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ENHANCING THE LEARNING EXPERIENCE OF STUDENTS USING AR

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Abstract-**With the help of AR, it is easily express our thoughts to an ordinary person, which will be easily understand by them. The Application of Augmented Reality across numerous fields like Academic, Automobiles, Research, etc., In this project, to create an AR APP for the educational fields with the help of AR APP, Students get more interest in their studies and acquiring real time knowledge about the concept. In this project Markerless based Augmented Reality are used for developing an Android based Learning Application. Two significant technologies for creating Augmented Reality(AR) apps are Unity and Vuforia. To built the Android App APEX AR using the above tools as a base. The use of AR in education has the potential to be a very interesting and practical strategy that changes how education is provided in the next years.**

Keywords- Augmented Reality, Ground Plane Detection, User Interface, C# Scripts, UNITY, Vuforia, Visual Studio Code.

I.Introduction

Augmented reality (AR) is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory and olfactory. AR can be defined as a system that incorporates three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.

II. Related Work

In the reference (1), Analysis of Students' Learning Outcomes A paired sample t test was employed to investigate the differences in overall learning outcomes of the two groups' food biotechnology knowledge before and after the learning activity. As indicated in Table 1, both the experimental and control group students showed significant improvement in their learning outcomes after the learning activity. Effect sizes of the test results were further computed based on Cohen's d value to compare differences in the pre-test and post-test scores of both groups. As shown in Table 1, the control group had a larger effect size, d¼ 2.49.

In the reference (2), The following part describes in detail the evaluation methodology and data collection from pupils' experience in this informal training course. The evaluation methodology includes three headings: academic achievement, creative thinking skills and pupil's motivation.

In the reference (3), The increasing processing power of tablets (including smartphones and phablets), the increasing number of augmented reality applications and the reducing prices of tablets, makes possible the use of augmented reality in the classroom. In this paper we explored the most popular augmented reality applications available for tablet devices. We looked augmented reality applications that could be used for teaching technical drawing in the first year of mechanical engineering. Such application should be user friendly, free and do not require programming knowledge, such that, every teacher can use them in everyday learning activities. We chose the Augment application to show 3D models on top of trigger image or a QR code. The examples

presented helps students to visualise the 3D model and draw the orthographic or the isometric views.

Complementary to the use of the AR, we also show that with the same device and with a low cost installation is also possible the holographic visualisation of the 3D model. This will improve the comprehension of the model before and during the process of learning how to draw it. The prototype makes use of easy achievable materials (polyester films or glass) that in conjunction with the tablets capacity to display good quality images and videos produce an helpful device to help the students in the visualisation of the studied models. In the future we pretend to test these two technologies in a full classroom context, creating two groups: one of control, and the other where these technologies are going the be applied during a semester. At the beginning and at the end of the semester inquiries are going to be applied to the two groups and final conclusion will be taken for a final validation of this "Prove of concept".

In the reference (4), A perfect system does not exist in the world. A terrible disease has landed on our planet. Very soon, it will be impossible to escape from this current situation. The effects of this plague have been felt in every sector of the world. The researchers also claim that physical stores will continue to exist. There will never be anything that replaces the ability to hold and use products or have personal face-to-face interactions with retail professionals. For the time being, brick-and-mortar retail is having a difficult time, but immersive technology is starting to be used to enhance the in-store experience. The good news is that this should help retailers increase their chances of survival. However, the melody of 3D E-Commerce is it would help out the in-store experience (Nassiri, 2008). If countermeasures to COVID-19 are not implemented rapidly, it may inhibit the growth of traditional E-Commerce also. The retail industry has experienced a paradigm shift due to Covid-19 (Murtadlo Hidayat and Puspo Dewi Dirgantari, 2020). To solve the issues of online business, E-Commerce companies should focus on 3D E-Commerce. Implementing such a system is quite possible as the hardware technology required for such a system is readily available. The most crucial learning during the research was the effects of immersion between VR setup and desktop setup. However, people using VR were more immersed in the environment, low on perceived product diagnostic, which the low readability could have influenced in VR setup. The software technology required for AR and VR is also available and has been implemented separately. The only implementation that needs to be done is to merge these existing technologies into one. The increasing number of VR users could help test the Beta version of this platform and make it ready for the broader market (Lu and Smith, 2007). The 3D E-Commerce is always referred to as a technology that would profoundly impact our lives in the future. Every movie talks about the future as VR or virtual world in one form or another, but with the technology available now, the future that we always thought of is here.

