ARCHERY EQUIPMENT SHOP IN VIRTUAL REALITY ENVIRONMENT (X-10 SHOP IN VR)

Yousef A. Baker El-Ebiary[1], Salameh A. Mjlae[2], Syarilla Iryani A. Saany[3], Julaily Aida Jusoh[4], M. Hafiz Yusoff[5], Muhamad Syafik Izwan[6]

[1]Assoc. Prof., Faculty of Informatics and Computing, UniSZA University, Malaysia,

[2]Lecturer, Prince Abdullah Bin Ghazi Faculty of IT, Balqa Applied University, Jordan,

[3]Assoc. Prof., Faculty of Informatics and Computing, UniSZA, Malaysia,

[4]Faculty of Informatics and Computing, UniSZA, Malaysia,

[5]Assoc. Prof., Faculty of Informatics and Computing, UniSZA University, Malaysia,

[6]Student, Faculty of Informatics and Computing, UniSZA, Malaysia,

[1]yousefelebiary@unisza.edu.my, [2]dr.s-mjlae@bau.edu.jo, [3]syarilla@unisza.edu.my, [4]julaily@unisza.edu.my, [5]hafizyusoff@unisza.edu.my, [6]047899@putra.unisza.edu.my

Corresponding Author: M. Hafiz Yusoff

Abstract

VR technology has begun entering the repertoir of tools used by all parties. Today, sports goods business uses VR for visualization and sales. For example, VR is used as a promotional tool in selling goods to consumers and providing up-to-date information on the right prices and archery items. Very important, VR can help customers communicate better about the proposed plateform. Therefore, the proposed application for the X-10 Store in Virtual Reality is recommended. The X-10 Shop is a shop to provide information and pricing for beginner users on archery tools and they can also learn about archery equipment before buying it. The main objective of this research is to develop applications, to test the use of this application. This app is a platform for users to create users who want to buy archery tools and easy tools to view information and prices of archery equipment without having to go to the store and waste time to get there. This involves the use of Unity application development software to generate X-10 Shop in Realita Maya.

I. Introduction

The man purpose of this research to developed is an application on archery equipment shop, named "X-10 SHOP IN VR" using a mobile application. The concept of virtual reality used is hoped to assist the user in recording their wonderful experience in a 3 dimension, as if they were in the real situational context of the archery equipment shop. The application provides help to the users allow them to search around archery tools and able to identify quickly the specific tool information.

There are many applications that can be used as virtual reality if added. Most of the applications are less interactive and unattractive in object design and transmission of information and data on archery equipment. Furthermore, users also need a lot of time and cost to compare between existing archery tools.

In addition, there is no Virtual Reality app available in archery tools. If the application is done in VR, the user can be easy to use and is able to increase the knowledge of archery equipment to the new archers or beginner archers (Saany, S. I. A., El-Ebiary, Y. A. M. A., Rahman, M. N. A., Alwi, E. A. Z. E., Mohamad, M., & Ahmad, M. M. T., 2019). Also the goal of this platform is to apply virtual reality to be comprehensively used in archery equipment shop and tools archery setting to understand it better.

The scopes for this platform are identified to make the application development process easier. The scope is divided into three categories which are application scope, user scope and technical scope. Application scope: Mobile application using VR Box, featuring several archery tools and providing information about them and Creative application with user-friendly interface. User scope: To all archery beginner player from 6 years above. Lastly technical scope: According to the concept of the archery equipment shop. And Covers 12 basic tools that must needed for beginner.

II. Literature Review

This topic describes and explains of the literature review carried out on the application that will be used as references in developing thus application. The existing application will also be discussed in the session. Literature review aims to review the critical points of the current knowledge on a particular topic. Therefore, the purpose of the literature review is to find, read and analyses or nay work or studies related to this application. It is important to well understand about all information to be considered and related before developing this application. Some research has been studied to understand to implement in the X-10 Shop in VR (El-Ebiary, Y. A. M. A., Saany, S. I. A., Rahman, M. N. A., Alwi, E. A. Z. E., Mohamad, M., & Ahmad, M. M. T., 2019).

