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Augmented Reality Based Education Tool

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ABSTRACT: Augmented reality (AR) refers to deploying virtual image over real world objects (The overlay is executed simultaneously with the input received from a camera or other input device like smart glasses, this superimposition of virtual images over real world objects creates an illusion that can effectively engage users in a virtual world). Until today only 3 main usecases are concentrated such as e-commerce, marketing and gaming platforms, using this kind of an advanced technology for the above usecases is conventional and hereby using it for an educational purposes for students to learn by observing objects in a more detailed manner helps develop the students intelligence and level of imagination.

KEYWORDS: Augmented reality, 3D assets, Education Tool, unity, blender, VUFORIA

I. INTRODUCTION

AR has already become a key ingredient and is a way to close the loop between print and digital and thus providing a technology that offers students with the ultimate imagination and feel of the real experiences with scientific concepts. Creating an application that identifies several interesting features that could be applied in education is the aim. It aims to introduce AR based education tool which can be widely used in schools so as to motivate students to be more interested in learning in a more lively manner. The application blends between the classical book reading experience and the recent technology, AR boosts visualization and Imagination leading to better understanding, more enjoyable and a better hands-on experience for the students.

II. EXISTING SYSTEM

a. E-COMMERCE: Unimaginable large number of sales are lost or delayed indefinitely because of the shopper's inability to confidently evaluate and envision the sense of using the product. Augmented reality bridges this gap significantly. By way of helping users visualize the products they're considering, in the context of the physical space they're going to be used in, it is a major boost to getting e-shoppers to feel comfortable and even enthusiastic about a potential purchase

b. MARKETING: In augmented reality marketing, the AR element must Provide a meaningful and branded interaction .Play an authentic role in the communications .Be a gateway to a new reality of brand engagement .There needs to be substance to the experience. It has to provide value.

c. GAMING: The gaming industry embraced AR technology. A number of games were developed for prepared indoor environments, such as AR air hockey, Titans of Space, collaborative combat against virtual enemies, and AR-enhanced pool table games. Augmented reality allowed video game players to experience digital game play in a real world environment. Companies and platforms like Niantic and Proxy42 emerged as major augmented reality gaming creators. Niantic is notable for releasing the record-breaking game Pokémon Go.

d. EDUCATION: AR has been used to complement a standard curriculum. Text, graphics, video, and audio may be superimposed into a student's real-time environment. Textbooks, flashcards and other educational reading material may contain embedded "[markers](#)" or triggers that, when scanned by an AR device, produced supplementary information to the student, rendered in a multimedia format. As AR evolves, students can participate interactively and interact with knowledge more authentically. Instead of remaining passive recipients, students can become active learners, able to



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interact with their learning environment. Computer-generated simulations of historical events allow students to explore and learning details of each significant area of the event site.

III. PROPOSED SYSTEM

A device that replaces augmented textbooks by bringing in 3D models of objects in an application itself. When pointing the phones at any stationery surface ,the image under the context is showed as a 3D model on the screen of the phone or table.

Modules split-up:

Cameras and sensors: Collecting data about user's interactions and sending it for processing. Cameras on devices are scanning the surroundings and with this info, a device locates physical objects and generates 3D models. These 3D assets are created using 3D modelling softwares such as blender or autodesk CAD

Processing. AR devices eventually should act like little computers, they require a CPU, a GPU, flash memory, RAM, Bluetooth/Wi-Fi, a GPS, etc. to be able to measure speed, angle, direction, orientation in space, and so on.

Projection. This refers to a miniature projector, which takes data from sensors and projects digital content(result of processing) onto a surface to view. The tool used for this process is Unity Engine.



Advantages

- More interactive so improves skill training
- Increases student's interest to learn
- Enriches many ways of teaching and understanding

IV. LITERATURE SURVEY

1. **Geometry Education with Augmented Reality** by the author Hannes Kaufmann filled the gap of next-generation user interfaces for mathematics and geometry education Construct3D is introduced a three-dimensional dynamic geometry construction tool that can be used in high school and university education. This system uses Augmented Reality (AR) to provide a natural setting for face-to-face collaboration of teachers and students. The main advantage of using AR is that students actually see three dimensional objects which they until now had to calculate and construct with traditional (mostly pen and paper) methods. By working directly in 3D space, complex spatial problems and spatial relationships may be comprehended better and faster than with traditional methods.

2. **The Magic Book— Moving Seamlessly between Reality and Virtual Reality** by Lawrence Rosenblum and Michael Macedonia helped with people to interact with the digital domain as easily as with the real world. Various

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approaches help us achieve this—in the area of tangible interfaces, we use real objects as interface widgets; in augmented reality, researchers overlay 3D virtual imagery onto the real world; and in VR interfaces, we entirely replace the real world with a computer-generated environment

3. Augmented reality based teaching in classrooms by Fayeemaabbasi ,Ayesha Waseem, Erum Ashraf proposed an algorithm to support marker based augmented reality teaching methodology. A controlled experimental lecture in classroom was conducted with the usage of augmented reality technique. The delivered lecture was then compared with the traditional method of teaching. Post and pre-test were conducted to record the student's understanding which depicted that the proposed augmented reality teaching method is more proficient than the traditional one and plays significant role in improving student's grades.

4. An Augmented Reality System for Learning the Interior of the Human Body by Carmen M. Juan, Francesa Beatrice presented an Augmented Reality system for learning the interior of the human body. We have tested the system with children of the Summer School of the Technical University of Valencia. In this test we have analysed if the use of a Head-Mounted Display or a typical monitor influence in the experience of the children. Results do not offer statistical significant differences using both visualization systems and confirm that children enjoyed learning with the system and consider it as useful tool not only for learning the interior of the human body but also for learning other subjects.