In the reference (5), In this paper we presented the features of the tool called Educ-AR. This tool allows the creation of class using augmented reality techniques. With this tool teachers can use the virtual models to enrich and improve the explanation of abstract subjects in various areas. The tool developed in this work was created to be used as an API. This API is represented by the components described in the section 3. With this API is possible to create new layers of software above the Educ-AR. The main component, JARToolKitJ3D is the unique component with public visibility in this system. So, it encapsulates the use of the other components and defines the rules to create new components. It should be emphasized that the use of technologies in education cannot be considered by itself an efficient solution. However, a case study conducted at the SENAI [6] showed that in most students approved the use of augmented reality techniques to help teach. They also noted that the exposure of the contents became more interesting and attractive. For teachers, everyone was satisfied with the proposed application in the case study, show insight this approach should be considered as a viable solution.

For the reference (6), the results of this study can provide reference and empirical support for overseas technology companies investing in the ecommerce industry in China. It also provides a practical reference for the development and innovation of the e-commerce industry as a whole. This study has some limitations. First of all, this survey was conducted on Chinese shoppers. However, the findings may not be applicable to other countries with their own unique shopping preferences and demographics. Therefore, in the future, we recommend expanding the research to other regions or countries and expand the overall

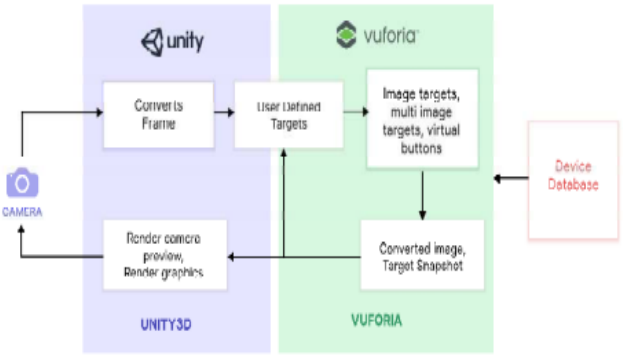
amount of data collected. In this way, the representativeness of survey data can be improved. Another limitation of this research is that it only introduces three theoretical perspectives to understand and explain the factors that influence consumers' intention to use ARSAs. Future research can focus on introducing and integrating other theories or models to study other factors that affect consumers' intention to use ARSAs. In addition, further comparative studies on the effects of the combination of various theories and models can be considered. Finally, this study uses a stated preference survey, and the data is cross-sectional. Moreover, the questionnaire survey was conducted during the COVID19 epidemic. As a result, the behaviors and decisions of consumers participating in the survey in this study were more or less affected by the epidemic environment. Therefore, the general applicability of the research results needs further confirmation. The future research can conduct separate questionnaire surveys in the postepidemic era. An analysis of the market situation of ARSA in the consumer society can be conducted by comparing data obtained from preand post-epidemic era.

In the reference (7), In this paper, we reviewed the empirical AR studies in educational settings published in SSCI-indexed journals from 2011 to 2016. The researchers in this study found that the number of AR studies in education has significantly increased since 2013. Authors from the Taiwan, Spain, and USA contributed most AR studies in education that were conducted during 2011 to 2016. In addition, the authors found that more and more empirical studies were carried out on Science, as well as on social science and Engineering. Furthermore, the quantitative research method was used more often than other methods in AR research in education in the past 5 years. Finally, we expect that the findings in this study could reveal the importance of the adoption of effective AR in education, and provide potential directions for future research.