In virtual reality, the platform used in the production of an application depends on the selection made before the builder. This application uses VR google

cardboard as the main platform. Google Cardboard is a virtual reality (VR) platform developed by Google for use with a head mount for a smartphone. Named for its fold-out cardboard viewer, the platform is intended as a low-cost system to encourage interest and development in VR applications. Users can either build their own viewer from simple, low-cost components using specifications published by Google, or purchase a pre-manufactured one (Matt Foro, (2018, April 11). To use the platform, users run Cardboard-compatible applications on their phone, place the phone into the back of the viewer, and view content through the lenses.

Application of this x-10 shop has been made based on some of the existing reference materials. Such an example of that book is The Archery for Beginner and example of the app is an Archery Star and Archery Kings VR.

II.i.   The Archery for Beginners

The Archery for Beginner is a book that allows users to reading information. Users can also place your own pictures inside the museum. This app has two versions of free and one for paid version (Andy Hood, 2017).
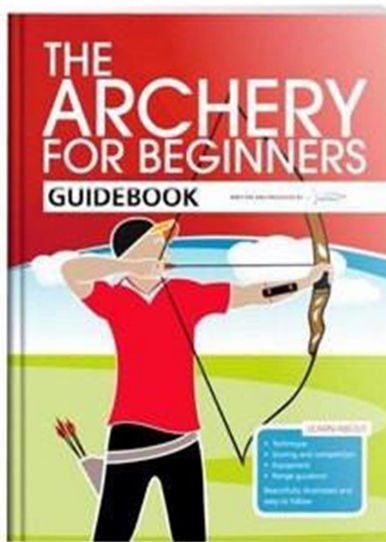

Fig. 1: View the archery for beginners.

The strength points of this application are easy to use and bring anywhere and has many right information source (Sinteza. 2017). On the other side, the weaknesses too many words that can focused also the interface not interesting as shown in Figure 1.

II.ii.   Archery Star

Archery Star is a mobile web-based application. In it the user can play the game using a smartphone. It is very interesting because it have many tools, very interactive and easy to use.

Fig. 2: View of Archery Star

Strength points of this application are interface very attractive and interesting, see figure 2. Plus, colourful and nice visually presented (Wiki., 2019). But, the weakness is not having information content in apps.

II.iii.   Archery Kings VR

Archery King VR is VR web-based application. In it the user can explore the real game archery in a 360-degree view panorama. It is very interesting because it seems to be in the real competition.

Fig. 2.3: View of Archery Kings VR

Strength is that the system has a 3D animation also can experience virtual play, as appear in figure 3. Weaknesses are the user must have Google Headset or VR Box when to use the apps and the tools VR Box experience.
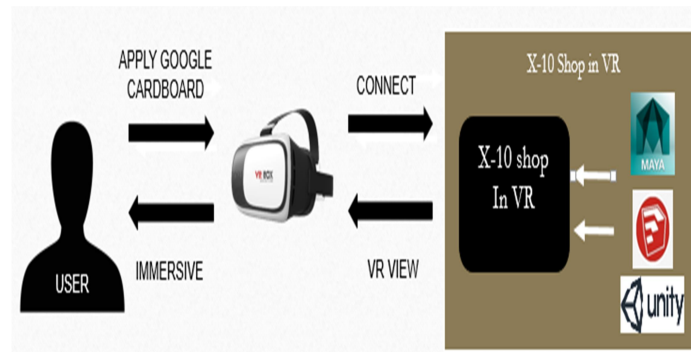
III. Frame Work

