

Previsualization and Virtual Production Pipeline Development at RIT

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I. INTRODUCTION

Epic Games Unreal Engine is at the center of multiple disruptive technologies, accelerating media tool development. This is generating a need to accelerate the learning process for those using these tools. With funding earned through the Epic megagrants program, a multi-disciplinary team at RIT is specifically addressing the shift from traditional film production to virtual production by working with key industry partners at multiple levels and developing an adaptive curriculum that will adjust to future changes and industry needs.



Fig. 1. Example virtual production stage at Imaginarium Studios. (<https://www.foundry.com/insights/film-tv/virtual-production-imaginarium-studios>)

II. VIRTUAL PRODUCTION

Virtual motion picture production and 3D-animated previsualization are now fully mainstream and rapidly changing how feature films and TV series are conceived and created. The integration of the Unreal Engine brings the ability to integrate interactive elements, iterative 3D tools, photogrammetry, VR scouting, real-time compositing, rendering, and on-set tracking metadata which are redefining modern filmmaking pipelines.

Motion capture technologies can be used to track actor movements and apply them to animations of virtual avatars in the computer-generated imagery (CGI) pipeline. Further, tracking and previsualization

technologies permit virtual cameras to be choreographed in engine by real cinematographers interacting with the live stage actors. Combining these blocking and action captures with real-time compositing and physically accurate rendering yields high fidelity motion picture sequences suitable for final exhibition.

In other workflows, tracking data and photogrammetry are used on a live motion picture set to drive backplate graphic renders for in-camera visual effects. By placing large-scale emissive screens behind practical set pieces, live compositing is accomplished, but with the benefit of accurate motion parallax and optical depth rendering for choreographed camera moves.



Fig. 2. Recording Motion Capture data with a virtual camera using the Perception Neuron mocap suit and the Unreal engine

III. DEMONSTRATION

In this demonstration, motion picture science students, Cole Swiernik and Maddie Nardi, will be utilizing the Perception Neuron motion capture suit and the HTC Vive system to track the motion of a virtual actor and virtual camera. The virtual camera is able to move freely around the subject to enable the cinematographer working with the actor. The Perception Neuron captures rough performance elements that can be later polished by the animator. The purpose of this demonstration is to highlight the capabilities and benefits of using VR and motion capture technology for actor placements, and pre-rendered animation assets that can later be adjusted in post.

