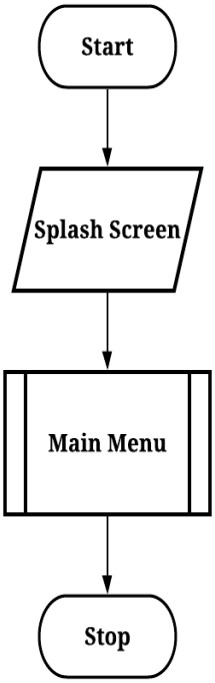

Figure 2: Splash Screen

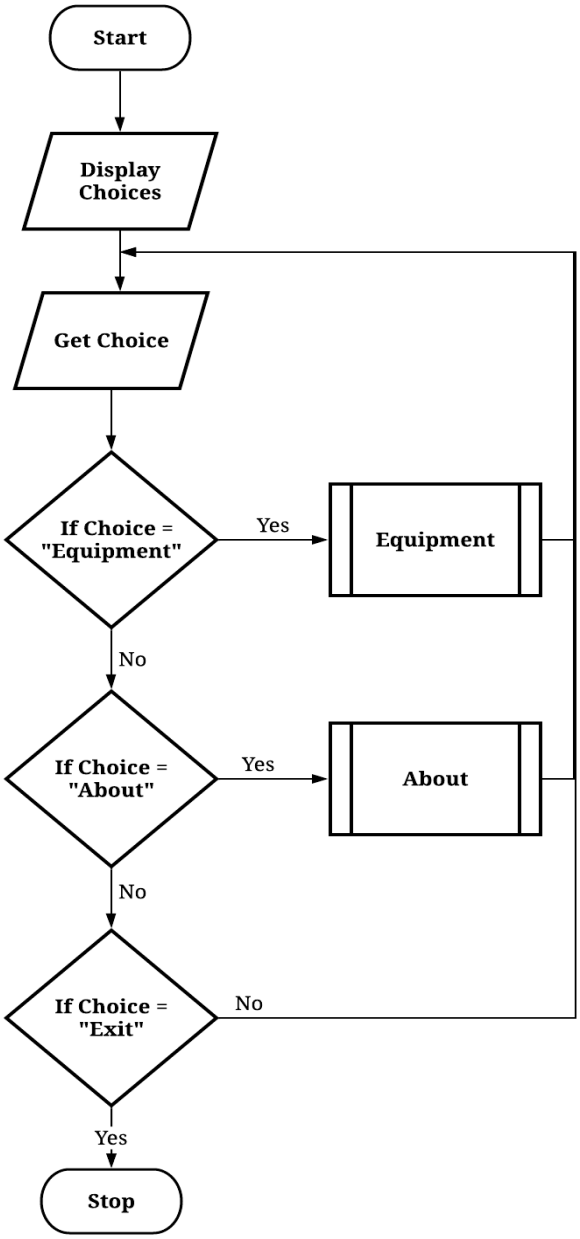

Figure 3: Main Menu

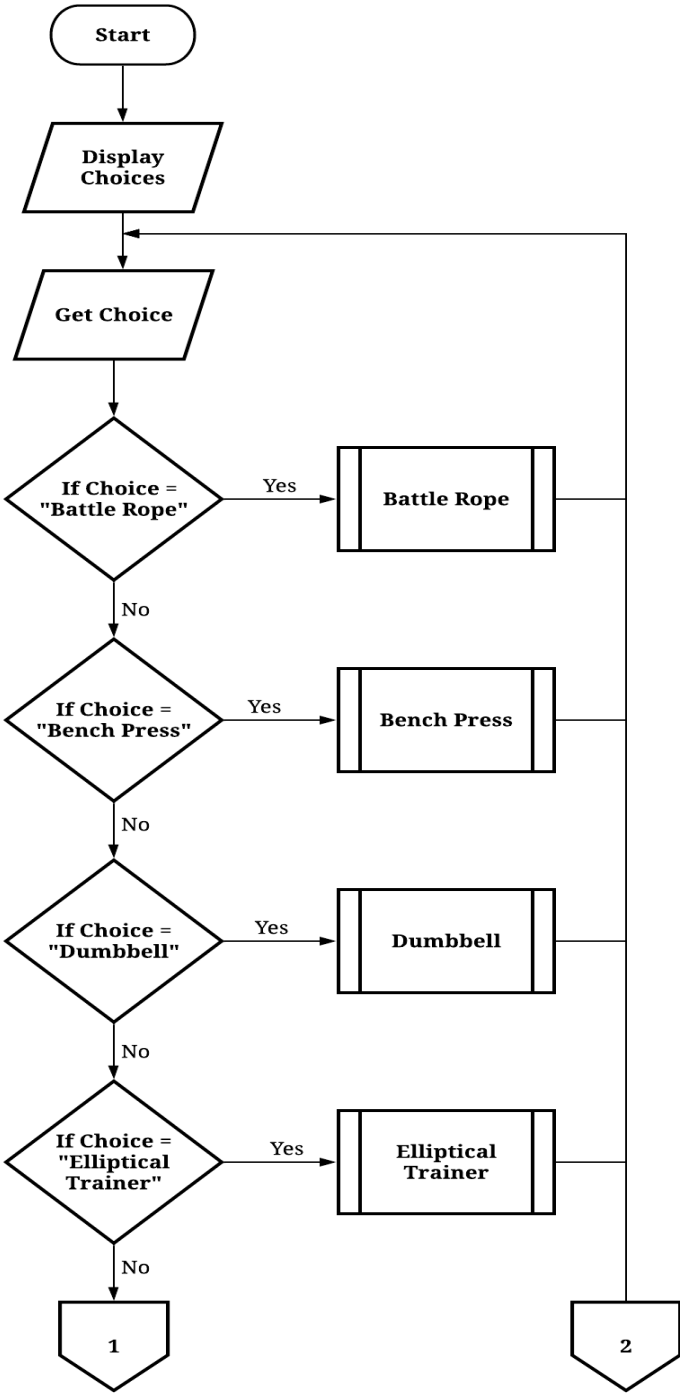

Figure 4.1 Equipment