Fig. 4: Frame work

The frame work of the developing this platform as shown in Figure 4. The point of gaze is recorded and used in real time as an input in the user-computer interaction. Researchers in this field develop more efficient and novel human computer interfaces to support users with and without disabilities. A person's point of gaze can be used in a variety of ways to control user interfaces, alone or in combination with other input modalities, such as a mouse, keyboard, sensors, or other devices. A major field within gaze interaction research is to find more efficient and novel ways to facilitate the human computer interaction for users with disabilities, who can use only their eyes for input. Other gaze interaction research focuses on the more general use of real-time eye tracking data in HCI to improve user–computer interaction and explore novel user interfaces. This platform run using   Smartphone with Android platform as a Mobile based application also VR Box and VR Cardboard are needed for using the application and viewing the Virtual Reality Environment. The Software tools that used in development such as Unity, Maya, Sketch up, Visual Studio and Adobe Photoshop.

IV. Design and Modelling Application

A storyboard is a graphic organizer in the form of illustrations or images displayed in sequence for the purpose of pre-visualizing a motion picture, animation, motion graphic or interactive media sequence. For the application, the X-10 Shop apps also have a storyboard that will give an example of design and modeling for this project. The X-10 Shop apps have a standard function of the button like as Play Button, Help Button and Contact Us button, as shown in figure 4.
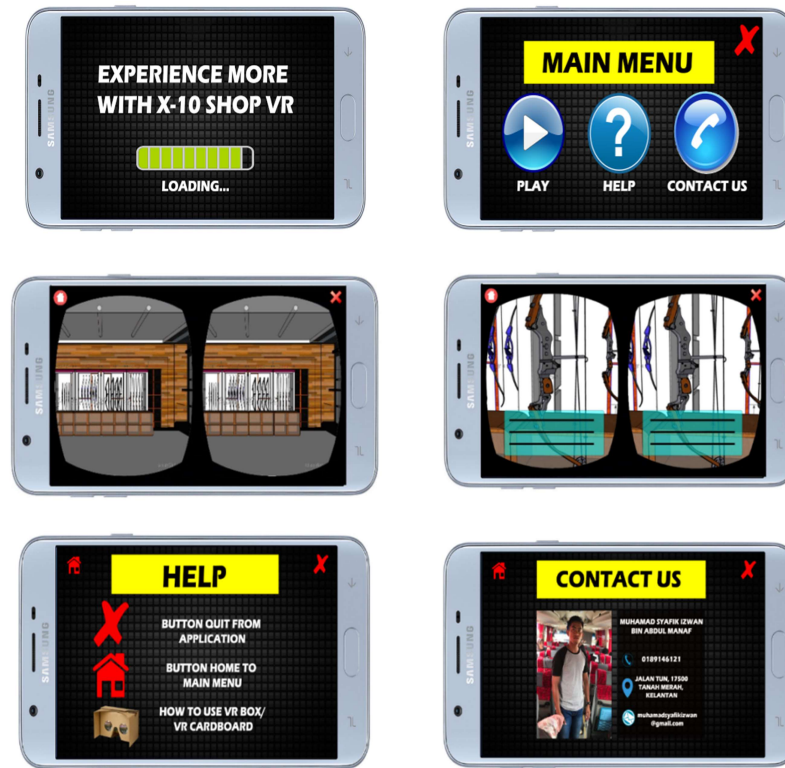
Fig. 4: Platform Interface

The selection of good methodology is very important to make sure the development of application can be done within the exact time given. Furthermore, a good methodology also can provide systematic steps in developing the application so that the application can be developed with minimum errors and problem. The methodology that is used by X-10 Shop in VR application for this project. It also explains the required hardware and software that are used in this project that guides to the success of this project.

V. Implementation and Testing

Implementation is executed to ensure the system is developed according to the main objectives of the system and fulfill the user requirement. Testing will be executed so that the developer will recognize the defects as soon as possible and repair it immediately.

