Augmented VR

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Figure 1: Two remote users are playing an immersive game in which the virtual world is augmented with realistic elements. Each user's virtual replica is 3D reconstructed in real-time, effectively re-creating their appearance as 3D media. These are then compressed and transmitted along with other necessary meta-data (body posture, gesture information) in order to facilitate their remote interaction within the virtual environment.

ABSTRACT

Traditional VR is mostly about headset experiences either in completely virtual environments or 360° videos. On the other hand AR has been mixing realities by inserting the virtual within the real. In this work we present the Augmented VR concept that lies at the middle right of the virtuality continuum, typically referred to as augmented virtuality. We offer another perspective by blending the real within the virtual focusing on capturing actual human performances in three dimensions and emplacing them within virtual environments [1–3]. By compressing and transmitting this new type of 3D media we can also achieve real-time interaction, communication and collaboration between users. Being in full 3D our media are compatible with a variety of applications be it either VR, AR, MR and open up new exciting opportunities like free viewpoint spectating while also increasing the feeling of immersion of all participating users. We demonstrate our technology via a prototype two player game that can support spectating in various devices like head mounted displays (VR) or tablet laptops (AR). Our system is easy to setup, requiring minimal non-technical human intervention, and relatively low cost taking one step ahead in making this technology available to the consumer public.

Index Terms: Human-centered computing—Human computer interaction (HCI)—Interaction paradigms—Virtual reality; Human-centered computing—Human computer interaction (HCI)—Interaction paradigms—Mixed / augmented reality; Computing methodologies—Computer graphics—Graphics systems and interfaces—Mixed / augmented reality; Computing methodologies—Computer vision—Image and video acquisition—Camera calibration; Computing methodologies—Computer vision—Computer vision representations—Appearance and texture representations; Computing methodologies—Computer vision—Computer vision problems—Reconstruction; Multi-user Virtual Reality; Tele-immersion;

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