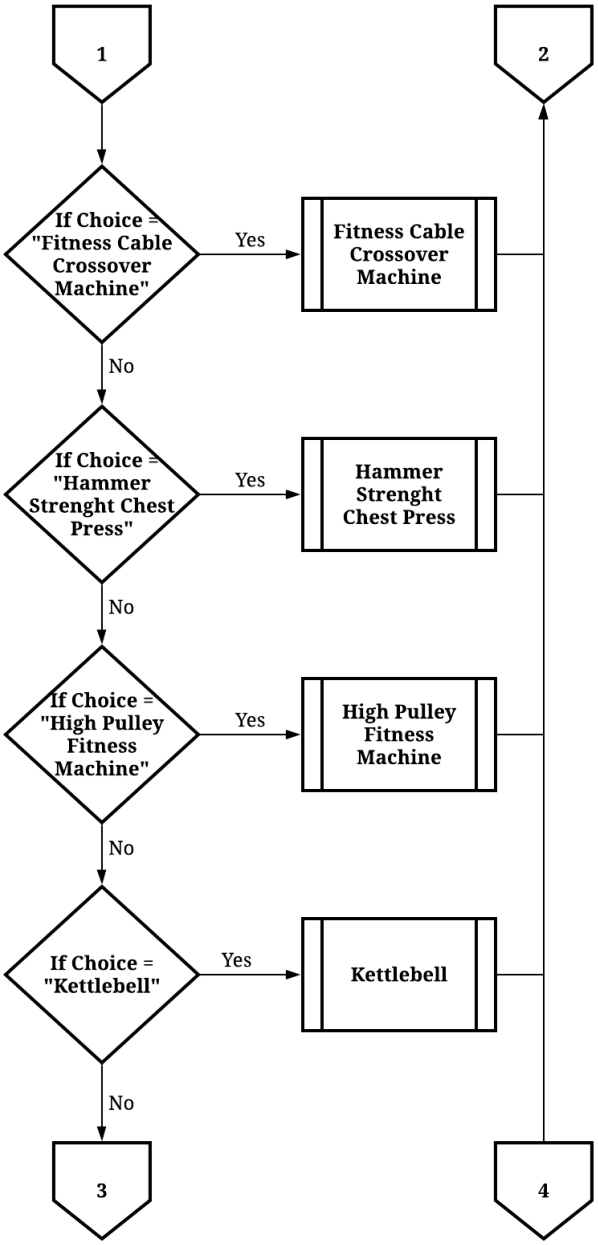

Figure 4.2 Equipment

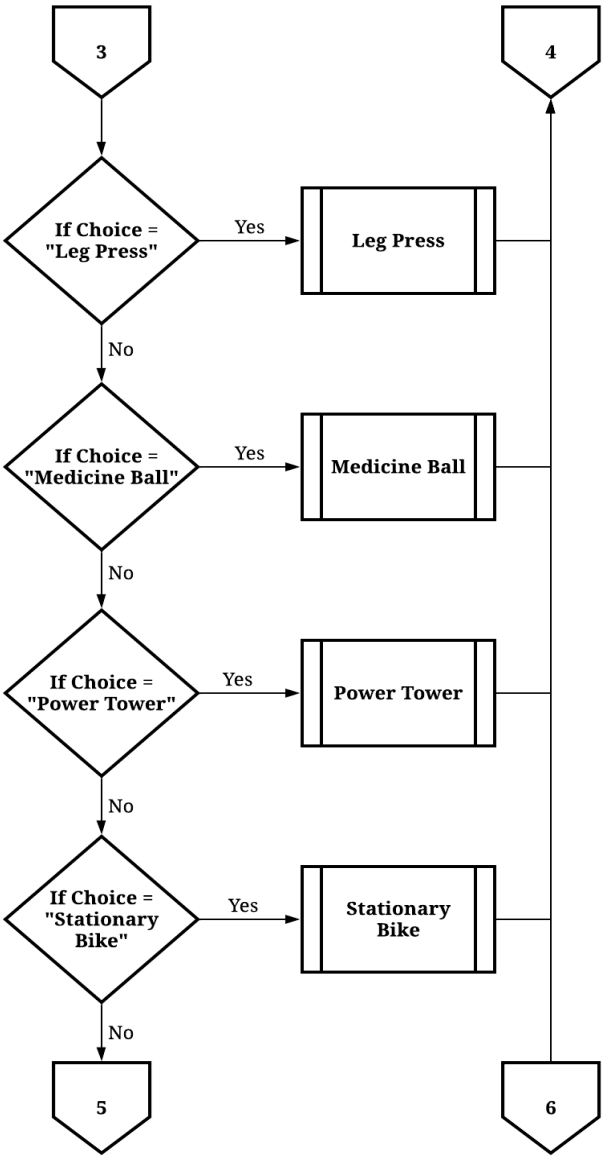

Figure 4.3 Equipment

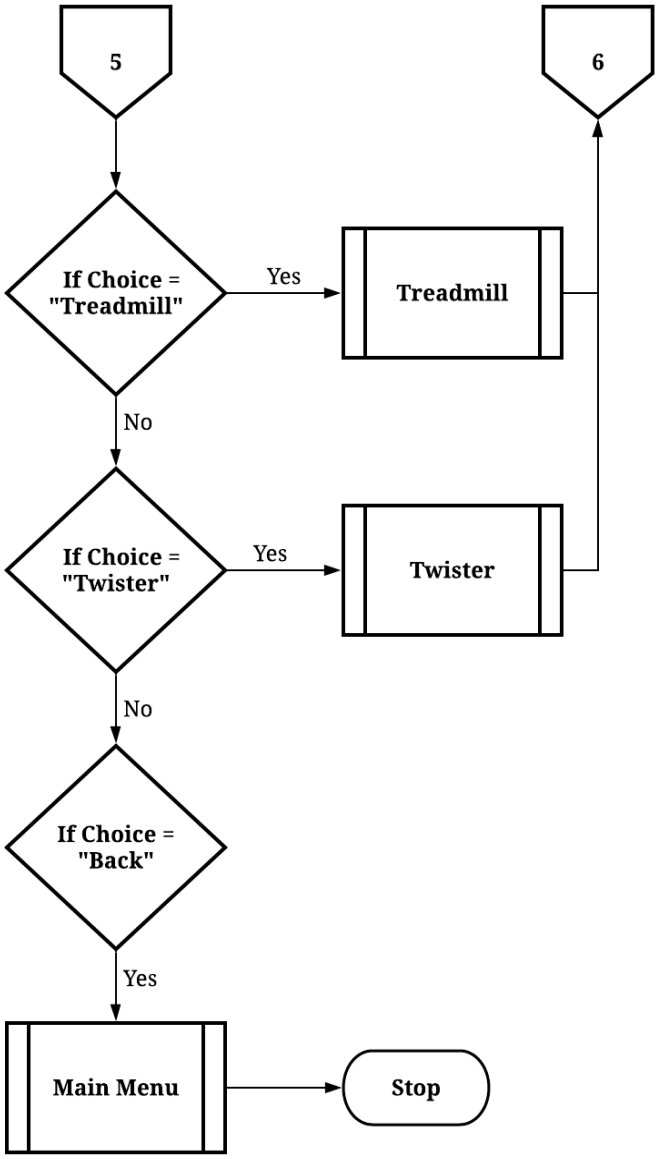

Figure 4.4 Equipment

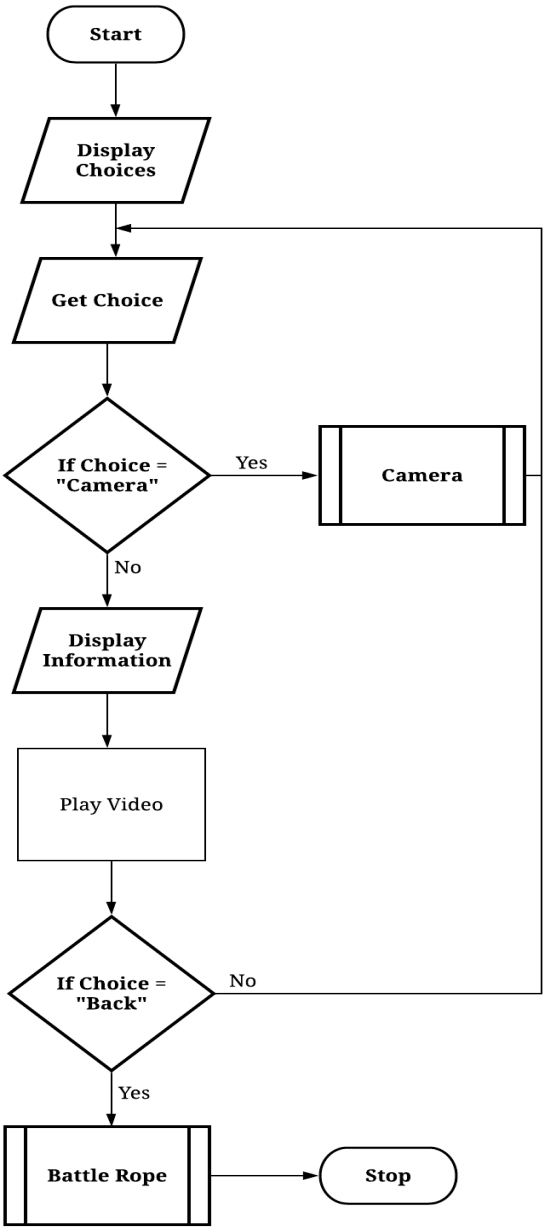

