

Augmented Reality (AR) In Education: Current Technologies and the Potential for Education

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Abstract: The real domain is 3D, mostly we use 2D media as learning methodology. The mixture of augmented reality

technology with the educational content makes fresh sort of automated applications and acts to improve the efficiency and attractiveness of education and knowledge for students in real life set ups. Augmented reality is a diverse medium, linking stages from universal computing, Tangible Computing, and Social Computing. This medium offers distinctive affordances, joining physical and virtual domains, through constant and implicit user control of the point of view and interactivity. The following document delivers an overview to the knowledge of augmented reality (AR) and its potentials for learning. Key technologies and methods are discussed within the context of education.

Index terms: Augmented reality, Technologies for augmented reality systems; Augmented reality in education (Keywords)

I. Introduction

Learners to real domain and relate them with that area mostly cannot be suitable. Though the usual domain is 3D, we select to use 2D media in teaching which is very suitable, acquainted, elastic, handy and realistic. But it is motionless and does not offer the vibrant content. Otherwise computer produced 3D virtual situation can be used but these scenes need extraordinary performance computer graphics which is more costly than others.

Although lots of prospects virtual areas may exist for education and learning, it is hard to provide an satisfactory level of realism. When users are totally engrossed in this environment they turn into separated from the real situation. So, it gives you virtual effects by demonstrating the real area you're experiencing.

This training has a twin goal. Initially description of augmented reality (AR) is assumed almost this new artificial and augmented environment. Features of augmented reality method are delivered and knowledges are categorized and used in this system. Moreover it's prospective training within this environment.

Augmented Reality (AR)

Currently a new medium "augmented reality" proposes a distinctive affordances, uniting physical and virtual areas. It is the novel technique of influencing how we network with that area. Without swapping the real field you're facing, this knowledge of additions on virtual data on top of the real domain with continuous and inherent user control of the fact of vision and interactivity. It delivers a combined understanding for the user with a mixture of the real scene watched by the user and computer produced virtual scenes. It is an augmentation of real domain by engaging an normal place, space, object or result in a way that is fairly mediated. It can compromise learners all-in-one communication amid the real and virtual domains by relating the educational content. This novel method improves the efficiency and desirability of training and knowledge. The skill to overlap computer produced virtual effects against the real domain changes the means we interrelate and trainings turn out to be real that can be seen in real period rather than a fixed practice.

Augmented reality conveys virtual information or object to any indirect idea of users real AR (augmented reality) tries to expand the users view and communication with the real world. And also associates domain environment to the objects on the real ones or scenes for exploiting ordinary and in-built user capability in real time. It is an shared environment where a real life is boosted by practical things real time. According to Azuma (1997), augmented reality (AR) need to have three features: joining the real and virtual domains, having real-time communication with the user, and is being recorded in a 3D space. Augmented reality (AR) permits the user to understand the real domain and purpose to add-onto reality without totally engaging user inside an artificial environment.

Technologies For Augmented Reality Systems

Augmented Reality (AR) And Virtual Reality (VR) Practices similar Hardware Tools And Share Loads Of Features Like Computer Produced Virtual Scenes, Three Dimensional (3D) Objects And Interactivity. The Foremost Modification amongst Them Is Where Virtual Reality Purposes To Substitute The Real Domain whereas Augmented Reality (AR) Dutifully Replaces It.

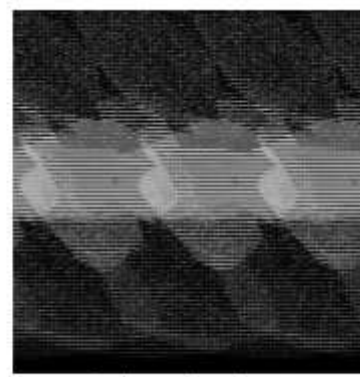
The Key Strategies For Augmented Reality (AR) Are Displays, Computers, Input And Tracking Devices. The See-Through And The Monitor-Based Displays Remain Two Main kinds Of Displays Used Now Augmented Reality (AR). In The See-Through Displays Place Both Images Of Real And Virtual Environment Above The User's View Of The World. The Video-See-Through And The Optical See-Through Systems Exist Two Forms Of See-Through Displays.

Head Mounted Displays

Head-Mounted Device Is A Kind Of Display That Is To Be Placed On The Head Or As Attachment Of A Helmet. Which Has A Slight Display Optic In Front Of One Or Each Eye.



