

Learning Malaysian traditional games using augmented reality

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ABSTRACT – Malaysian Traditional Games using Augmented Reality is a platform for the younger generation to learn about their heritage. This application is developed to solve the problem of the younger generation that does not know about their own country's traditional games because of a lack of exposure. Traditionally, some of the traditional games are taught in the form of books that are difficult to visualize and the instructions are difficult to understand. The main goal of this project is to provide users with a visualization of traditional games to learn and acquire knowledge by using augmented reality. This application provides the convenience steps for students or public people to learn about Malaysian traditional games interactively through the touch screen to zoom and rotate the 3D object and watch the AR video on how to play the traditional games. Alpha and beta test was carried out with 30 users exclude the experts to verify the effectiveness of the mobile AR application. The results that have been obtained from the test show that learning playing traditional games through Augmented Reality is more effective than using the traditional method.

1. INTRODUCTION

Malaysia is a famous country that has a combination of other cultural interventions that make Malaysia itself a very unique country. One of the cultures that are still retained until now is the diversity of their traditional games that existed. Malaysia is very rich with the different kinds of traditional games that were played until now and suits to all generations. Among all the types of traditional games, some games are still popular until now such as wau, congkak and batu seremban [1]. These traditional games have their uniqueness in terms of their history and characteristic that we need to protect to ensure that it does not fade and can be carried on the next generation [2].

Augmented reality (AR) increases the representation of reality created using technology to add visual details on a device-wide image of something being viewed [3]. Nowadays, AR offers new ways to communicate with the physical world and can construct interactions that would not be possible in a virtual or real environment either [4]. By using a smartphone, AR can be used in education to generate excitement and fun for students whatever they are [5]. AR also encourages improved quality of learning in students [6]. It drives them into a place of learning where they are crucial to the dissecting of new ideas. It improves students'

imagination in the learning process. This project uses AR to help people to visualize the tools of the games. Even though some of the equipment does not exist or the game does not be practice anymore but this can give some information and gain some knowledge for them. They also were able to learn how to play traditional games through an animation video and not for visualization only. This project target is to attract people to love, learn and protect our country heritage so that our next generation can still know about Malaysian traditional games.

1.1 Problem Statement

Some of the younger and older generations were unaware of their country's traditional games. Some of them maybe being exposed by their parents or see it through television and the internet but they did not know how to play them. There are many books or websites show about Malaysian traditional games but people cannot visualize the traditional games just by looking into the picture. Some people have difficulties visualizing the demo of the game by using text or graphics. There are some campaigns or events that promote traditional games but not regularly. There is no advertisement to promote Malaysian traditional games to local or foreigner. This project embarks on the following objectives: 1) To study the Malaysian traditional games about their equipment and instruction for playing the games. 2) To develop an augmented reality about traditional games so that the next generation can visualize and know about their country heritage. 3) To evaluate the effectiveness of learning playing traditional games through Augmented Reality compare to traditional learning methods.

2. METHODOLOGY

Multimedia Production Process is applied for this project. This methodology cycle is divided into three stages and each of them consists of two different phases which have shown in Table 1.

Table 1 Multimedia production process

Stage	Phase	Activity
Pre-Production	Analysis	Gathering the requirement what user needs, defining the problem of the existing system, understanding what system is needed to be built, and its function.
	Design	Design the 3D model, flow of the application, user interface, and icon design.
Production	Development	3D modeling of traditional games,

		and animation video. Installation of software needed.
	Implementation	Gathering all the information and design to develop the system to suit the user needs.
Post-Production	Testing	Testing will be carried out for alpha and beta versions. Tester for alpha is multimedia students and for beta version are primary students and public people.
	Evaluation	Selected student's ages range from 9 to 12 years old and random public people will answer the questionnaire and try the application that developed.

3. RESULTS AND DISCUSSION

In this project, the Android devices will be the main platform that will be used for system development. This project is focusing on applying the augmented reality (AR) technology to smartphones or tablets. Therefore, two types of SDK to develop the AR application were used which are Android SDK and Vuforia SDK. Vuforia SDK is used to create the AR environment in smartphone together with the Unity [7].



Figure 1 System architecture

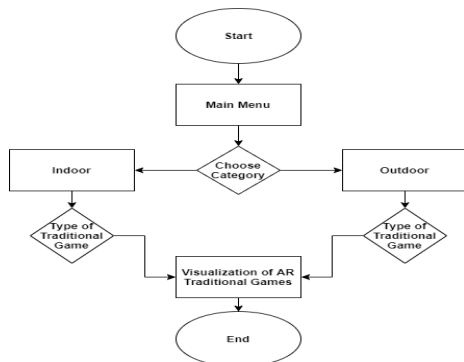


Figure 2 System flowchart

Besides that, the application must also be supported and installed into a compatible Android version phone for the smooth running of the device. Users need to scan any place since this project is marker less-based AR where the process of using this application is assisted by a smartphone camera. Alpha and beta test was carried out with 30 users exclude the experts to verify the effectiveness of the mobile AR application [8]. There are a few aspects that have been used to evaluate the results of the learning augmented reality application, which is learnability, effectiveness, efficiency, engagement, error tolerance, and ease of learning [9]. The results that have been obtained from the test show that learning playing traditional games through Augmented Reality is more

effective than using the traditional method.

4. CONCLUSIONS

In conclusion, to let the young generation have a will to learn and gain knowledge about Malaysian traditional games, 3D Augmented Reality mobile application is introduced and developed to visualize and explain the information about the traditional games so that it could nurture the knowledge of the young generation. For this augmented reality application, all the traditional games are modeled in 3-dimensional shapes and it is a marker less-based application. Besides, it also provided AR video to explain about the instruction to play the traditional games.

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REFERENCES

- [1] ChePa, N., Alwi, A., Din, A. M., & Mohammad, S. Digitizing Malaysian Traditional Game: e-Congkak. *Know. Mgmt. Int. Conf.*, 2014.
- [2] Chyan, N. T., & Hisham, S., Interactive augmented reality art book to promote Malaysia traditional game, 2014 *Int. Conf. on Comp. Comm. and Control Tech. (I4CT)* pp. 203-208, 2014.
- [3] Schmalstieg, D., & Hollerer, T. (2016). *Augmented reality: principles and practice*. Addison-Wesley Professional.
- [4] Khan, T., Johnston, K., & Ophoff, J., The impact of an augmented reality application on learning motivation of students. *Advances in Human-Computer Interaction*, 2019.
- [5] Iftene, A., & Trandabăț, D., Enhancing the attractiveness of learning through Augmented Reality. *Proc. Comp. Sci.*, vol. 126, pp. 166-175, 2018.
- [6] Saidin, N. F., Halim, N. D. A., & Yahaya, N., A review of research on augmented reality in education, *Int. Edu. Stu.*, vol. 8, no. 13, pp. 1-8, 2015.
- [7] Linowes, J., & Babilinski, K., *Augmented Reality for Developers: Build practical augmented reality applications with Unity, ARCore, ARKit, and Vuforia*. Packt Publishing Ltd., 2017.
- [8] Freiler, L., Alpha vs. Beta Testing. Retrieved October 05, 2020, from <https://www.centercode.com/blog/2011/01/alpha-vs-beta-testing>
- [9] Che Ku Mohd, C. N., & Shahbodin, F., Personalized Learning Environment: Alpha Testing, Beta Testing & User Acceptance Test. Retrieved October 05, 2020, from <https://www.sciencedirect.com/science/article/pii/S1877042815037982>