Figure 5: Augmented Reality of Gym Equipment

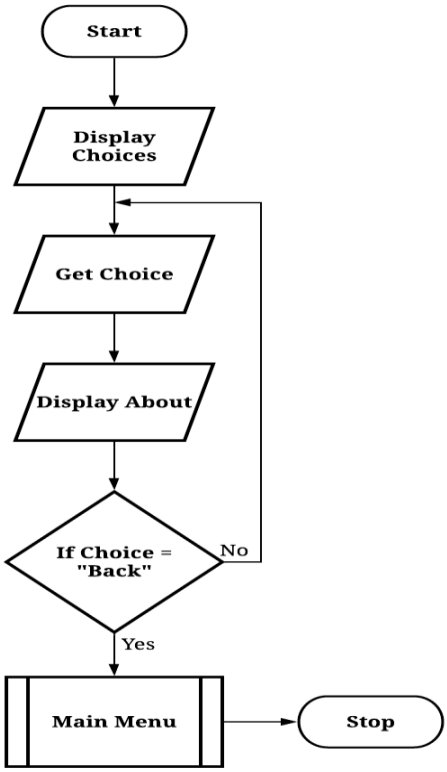

Figure 6: About

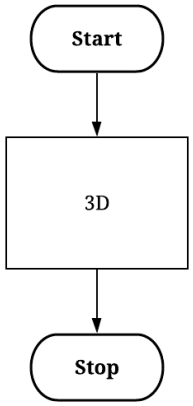

Figure 7: Camera

SCREENSHOT

