

Research on Interaction Technology in Augmented Reality based on Smart Phone

Yu Jiayao

ABSTRACT

This thesis mainly researches on how to apply interaction technology in augmented reality (AR) for display of historical sites in a portable way for tourists. Overall, the thesis develops those by using the Unity3d game engine with programming in C#, and builds it to an Android App as production presentation. Also, the thesis accomplishes those by three steps: construction of AR scenes, touchscreen interaction and then embodied interaction with virtual objects, with an emphasis on the last step -- embodied interaction.

In terms of construction of AR scene, the thesis obtains the real environment with the help of WebCamTexture class in Unity3d, calling the phone's camera to record its view as the texture of a customized plane, binding the plane to the view port and following the latter's movement in real-time. Meanwhile, the thesis places off-the-shelf models in the scene, set virtual objects' position and scale according to the real world, and edit their animation into a micro story to spice up this App. When it comes to touchscreen interactions with virtual objects, via Transform component in Unity3d, the thesis achieves touchscreen gestures like dragging, scaling, rotating, etc.

For embodied interaction with virtual objects, the thesis reads rotation degree of each coordinate axis in 3D world, from built-in gyroscope of cellphone, and calculates the camera's attitude real-timely. After that, the thesis activates interactions with virtual objects according to user's sight denoted by camera's attitude; in addition, the thesis moves the camera along with a preset track, making user feels like going sightseeing in AR while his/her view moving with the camera.

Keywords: Augmented Reality, Interaction, Gyroscope, Unity3d, Smart Phone