Adaptive Framework for Online Deployment of Virtual Scenes on Heterogeneous Applications

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First page example

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Key words: Virtual Reality, Semantics, Ontology, Optimization, Deployment.

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Introduction

With the vividness and interactivity brought to us by virtual reality technology, the virtual scenes developments are widely carried out in many application domains. Such domains include tourism, medicine, education and advertisement. In order to achieve great results of simulating physical presence for the users, the virtual reality developers are equipped with powerful commercial tools (such as Maya and 3ds Max) for creating complex 3D scenes containing huge number of geometry objects and appearence information. These complex virtual scenes give users immersive and highly visual experience in their application domains with high-end user facilities coupling with great processing power, high image resolution, and sufficient communication bandwidth. However, this situation changes recently with emergence of online application of virtual reality technologies, such as virtual 3D online shopping and online virtual tour. With rapid growing of online virtual reality applications, there are more and more users who are gaining access to virtual scenes with their own personal access devices, such as PC, laptop, PDA and mobile phone. Those personal computing devices share the common limitations: lacking of computing power, displaying resolution and communication bandwidth to run the virtual scenes with large mass of geometry and appearance data developed by experts using powerful modeling tools in traditional virtual reality applications. Running such virtual scenes on the limited devices can cause long waiting time for downloading due to the bandwidth shortage or distinct lag between adjacent scenes due to the limited processing power.

Although great efforts have been made by 3D developers to create complex 3D scenes, for these reasons above, many of these scenes can not be directly used by online virtual reality applications [1]. Thus, many online applications need to create their own virtual scenes for their own domains and devices abilities instead of reusing the scenes created by the experts from other domains. In order to solve this problem, a process of adaptation needs to be placed between the complex 3D scenes and the online end-user devices which are consuming the 3D data. Through an adaptation process, the virtual scenes developed by other application domains are adapted to reach the level of computing and transmission abilities of the online end-user devices.