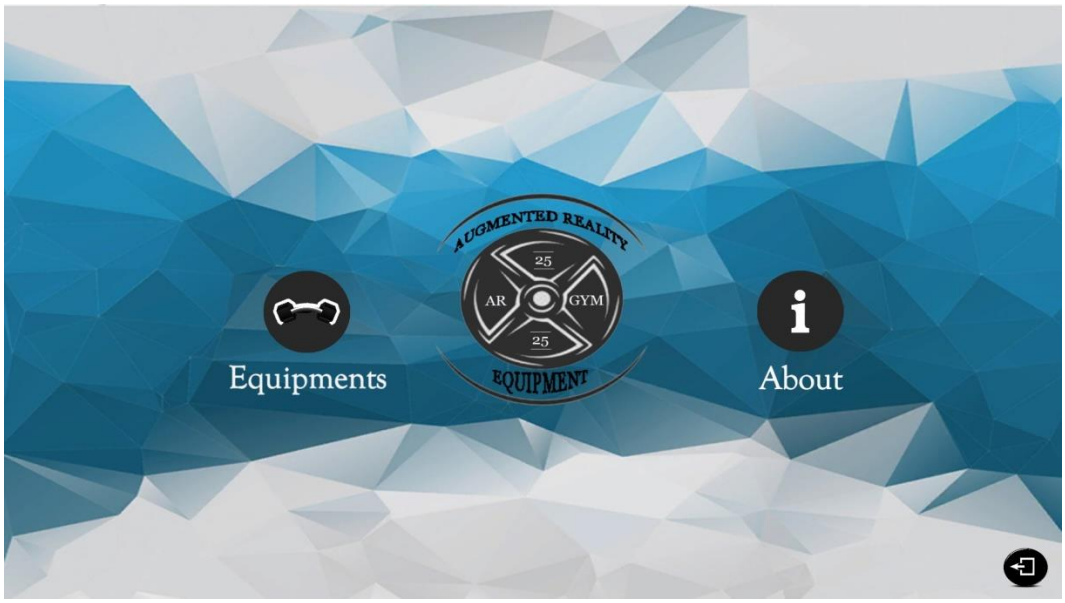

Figure 8: Main Menu

This figure shows the main menu, the equipment button and about button

Figure 9: List of Equipment

This figure shows the content of the equipment button such as