In the reference (8), The Arithmetic unit, Logical unit, Multiplexer based on majority gate configuration, Integration of Arithmetic and Logical unit has been designed and they are simulated using the QCA Designer tool. The comparison between the existing and the proposed ALU has been performed in this section.

III. Methodology

The two primary software programmes utilised nowadays throughout the whole cycle of creating augmented reality (AR) apps for educational purposes are Unity3D and Vuforia. Unity3D especially uses the Vuforia – Augmented reality Software Development Kit v.4.2 citation two for cross-platform interoperability[14]. Qualcomm intends to introduce the Vuforia engine to the target market to increase interoperability and reduce dependency on certain platforms. A real-time augmented reality mobile device enabler may be Vuforia. defining logical connections by using augmented reality and pattern recognition. A database of 2D and 3D data was created using Vuforia and generated using the "Unity Editor". Unity3D and Vuforia are being utilised to create locally based services that are dependent on one another and an interoperable platform[14]. The portable device's camera will be utilised to produce the picture, convert the framing into pixels, and show the results. The picture will be modified to match the userspecified targets with the image target dataset from Vuforia using local and cloud-based datasets that were made accessible during the creation of the AR-based apps.

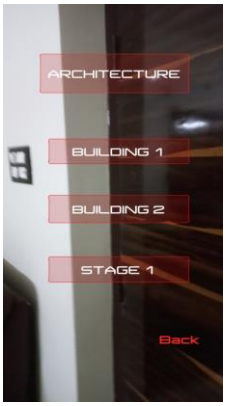


With the help of Vuforia, mobile devices might instantly serve as AR enhancers. Shape recognition and augmented reality will also be included to Unity's own Editor for future development purposes in order to build plausible correlations using 2- and 3-dimensional datasets obtained in database format with the aid of Vuforia. Unexpectedly, Vuforia provides APIs and extensions for building augmented reality apps on a variety of mobile platforms, including iOS and Android. The task of tracking and recognising the imagery that the user has validated and matching that imagery with the current data collection of

objects inside the database repository is performed by the ”Target Management System,” also known as [14] or TMS. In order to assist the Target Management System in producing the best outcomes, the Vuforia employs photographic camera involvement processes.

The ”object-oriented programming” (OOP) approach is employed when a logical framework has to be constructed in an application through the compilation and integration of code. The methods and properties required to perform operations on each method and property are initialized, defined, and executed using this methodology. utilizing the object management system of Vuforia, which consists of the gaming engines and databases. An audio, visual, and motion rendering platform is offered by Unity. This platform includes sensors that can detect light and direction as well as a range of user interfaces that let users interact with 3D objects. Along with that, it offers scripts for managing databases and altering Vuforia’s behavior. The framed data will be converted into pixels by the mobile device’s camera and shown as pixels. Before being transmitted to the location that users have previously defined using the image target dataset, the image will be transformed by Vuforia.

IV. Experimental Analysis



V. Conclusion

The method that we learn in the classroom is evolving quickly. Since today’s students are used to using a range of technologies. Growing numbers of educational institutions are using augmented reality (AR) to assist students with difficult courses. Professors can greatly improve the learning environment, teach students new and fascinating skills, inspire young minds, and encourage them to explore and discover new academic interests by utilising the interaction and environment that AR technology offers. In addition, teachers can create an engaging educational experience on their own utilising current AR technologies to ensure that their students are understanding the curriculum. Kids are more motivated to study because AR content is digital and shareable, which also pushes them to do so. It is more cost-effective to incorporate AR in education because young Indians use smartphones more frequently and already have the equipment needed to run AR applications. Technology will become more accessible, practical, affordable, and necessary as augmented reality (AR) advances, and this includes helping youngsters build the social and academic skills they’ll need to succeed in their future careers.

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