V. CASE STUDY

POKÉMON GO Pokémon Go is a mobile game inspired from cartoon TV series Pokémon. It is a free game based on location-based augmented reality developed by Niantic in 2016 for iOS and Android devices. It broke all the records in merely 14 days of getting launched and was downloaded by more than 30 million people and is expected to surpass other apps to become the most used app.



Pokémon go is based on technology of location-based markers Augmented Reality. People roam around different places in search of Pokémon. What makes this app most interesting among all is its feature of Augmented Reality. As soon as a player finds a Pokémon the AR mode turns on, which results in additional effects to appear on the screen. Turning on the AR mode results the camera to turn on and the animated Pokémon appears on the screen along with the real life background. Also, it has special effects that supplement sound, animation and other effects. This feature not only entices kids the most but also adults and gives them an experience of gaming at another level.



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VI.SIMULATIONS AND RESULTS

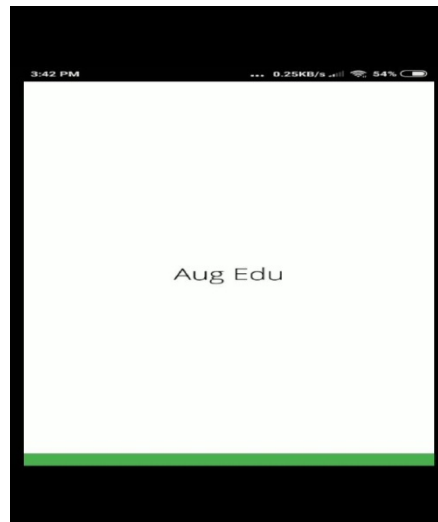


Fig 1. The front page of the application

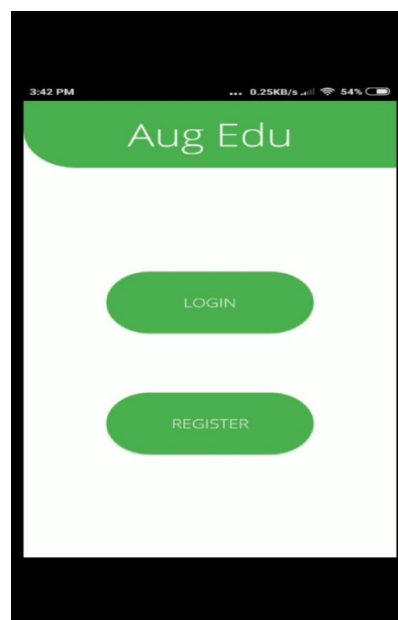


Fig 2. The register and login page where the details are given and a one time password is sent to the registered mobile no. to access the application for the first time users and automatically can enter the application by entering the username and password.



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Fig 3. This page takes to the subjects where they are selected and the course materials are displayed.

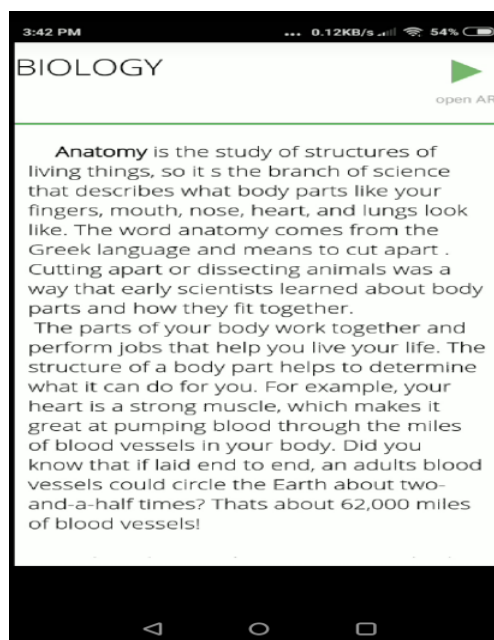


Fig 4. The information about the course is fully explained with pictures.

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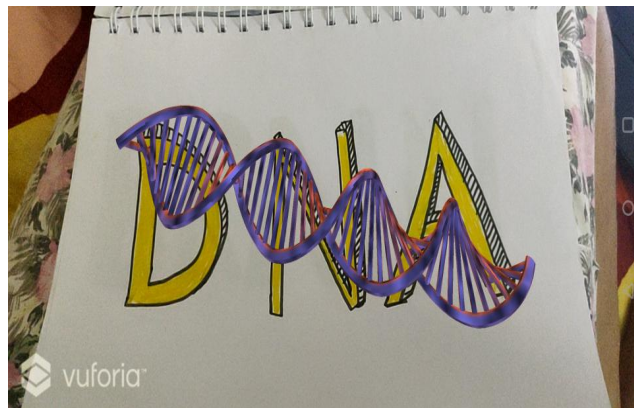


Fig 6. When a marker is placed, an augmented picture of the marker is shown where it can be zoomed, rotated, pinched etc.

VI. CONCLUSION

Since the past three decades, Augmented Reality is emerging as one of the most powerful technologies in the field of computer science. It has added a new dimension in the world of computing. With its capability of superimposition it has been contributing to entertainment, education, medical sciences, commercial, sports, military etc. With the rapid development of Human Computer Interaction and its ability to interpret three dimensional human gestures, it will lead Augmented Reality to an exceptional level.

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