the common type of gym equipment.

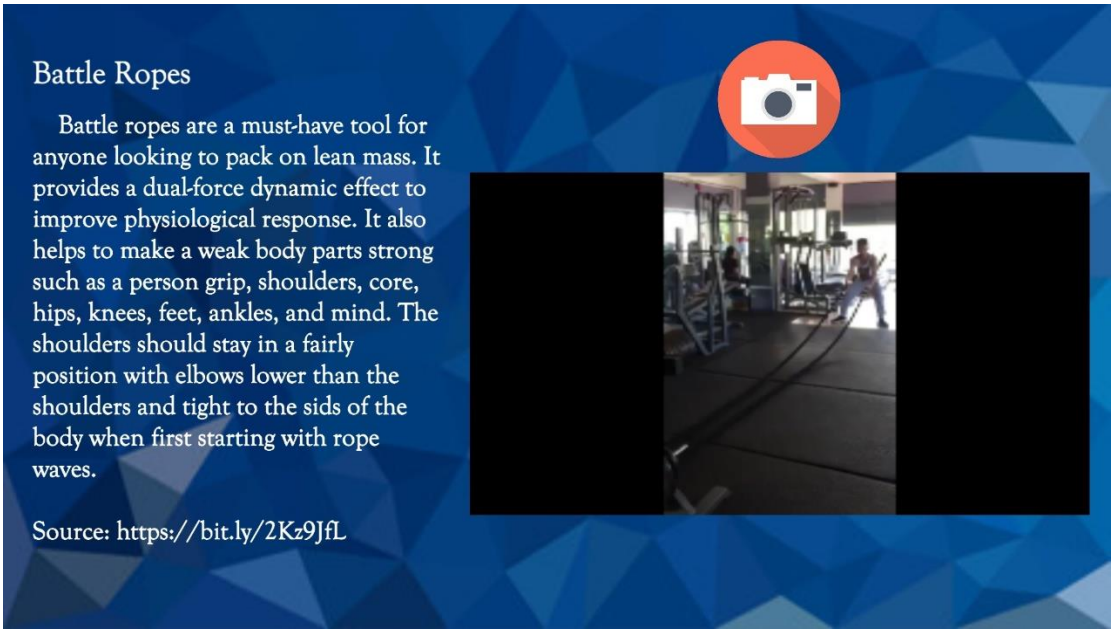

Figure 10: Features of Equipment

This figure shows the equipment information, video clip and a button that augment the equipment.

