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AN INNOVATIVE PEDAGOGY WITH AUGMENTED REALITY

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Abstract

In India, 50% of the kids in the age between 6 and 18 do not go to school. Dropout student rates are even more worsening from class 3 to class 5. Indian Education system is paper based/ theoretical and many of the times students do not understand the subject. This is one of the reasons that innovations are less in number. Students have been taught with the facts but not with reasoning. In this world, we cannot live without technology. This generation plays with technology oriented toys and they prefer to acquire knowledge with gadgets and newer technology. Kids with learning difficulties need to be addressed as they need to survive on their own. To overcome the challengesof 2D learning and to make the teaching learning process interesting, augmented reality could be employed. The proposed idea is to employ augmented reality to increase the participation in the classroom, sensory development and to nurture the learning process.

Keywords—Augmented reality, Education system, Pedagogy.

1. Introduction

Augmented reality is a technology that overlays a computer-generated image on a real world user's view and as a result producing a composite view. It is quite different from virtual reality by the fact that it does not create an artificial environment. It uses the existing environment and adds information on top of it in an understandable way. There are different types of Augmented Reality which are meant for different applications based on their characteristics. Triggered AR is based on marker, location , dynamic augmentation and complex augmentation. View-based AR method is either in the form of indirect augmentation or non- specific Digital Augmentation. Marker-based AR uses a QR/2D code to get sensed by reader and produces the required result. Learning disabilities are diagnosed when a kid goes to school by comparing in the normal kids and the kind of response that they provide for the queries posed on them. Teachers can evaluate by the process called as RTI "Response to Intervention". They may have difficulty in following directions, sequencing, poor coordination between eyes and hand and other sensory difficulties. This could be solved only with the help of certain tools and strategies. ADHD refers to Attention Deficit Hyperactivity Disorder has affected more than 7 million children. These disabilities cannot be cured, it's a lifelong problem. With the proper support and training, kids can able to manage to school. To grab the attention and focus their energy in the positive direction, augmented reality technology can be used.

2. Methodology

- Aurasmais HP Autonomy's an augmented reality platform for IOS and Andriod mobile devices. In addition to Aurasma's own mobile app, this technology can be integrated into many other smart phone and tablet applications. The 2D images could be overlaid with the videos and can be enabled with the help of a trigger.
- Many 3D video making open source software such as Blender, Autodesk 3ds Max, Autodesk Maya , Maxon cinema 4D , Lightwave 3D, Google Sketchup, Adobe After Effects
- Aurasma now named as HP Reveal has preprocessed sample videos and the trigger images. The project can be developed with a simple image and can be used as a trigger to play the 3D videos. The limitation of imbibing the video is 100MB. Any number of videos can be incorporated with a trigger of an image.
- Many other Augmented reality software such as A-Frame, Argon, ARToolKit, JavaCV etc. can be used for creating the AR environment.

3. Literature Survey

Mixed Reality technology alters traditional education environment with the augmented textbooks for better understanding. The teachers can provide additionals to the textbook which makes the student to relate easily and even the students can use the content from their own portable terminals. Incorporating augment reality into education will make students excited about learning. The paper titled "Augmented Reality Versus Virtual Reality for 3D Object Manipulation" by Max Krichenbauer is referred to know how AR technology is use to render object that are difficult to imagine and convert them into 3D model, that makes it easier to understand hard content. "A Review on the use of Augmented Reality to Generate Safety Awareness and Enhance Emergency Response" by AhishAgrawal , GouravAcharya , Krishna Balasubramanian, NehalAgrawal and Ratnesh Chaturvedi states that Augmented reality applications explain the hard content with computer generated graphics along with study on various existing augmented reality systems that have been successful in implementing a way to provide the user with the knowledge relating to safety practices or providing knowledge to the user when it comes to learning how to react in case of emergencies.

Also, the paper entitled **"**Revealing the Shopper Experience of Using a 'Magic Mirror' Augmented Reality Make-Up Application." By Ana mariamountiho states that along with augmented reality motion capture techniques is used in shopping, observing how shoppers approach and respond to such a "Magic Mirror" in a store.[3] "Augmented reality systems for medical applications" by Son-Lik Tang proposed the usage of Augmented reality technology in medical application ,which can help in guiding surgeons in executing a surgical plans in an enhanced way.[4] "E-learning system using Augmented Reality" by Siddhantpatil , where AR is reffered in An e-learning system for 3D geometry, which makes use of Augmented Reality to enable the user to understand the 3D geometry concepts better.[5]

https://www.wired.com/story/ai-could-target-autism-before-it-even-emerges-but-its-no-cure-all helps to understand how to treat better the Children with Autism Spectrum Disorder.[6]

RealityTechnology:http://www.realitytechnologies.com/applications states how reality technology is used in real world.[7]

Frontiers in Pediatrics : https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5483849/ gives the current situation on Brain Power System.[8]

Quora:https://www.quora.com/What-are-some-good-examples-of-augmented-reality referred to better GPS navigation with Enhanced AR Technology.[9]

"Virtual Memory palaces:immersion aids recall" by Eric Krokos,Catherine plaisant , Amitabh Varshney, referred that human always used visual –based methods to help them remember information which evidenced virtual reality is the next logical step in this progression.

