**Usage of Benefits of Augmentation Reality in education**

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**Abstract**: We are leaving in Digital world where every second we depend on gadgets in our life style. Every task not only undergone with ease but also implemented with intelligence.

Augmentation has played major role in education. Since in pandemic many have lost quality education, Introducing Augmentation Reality in education has created tremendous development in understanding facts instead of route learning. AR creates an interactive experience with unreal object with real world. In this paper recent technologies are depicted for education.

**Keywords:** AR – Augmentation Reality

SAR – Spatial Augmentation Reality

IOT – Internet of Things

SLAM – Simultaneous Location and Mapping

**Introduction**

We have entered in new era where education system is completely changed. Introducing new technology makes teaching more creative and effective. we are blended with new technologies and new method of understanding concepts. Online meet teaching approach has made students inactive and declined potential strength of students. AR creates major impact since Learners are engrossed towards digitization; quality time can be improved by understanding more eventually. There are different types of learners and pace of learners certain apps and application provides to learners in one to one learning basis. Practically every learner can’t be approach by considering space and cost. We are in a stage where IOT, AR, VR, Artificial Intelligence, Big data, Block chain are more used terms. Visual learners are major among learners so most learners can be entackled by Augmented Reality. AR creates impact in fun learning with leads to edutainment. AR assist for decision making and the purpose of design education is to teach design students the essential skills of innovation, aesthetics and analysis

**Five key factors of AR**

Interaction: Interacting with virtual object in real world does more impact in understanding concept.

Visibility: viewing virtual object in real world which provides opportunity to view and examine.

Collaboration: Interacting virtually with multiple users.

Independence: Provides to understand by working in own perception.

Motivation: Practical approach makes learners more motivated which can be done virtually.

**Requirements**

AR system uses tracking systems mainly classified into marker based or marker less(ex:location based). Marker based is fudicial markers or radio frequency tags. Spatial displays. Digital cameras, projectors, optical images or interest points are detected in the camera images. Tracking can make use of feature detection, edge detection, or other image processing methods to interpret the camera images, wrist band and gloves can be used for interaction

**Working**

To insert a virtual object, we must know where the real world objects lies. Marker-based approaches utilize a simple black and white marker for easy detection and tracking of the marker area. The camera pose tracking is a problem of obtaining the relative camera-to-object position and orientation. Motion-based approaches track many feature points and recover camera motion parameters from the point correspondences. Once camera parameters are known we can blend virtual image with real image. To make fully realistic we have to implement certain transformations and texture mapping pixel position and color also matter.

Input video frame

Feature tracking

Virtual Object

Estimate camera parameters

Finding real object texture

Object projection

Blending with realty

Output video frame with virtual element

Computing object texture

Optical elements

Interact

User

Tracking

Indoor Outdoor

Slam Vision Gps Inertia based

Marker Markless Acceleronder GYROS

Tangible Interface

Multi modular

Although the direct communication between students and teachers in the classroom works successfully, design educators are interested in introducing more productive and effective methods for improving the learning experience of students. AR applied in many areas in medicine AR used in simulations and models to know human anatomy. Internal view and 360 degree view is applied through AR. Astronomy AR applied to see spatial objects in universe, engineering, statics are other areas of AR and AR search engines have played major role in indulging lens and listing information.

Spatial Augmented Reality (SAR) make use of video-projectors, camera, optical elements, holograms, radio frequency tags, and other tracking technologies to display graphical information directly onto physical objects without requiring the user to wear or carry the display This produce immersive contents by overlapping virtuality in real world. This technology can be used as prototype designing, which helps learners to design, model, and check development phase test.

**Benefits in SAR:**

This methodology saves time and cost because evaluation is done by implanting virtual prototype.

Design phase is not bounded with space.

It creates a flexible environment by increasing spatial skill development.

It conveys the client or educator about ideas.

Increased higher attention towards the potentials of learns.

**Face to face Collaborative AR**

Collaboration face to face provides to manipulate with virtual annotations. Interacting with 3D objects understand shared understanding. Applying Tangible interface along with AR techniques enhance more reality in learning. Practical approach towards understanding, learning and implementing can be implicated. Head mounted devices and digital gloves are used to interact with virtual objects. AR software handles all signals from the interacter and processed by the software. Implementing this to education makes learners to virtually feel the real impact. Students can allow to do multiple projects in collaboration.

**Remote Collaboration**

In remote collaboration there with be no physical presence for interaction. Virtual conference which provides participants on screen now it can be inculcated with AR techniques where 3D techniques can be used by mapping texture of participants and creating virtual object of them and placing in real environment which makes feel as physical presence. These techniques made use of understanding participants relations and grasp facts with ease. In pandemic situations online education played main role. Screening of educator has created learner misimpression. Inclusive of remote collaboration has giving way of participation.

Traditional approach of reading book can integrate AR techniques, which supports project based learning. When handled device is capture the book pages and virtual content override on the page creating more informative virtually. . Multiple users can also be immersed in the virtual scene where they will see each other represented as virtual characters. It created fun in understanding concepts. Learners were attracted towards Reading books. Hindered thinking capacity and memorization which lead so self learn. Qualitative results were shown when e-learning of books used by learners. Book has become transport mechanism from virtuality to reality. This has increased learning curve.

New emerging AR technology provide multimodal interface which combine real interface with visual, haptic, auditory, smell sensory information. AR helps in substituting learning with visual impaired or poor vision by audio clues, deaf or dumb users by visual clues. Since interaction can be done in many ways hence none are retarded with learning.

**Challenges:**

Social issues of public acceptance.

Sellen conclude that the technology is not only important but effect of communication matters with mediating technology.

Collaborating remote sensing applications for remote practical learning [ex: science labs]

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