Figure 11: Augmented Reality of Equipment

This figure shows the augmentation of the equipment.

Figure 12: About Button

This figure shows the information about ARGym and its developers.

5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

This application entitled “ARGym: A Mobile Augmented Reality Application for Gym Equipment” is a mobile application developed using Unity 3D, Blender and Adobe Photoshop. It provided a 2D image for augmenting the equipment. It is developed to help people specifically those first-time users to know common gym equipment. It also provided information about the equipment with a video clip. It also gave some entertainment in viewing the equipment using AR. The application works with android phones only and does not require internet connection to access the video clip.

CONCLUSIONS

Based on the development of the “ARGym: A Mobile Augmented Reality Application for Gym Equipment”, the following conclusion were drawn:

1. To build and develop augmented reality of gym equipment it would take time and management to tally common gym equipment and know its function and uses.
2. With ARGym application features, it will present gym equipment in a new way and provides entertainment to the user as well as information on its uses.
3. Demonstrating the uses of equipment will help users to be more familiar and willing to go to the gym.

RECOMMENDATIONS

Based on the conclusions the following recommendations are hereby forwarded:

1. Developers can upgrade the information of the gym equipment as well as conduct research for other gym equipment that are unknown to many.
2. Developers can add some more features about the gym such location and a full video of its uses.
3. Future developers may create the application available to any operating system like iOS.

APPENDICES

A. CODE LISTING

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.SceneManagement;

public class links1 : MonoBehaviour
{

    void Start()
    {

    }

    {
        if
(Input.GetKeyDown(KeyCode.Escape)) {

SceneManager.LoadScene("equipments");
        }

    }
    public void back()
    {

SceneManager.LoadScene("equipments");

    }
    public void about()
    {
        SceneManager.LoadScene("about");
    }
    public void e1()
    {
        SceneManager.LoadScene("e1");
    {
    }
    public void e3()
    {
        SceneManager.LoadScene("e3");
    }
public void e4()
    {
        SceneManager.LoadScene("e4");
    }
    public void e5()
    {
        SceneManager.LoadScene("e5");
    }
    public void e6()
    {
        SceneManager.LoadScene("e6");
    }
    public void e8()
    {
        SceneManager.LoadScene("e8");
    }
    public void e9()
    {
        SceneManager.LoadScene("e9");
    }
    public void e10()
    {
        SceneManager.LoadScene("e10");
    }
    public void e11()
    {
        SceneManager.LoadScene("e11");
    }
    public void e12()
    {
        SceneManager.LoadScene("e12");
    }
    public void e13()
    {
        SceneManager.LoadScene("e13");
    }
    public void e14()
    {
        SceneManager.LoadScene("e14");
    }
    public void e15()
    {
        SceneManager.LoadScene("e15");
    }
    public void e16()
```

```
{
    SceneManager.LoadScene("e16");
}
public void ar1()
{
    SceneManager.LoadScene("ar1");
}
public void ar3()
{
    SceneManager.LoadScene("ar3");
}
public void ar4()
{
    SceneManager.LoadScene("ar4");
}
public void ar5()
{
    SceneManager.LoadScene("AR5");
}
public void ar6()
{
    SceneManager.LoadScene("ar6");
}
public void ar8()
{
    SceneManager.LoadScene("ar8");
}
public void ar9()
{
    SceneManager.LoadScene("ar9");
}
public void ar10()
{
    SceneManager.LoadScene("ar10");
}

 public void ar11()
    {
        SceneManager.LoadScene("ar11");
    }
    public void ar12()
    {
        SceneManager.LoadScene("ar12");
    }
    public void ar13()
    {
        SceneManager.LoadScene("ar13");
    }
    public void ar14()
    {
        SceneManager.LoadScene("ar14");
    }
    public void ar15()
    {
        SceneManager.LoadScene("ar15");
    }
    public void ar16()
    {
        SceneManager.LoadScene("ar16");
    }
    public void viewmain()
    {

SceneManager.LoadScene("mainscreen");
    }
    public void exitapp()
    {

        Application.Quit();
    }
}
```

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