3.1 Challenges

- Cost of the hardware gadgets to have full experience of AR will be high.
- Extensive Skills and training are needed to prepare the course materials
- Learning from 2D and translated version of 3D forms is difficult at initial stages.
- More time required for collecting the relevant material in making the videos.
- To create awareness about this concept of learning is challenging.

4.Proposed Method

The main objective of this paper is to provide a better understanding with the education system and provide a good environment which brings out the best innovative ideas. In the recent times, there is trend of social story with the help of animation videos where kids understand the social situations and responding to the scenario based on their experience therein improving the social interaction, skill and behavior pattern. The betterment of the society lies in the hands of the kids.

In this method, a sum of fifty students may be considered taking the account of their background in terms of their accessibility to gadgets and the environment. Instead of a book, a card will have images and with the trigger of the image the 3D videos could be played anytime with the corresponding resources. With the advancement of Augmented reality and gadgets, the video could be viewed in 360 degrees and sliced with any angle of their interest. For example, the concept of photosynthesis by which plants and other organisms use sunlight to synthesize foods from carbon dioxide and water. It involves chlorophyll and generates oxygen as a byproduct. The importance of oxygen released by plants and how it impacts the ecology could be felt by a simulated version of augmented reality. Many corporate such as Intel, Google, Microsoft,Facebook etc are developing their own gadgets to make it affordable to everyone.

Vuzix Blade AR glasses are considered as the next-gen glasses which provide an AR smart glasses that float a screen in the upper right corner of the vision. The cost of the product is very high when compared with the standard education system.

4.1 General Mechanism of the proposed system

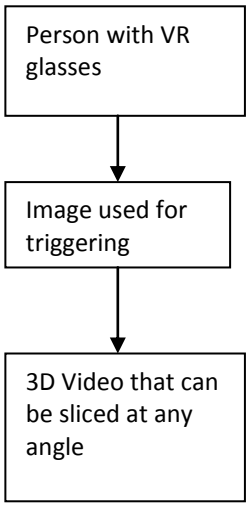

Figure 1: Flow of the Proposed System

For instance, a study of life cycle of a butterfly will be difficult to define in the imaginary way of teaching. When a kid wants to learn, the image trigger will enable it in the real world and finally can have an experience of being in the garden and watching them grow from egg to adult.

Figure 2: Life cycle of a butterfly

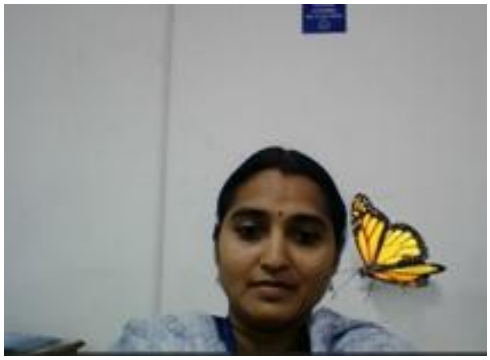

Figure 3: A virtual View of the butterfly

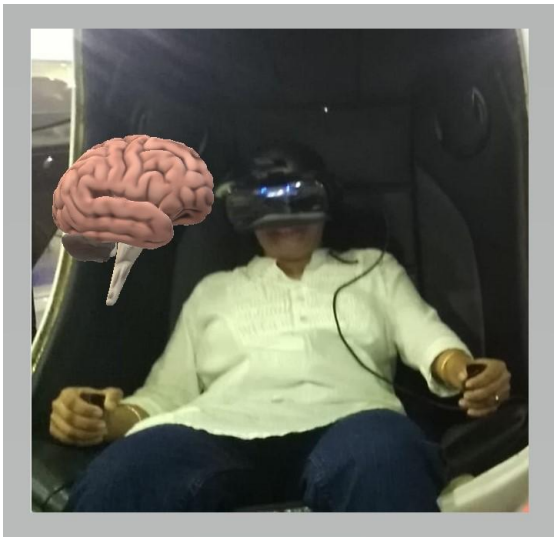

Figure 4: Sectional View of Human Brain

A 360 degree sliced view of Human Brain will educate in a better way. Human Brain can be sliced at any angle and the detailed study could be done which cannot happen in real environment

5. Conclusion

The proposed method ensures the betterment of the education system. It helps to recall the information in a better way. Many results have shown the overall improvement of 8.8 percent in recall

accuracy. Augmented reality is used in developing the diagnostic tools for medical emergency. Some ideas such as hazardous material and surgical stuff etc which cannot be understandable in class can be made easy with this method. Humans have always used visual based methods to remember information in the form of drawings, images etc.

6. Future Work

Haptic Technology can be employed to feel the objectsthat are in augmented reality environment. Haptic gloves and suits may be used in future. Interactive videos could be prepared to respond to the queries of the kids. Every class should be equipped with necessary gadgets and the relevant software. In the Industrial training sector where the real experience may not be felt and its mandatory for the employees to learn.

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