Among the things tested in this testing process, this application should take the test of functionality and malfunction. This app should be tested based on the insights planned for the app to work fully.
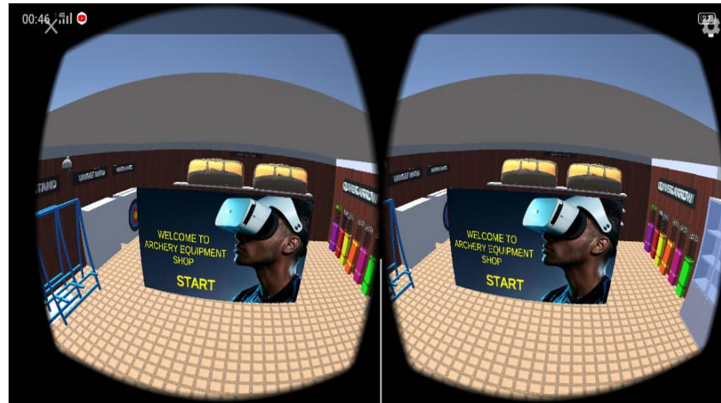
Fig. 5: Show the home page for user and the button

The main menu is the first view of this app. Figure 5 shows the main menu featuring three optional buttons to start exploring the x-10 shop, contact us button to show my contact and exit button to exit from the app.
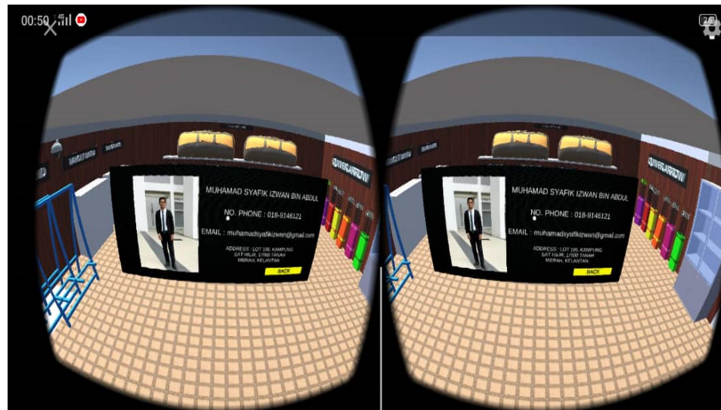

Fig. 6: Show the Contact Us interface

When the "Contact Us" button on the main menu is pressed this view will be removed. Figure 6 is a display for users about profile developer. The users can also return to the main menu view by selecting the button back at the bottom right of this interface.
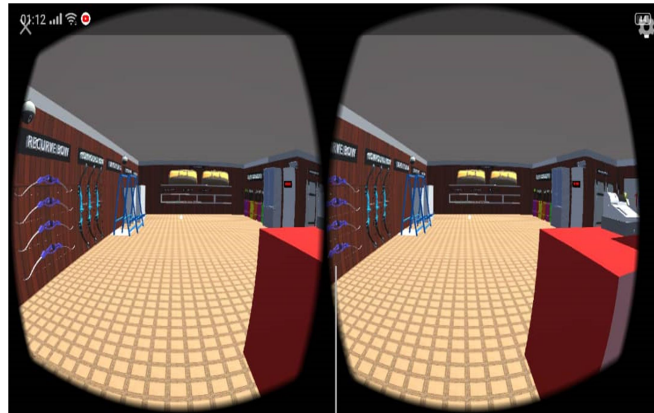
Fig. 7: Shows the main view after pressing the start button