Video-see through system
(Trivisio, 2011)

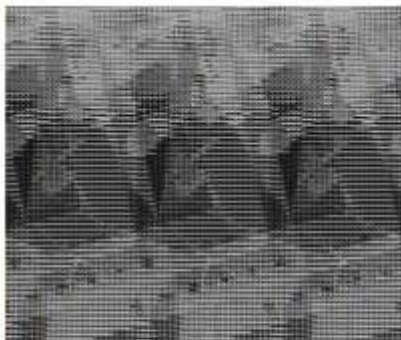


Optic-see through system
(Inition, 2011)

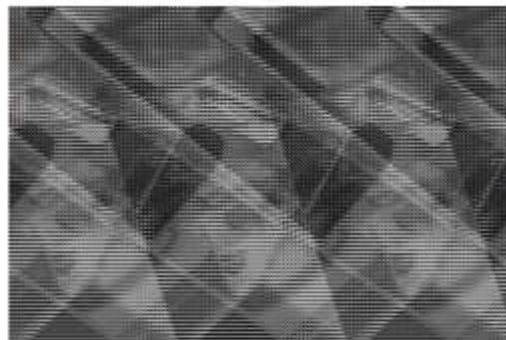
Video-See Through Systems Are Suitable While You Want To Evolve Something Distant Or Consuming An Image Enhancement System To Boost Optical See-Through Systems Combine Computer Generated Scenes By Means Of "Through The Glasses" Image Of The Real Domain. Usually A Partially Slanted Semi-Transparent Mirror Is Taken For The Usage. This Mirror Technology Permits The Image Of The Physical I.e., Actual World To Pass Along The Lens And Diagrammatically Or Graphically Present The Data To Be Viewed By The Users Eyes.

Handheld Displays

Small Computing Devices With A Display That The User Can Clamp In Their Hands.



A handheld AR system displaying a three dimensional graph registered to the cones and table (CSM, 2011)



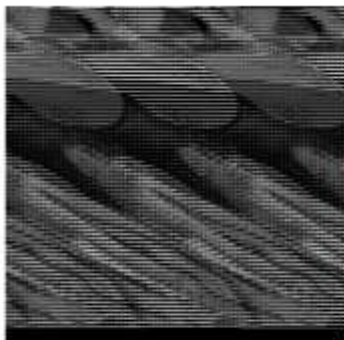
Smart AR, a visual technology that capable to capture visual objects through its smartphone webcam and project it out as a moving subject over an actual 3D space (Sony, 2011)

Alternative Type Of Devices Use Video-See-Through Procedures To Overlay Graphics Against The Real Environment Stays Handheld Displays. These Are Small Computing Devices Using A Display That The User Can Clamp In Their Hands. Dual Advantage Of Handheld Augmented Reality (AR)

Are The Portable Nature Of Handheld Devices And Omnipresent Feature Of Camera Phones. The Drawbacks Are The Physical Restrictions Of The User Partaking To Clamp The Handheld Device Ready In Front Of Them At All Times And Also falsifying Effect Of Typically Wide-Angled Mobile Phone Cameras When Compared To The Real Domain As Viewed Through The Eye (Feiner, 2011). Smart-Phones, Pdas And Tablets By Means Of Cameras, Digital Compasses, GPS Units For Their Six Degree Of Free Will Tracking Sensors And Fiducial Marker Systems Used As A Handheld Display In Augmented Reality (AR).

Spatial Displays Are Used In Video-Projectors, Optical Elements, Holograms, Radio Frequency Tags, And Additional Tracking Technologies To Display Graphical Infostraighton Physical Objects Without Requiring The User To Wear Or Carry The Display (Bimber, Raskar, & Inami, 2007). Additional Methodused To Associatephysical Objects And Computer-Generated Information Is Projection Displays. In The Physical Three-Dimensional (3D) Model Computer Image Is Projected To Generateanaccurate Looking Object.

Pinch Gloves, Wand With Buttons And Also Smart Phones That Signals Its Location And Positioning As Well As Orientation From Camera Images Are Chief Input Devices Used In Augmented Reality (AR). Pinch Is A Pair Of Stretch-Fabric Gloves Comprises Of Sensors In Each And Every Fingertip That Detectsinteractionamongst The Digits Of Your Hand. It Is A Extraordinary New System Used Gestures For A Wide Range Of Control And Interactive Functions And Relating With 3Dmodel Simulation. A Pinching Gesture Can Be Used To Seize A Virtual Object, And Delivers A Trustworthy And Cheapest Method Of Diagnosing Natural Gestures.



Pinch Gloves (Inition, 2011)



Data Glove (CyberGloves, 2011)

Figure3 PinchGloves

Digital Cameras And/Or Additional Optical Sensors, Accelerometers, GPS, Gyroscopes, Solid State Compasses, RFID & Wireless Sensors Are Used As Tracking Devices For Positioning And Angling Of The User's Head, Hand(S) Or A Handheld Input Device. These Technologies Offer Variablestages Of Precisionand Accuracy. Computers Normally Used Toinvestigate The Known Visual And Additional Data. They Synthesize And Position Augmentations And Then Replicate Users Display Devices.

