Abstract

Augmented reality provides a user with a view of their current surroundings augmented with virtual objects. To immerse the user into the augmented world the virtual and real world must blend in together seamlessly. Standard augmented reality frameworks rely on real-time rendering for displaying the virtual elements in the augmented scene. For real-time rendering the computations required to display the scene must be fast and optimised, which could prove to be a problem when attempting to use photorealism methods to render convincing virtual objects. In a photorealistic augmented scene, advanced lighting and shading methods which take information from the real world as input into their respective calculations must be considered.

This paper suggests using stylised rendering in order to integrate the virtual elements by abstracting details from both the virtual and real planes. However, for the virtual model to keep intact with the real scene, some photorealistic techniques such as shadows and light estimation are used. To abstract the camera image a smoothing filter and edge detection algorithm are used. The smoothing blurs the finer details from the image and the edge detection function is used to outline the edges found in the image for a cartoon like effect. The virtual object is stylised by using non-photorealistic rendering techniques (NPR). The combined NPR and photorealistic methods used are proven to be fast enough to generate augmented images in real-time and are customizable through the stylised AR framework presented in the paper. The results show quite clearly that the used paradigm is successful in proving the hybrid augmented reality concept and provides an integrated and pleasing AR experience.