When the "START" button on the main menu on press this scene is removed. **Figure 7** is the user's main view in virtual reality view. Users will see a virtual reality views of equipment archery in the X-10 Shop. When the user moves a little forward control, the user will hear the music was playing.
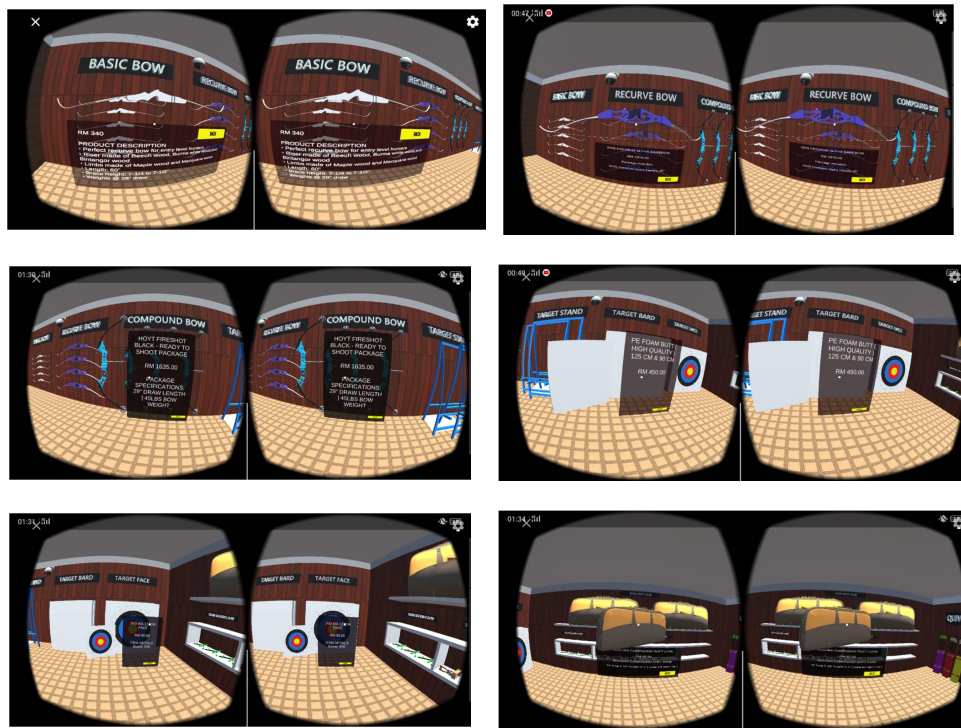

Fig. 8: Sample of the available tools

Figure 8 shows the sample of tools and features in X-10 Shop VR that are aailable in the shop. The users only needs to close the existing tools and the tools will automatically output and move in gaze interaction 360 with the information.

Testing is needed to test the system full function and free error. There is three types of testing in the application. Those are unit testing, integrate testing and system testing. Unit testing is carried out to verity the functionality of specific section code and intergration testing works to exposed defects in the interfaces and interaction between modules. End-to-end or system testing tests a complete integrated system to verity that it meets its requirements.

A test case is a set of conditon or variables under which a tester will determine if a requirement upon an application is partially or fully satisfied. A test case also can be defined as a sequence of steps to test the correct behavior of functionality or feature of an application. There is a list of steps, test, procedures and expected outcomes would be stated in a test case.

Table 1: Test case for successful of open the application

Steps	Test Produce	Expected Output	Result
1.	Open the application	One-button will appear on the page which is Start	Success

Table 2: Test case for successful of the home page.

Steps	Test Produce	Expected Output	Result
1.	Click the Start Button	View the equipment archery in Virtual Reality	Success
2.	Click the contact us button	View the developer profile and contact number	Success
3.	Click the exit button	Exit from the application	Success

Table 3: Test case for successful of audio and gaze interaction in VR environment