Sort Of Devices And Communication Of System Amongst The User And The Virtual Content Of Augmented Reality (AR) Applications Describe Systems Interface. There Are Four Keymethods Of Communication In Augmented Reality(AR) Applications: Tangible, Collaborative, Hybrid And Emerging Multimodal Interfaces. Using The Above Devices One Can Develop Five Different Augmented Reality(AR) Systems. These Structures Fixed Indoor Or Outdoor Systems, Mobile Indoor Or Outdoor Systems, And Mobile Indoor And Outdoor Systems. Mobile Ones Are The Systems That Allow The User For Undertaking With The Assistance Of A Wireless System And Fixed Ones Are The Systems, Anywhere They Are Set Up Deprived Of Having The Flexibility To Transfer.

Augmented Reality In Education

Augmented Reality (AR) Technology Is Not A Fresh Issue. Augmented Reality (AR) Technology Has Been Used In Fields Such As: Military; Medicine; Engineering Design; Robotic; Telerobotic; Manufacturing/Developing, Maintenance And Repair Applications; Consumer Design; Psychological Treatments, Etc. (Azuma, Baillet, Behringer, & Feiner, 2001). Exhibiting Information By Using Virtual Things That The User Cannot Directly Sense With His Own Intellects Can Permit A Person To Interrelate With The Real Domainin Different Meansnever Possible Before. One Can Modify The Position, Shape, And/Or Other Graphical Features Of Virtual Objects With Communication Techniques Augmented Reality(AR) Technology Supports. By Means Of Our Fingers Or Motions Of Handheld Devices Such As Shake And Tilt, Can Have An Ability To Manipulate Virtual Objects, And Also The Physical Objects In The Real Domain.

Augmented Reality (AR) Can Be Applied For Education, Entertaining, Or Learning By Improving A User's View Of And Interaction With The Real Domain. User Can Do The Alteration Around The Three-Dimensional 3D Virtual Image And Observe It From Any Vintage Point, Just Like A Real Object. The Data Conveyed By The Virtual Objects Aids Users Perform Real- Domain Tasks. Physical Interface Metaphor Is One Of The Significant Way To Improve Learning. The Attribute Enables Manipulation Of Three-Dimensional 3D Virtual Objects Merely By Moving Real Cards Deprived Of Mouse Or Keyboard.

Augmented Reality (AR) Can Also Be Used To Boostjoint Tasks. It Is Possible To Develop Pioneering Computer Interfaces That Unite Virtual And Real Domains To Boost Face-To-Face And Remote Association. These Augmented Reality (AR) Applications Are Additionalsimilar To Natural Face-To-Face Collaboration Than To Screen Based Collaboration (Kiyokawa, Et Al., 2002).

Web Technologies And Internet Are Conjoint, As Appliedto Conditionpublic Still Desires Reading Books As A Substitute Of Facing Screens And Textbooks Are Still Expansively Used. Further Enthralling Application Of This Technology Is In Augmented Reality (AR) Readers. These Books Are Printed Normally But At A Point, Needswebcam To The Book Brings Imaginings And Interactions And Also Visualization Designed. This Is Imaginable By Relatingdiverse Software On A Computer, Using Diverse Mobile Apps Or A Web Site. The Above Technology Sanctions Any Existing Book To Be Developed Into An Augmented Reality (AR) Edition After Publication. Using Three Dimensional 3D Objects And Opinions, Numerous And Creative Media, Simulations With Diverse Types Of Communications Is The Coolest Ways Of Joining The Two Remotedomains. Over The Use Of Augmented Reality (AR) In Printed Book Pages, Textbooks Will Turn Into Dynamic Sources Of Material. In This Way Folks With No Computer Background Can Still Have Anironic Interactive Experience.

II. Conclusion

Augmented Reality(AR) Has Power To Modify How We Use Computers. Augmented Reality (AR) Makes The Incredibleconceivable And Its Probable In Education Is Just Commencing. Augmented Reality(AR) Interfaces Proposes Unified Communicationbetween The Real And Virtual Domains. Using Augmented Reality (AR) Systems Beginnersrelate With Thethree Dimensional 3D Data, Objects And Events In Ausual Way. The Educational Experience Offered Byaugmented Reality (AR) Is Diverse For A Number Of Reasons As Mark Billingham (2002) Mentioned:

Backing Of Continuouscommunication Between Real And Virtual Environments

The Use Of A Tangible Interface Metaphor For Object Manipulation

The Ability To Transition Easilyamongst Reality And Virtuality

It Is Crucial To Organize A Team Of Professional To Potential Augmented Reality (AR) Solution In Educational Matters. In Order To Attainaccurate Solutions One Needs To Plan, Design And Coordinate And Also To Manage Multi-Disciplinary Research Project To Boost Content And Environments. Instructorsnecessarily Work With Scholars To Develop Augmented Reality (AR) Interfaces. Software(S/W) And Hardware(H/W) Technologies Show An Significant And Important Key Role To Produce Augmented Reality (AR) Applications. There Are Engineers, Who Can Project Altered Augmented Reality(AR) Environments. However For Knowledge, In Educational Technology Field, There Is A Vastnecessityfor Instructionalengineers, Who Can Design Educationalactionsfor Augmented Reality (AR).

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