Augmented reality in education

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Abstract

In a rapidly changing technological society adopting and applying information at the right time and right place is needed to maintain efficiency in the field of education. Augmented reality is one of the technologies which can be applied in the field of education and acts to enhance the effectiveness and attractiveness of teaching and learning in real life scenarios. This article critically reviews how augmented reality can be applied to education and the potential impacts on the future.

Keywords

Augmented reality, Virtual Reality, Interface metaphor, augmented textbook, Education technology

Introduction

The ability to overlay computer graphics onto the real world is called augmented reality. Unlike immersive virtual reality, augmented reality interfaces allow users to see the real world at the same time as virtual imaginary attached to real locations and objects. Augmented reality is a technology that allows computer generated virtual imaginary information to be overlaid onto a live direct or indirect real-world environment in real time. (Azuma, 1997) (Billinghurst, 2002)

According to Johnson, Levine, Smith and Stone in the history of augmented reality, the first system to introduce this technology was for both augmented reality an virtual reality .But due to lack of processing power of computers at that time, it was not completely successful and only very simple wireframe drawings could be displayed in real time. But when this augmented reality has got its own identity, it has been used by major companies for visualization, training and other purpose. Augmented reality offers three dimensional virtual environments by modelling the real world you are experiencing by providing virtual objects. It supports education with experiential leaning. (Lee, 2012)

Augmented reality in education

Augmented reality is used in many fields such as military, engineering, robotics, maintenance and repair, consumer design etc. Its significance in education is also inevitable. Learners can experience and interact with real world according to his perception. One of the important ways to enhance learning is Tangible interface metaphor and it helps to manipulate three dimensional virtual objects by moving real cards without mouse or keyboard.

Augmented reality enhances collaborative tasks. Augmented reality technology can be used to develop innovative computer interfaces that combine virtual and real worlds to enhance face-to-face and remote collaborations and it will be more similar to real face to face collaboration than to screen based collaboration.

Another important application of augmented reality technology in education is augmented reality text books. These are normal books but pointed a webcam to the book to bring visualizations and interactions with the help of special software. Dynamic sources of information can be made by simulating augmented reality technology in text books.

Technologies used for augmented reality systems

The main devices used for augmented reality for better experience of imaginary word are Displays, computers, input and tracking devices.

Head mounted displays

It is a kind of display which we have to wear on the head. It has a small optic display in front of one or each eye. It can be of two types, video-see through systems and optical see-through systems. Video see-through systems are used to experience something remotely with the help of an image enhancement system. Optical see-through systems provides image of the real world through the optic glasses.

Handheld displays

Handheld displays are small computing devices with a display that the user can hold it on their palms. Example: smart-phones, PDAs

Pinch Gloves

Pinch gloves are pair of stretch-fabric gloves that contains sensors in each finger tips which detect contact between the digits of your hand. It uses gestures for interactive functions and wide range of control with three dimensional simulations. (Mehmet Kesima, 2012)

Conclusion

Augmented reality offer immaculate interaction between the real and cybernetic worlds and learners interact with three dimensional information, objects and events in a natural way. The education experience offered by augmented reality is different due to many reasons as Mark Billing Hurst mentioned.

- Support of ideal interaction between real and virtual world environments.
- The use of tangible interface metaphor for object manipulation.
- The ability of realignment smoothly between real and virtually.

Even though the researches have been shown that the augmented reality systems have the capability to augment students learning, the educational community remains unclear regarding the usefulness of augmented reality. It is essential to coordinate a team of specialists to design augmented reality solutions in educational issues. Educators must work with researchers to develop augmented reality interfaces effectively to apply in the field of education. However for learning the educational technology fields, there is a big need of instructional designers, who can design learning for augmented reality.

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