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Virtual Interaction on Augmented Reality for Education with Nonparametric Belief Propagation Algorithm

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Abstract

In this study. we develop a new technology. how the virtual environment 3D computer should be able to recognize human hand as part as virtual object. so it can interact with virtual environment for education. This research is using Nonparametric Belief Propagation (NBP) as a tracker in virtual interaction by using Augmented Reality (AR). the problem that arise in AR is how to read marker. so it can display a virtual object that has been computed before. basically NBP is used to read the geometry model of human hand. then the result from the processing of the human hand model geometry is used as a marker. so it can interact with a virtual environment on AR as one of the HCI model implementation. This process is intended for the movement of human hands that have been read as a virtual object can communicate virtually using image processing.

Keywords: Human Computer Interaction; Augmented Reality; AR-Education; NBP; Virtual Interaction

1. Introduction

Augmented Reality (AR) is to merge the real world and virtual environment. Virtual object added into real world in order to improve or to add more information from the object. AR is a computer-generated data integration with the real world. which among others can be done with computer graphics rendering on a real-time footage. AR can be used for many things. such as displaying a mobile directions to head-up display. in the medical field. the AR may help doctors to insert information on a patient's medical record (such as x-ray result from the patients). or to reconstruct the old buildings and historic as reality which

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can be seen at present time. Virtual Reality (VR) was developed using a concept that actually use the environment which are engineered in such a way that resembles the real world.

AR and VR provide features that complement each other from the results displayed by the computer-generated images to provide another experience for the user. The differences would be very visible at the time of AR displays the real world that actually taken from real-time environment where the real environment are given an additional reality the result of image processing performed by the computer. Combined real-world and computer engineering image that is currently being developed by several research at several universities such as Columbia University and the University of South Australia.

To do such a thing. someone can connect a video camera to the computer and create a virtual image on a digital paper (paper that has been contained images that can be read by a computer camera as a marker) or other objects that have been determined so that the camera can be recognized by computer or better known on AR as the HMD (Head Mounted Display). so that the user can see the virtual object on paper or augmented objects that have been determined. on the computer screen.

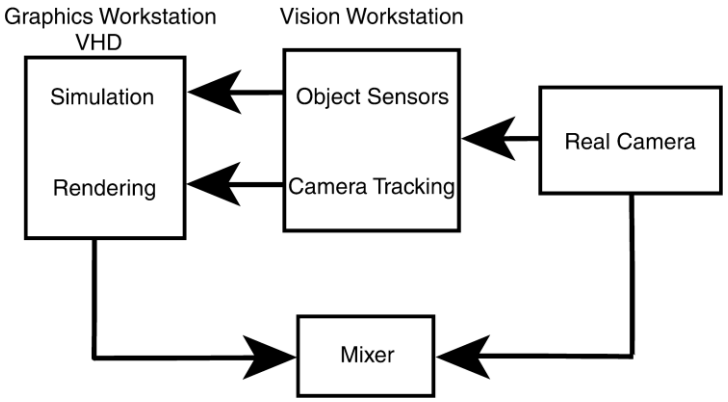

Fig. 1. AR System in General.

HMD introduced for the first time in 1968 and VR are the focus area of its development. there are some similarities. the problems that arise in research on VR and AR but not dependent on the physical environment which then can be displayed on the monitor or the projector. the VR research. researchers engineered environments has a limited to using a computer and thus require substantial resources to produce large environments. distinction from AR that uses a real environment as a basis and added to computer engineering. so researchers were not stuck with how to develop a virtual environment. but they are use the real environment in real time.