Steps	Test procedure	Expected Output	Results
1.	Users open the application	The audio Welcome to Archery Equipment Shop will listen automatically	Success
2.	User enter the play button in main menu	The audio music will listen automatically	Success
3.	The user approaches distance with basic bow	Automatically gaze interaction around 360 and display the information , price about the basic bow	Success
4.	The users approaches distance with recurve bow	Automatically gaze interaction around 360 and display the information , price about the recurve bow	Success
5.	The users approaches distance with compound bow	Automatically gaze interaction around 360 and display the information , price about the compound bow	Success
6.	The users approaches distance with target stand	Automatically gaze interaction around 360 and display the information , price about the target stand	Success
7.	The user approaches distance with target bard	Automatically gaze interaction around 360 and display the information , price about the target bard	Success
8.	The user approaches distance with target face	Automatically gaze interaction around 360 and display the information , price about the target face	Success
9.	The user approaches distance with bow soft case	Automatically gaze interaction around 360 and display the information , price about the bow soft case	Success
10.	The users approaches distance with sight bow recurve	Automatically gaze interaction around 360 and display the information , price about the sight bow recurve	Success
11.	The users approaches distance with sight bow compound	Automatically gaze interaction around 360 and display the information , price about the sight bow compound	Success
12.	The users approaches distance with basic sight	Automatically gaze interaction around 360 and display the information , price about the basic sight	Success
13.	The user approaches distance with quiver arrow	Automatically gaze interaction around 360 and display the information , price about the quiver arrow	Success
14.	The user approaches distance with bow hard case	Automatically gaze interaction around 360 and display the information , price about the bow hard case	Success

Table 4: Test case for successful of exit page.

Steps	Test procedure	Expected Output	Results
1.	Click the exit button on the virtual realityview	Redirect exit the application	Success

The user interfaces in the android application as shown in the above tables 1, 2, 3 and 4, act as a guide for a new user to use this application. Testing also has been done successfully to ensure that all the functionality achieved and run smoothly.

VI.   Conclusion

The contribution if this application will be developing for beginner archery players using Virtual Reality technique. The application to give information and price about the equipment archery. X-10 shop in Virtual Reality using VR technology created with VR mobile application using Unity3D software. Next I've designed all 3D environment and equipment with Sketch up. All button in this application using in Unity3D. Lastly, this application also created using a new technique which is gaze interaction technique. Users don't need any controller to interact with any button in application.

The major problem and limitation during the project development are the some of the colliders is not functioning well as expected. This has caused due to lacking of knowledge in this field also make the project development quite harder and not works well.

Every developer has aims to improve their application or project for the next project. They come out an idea to solve the problem of previous application. On this application, the future work that come from the developer idea are to design different environment in the tank. So, can make this application more interesting and colourful. Since this application just has 12 type of equipment archery, so developer can add more type of equipment archery in the next time for users learn and user can get more information and price about it. Next, the future work is doing the multi-language and make computer-based platform using Sketch up.

In conclusion, the objective to build an X-10 Shop in Virtual Reality Application was successfully achieved. This system is really helpful to the user who wants to know information and price about the equipment archery. Then, the gaze interaction techniques have been used in this application to add more interactivity and user-friendly for users. ADDIE model has been used during the development of the application. The framework and the interface design that included in this report can also act as a guideline for user to use this application.

VII. Acknowledgement

References

I   Andy Hood, (2017, May 6). Archery Star. Grand Millennium Plaza (Lower Block), 181 Queen's Road Central, Hong Kong: Taprun Studio.

II   El-Ebiary, Y. A. M. A., Saany, S. I. A., Rahman, M. N. A., Alwi, E. A. Z. E., Mohamad, M., & Ahmad, M. M. T. (2019). "Using Smartphone Application to Notify Muslim Travelers the Jama'Qasar Pray, Azan Times and Other Facilities". (IJEAT), 8(2S2), pp. 366-370.

III Matt Foro, (2018, April 11). Archery Kings VR. United Kingdom: Appnori Inc Developer.

IV   Saany, S. I. A., El-Ebiary, Y. A. M. A., Rahman, M. N. A., Alwi, E. A. Z. E., Mohamad, M., & Ahmad, M. M. T. (2019). Lactation Mobile Application in Islam Perspective". (IJEAT), 8(3S), pp. 271-274.

V   Sinteza. (2017). Addie Model for Development of E-Courses. Information Technology in Education, 244.

VI   Wiki. (6 May, 2019). Wikipedia. Retrieved from Virtual reality: https://en.wikipedia.org/wiki/Virtual_reality