Driving Motion Control by Motion Capture Using CG

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1 Introduction

In creating the Pepsi “Dance Tron” commercial (accepted to the 2007 SIGGRAPH Computer Animation Festival), Method Studios combined motion capture with motion control in a novel manner. Following a pre-shoot motion capture session with breakdancers, we used a skeleton in Autodesk’s Maya for pre-visualization of the intricate dance moves to select the desired motions. Repeatable action rigging systems, built to hold ten dancers and mounted on a gimbal for the live shoot, were created to reproduce as much movement as possible, and these rigs were driven by data created in CG based upon the motion capture. In this manner, we were able to smoothly combine CG and practical elements, a method that we believe to be best for generating a believable appearance for such imaginative creations.

2 Execution

The request from Pepsi was to create a giant made of people that would perform breakdancing moves. With a working period of less than two months, such an undertaking required very detailed and specific preparation. We built upon a technique with which we had experimented for the first time in the Adidas “Carry” spot – exporting motion capture data to CG and then to a motion control camera. In “Carry,” a man appears to carry dozens of people stacked upon his shoulders. For that effect, the hero was shot carrying a backpack with tracking markers protruding upward; we extracted these data to create a camera solution whereby we moved the camera from the proper perspective, given that the rig (holding the people) was fixed and the camera was moving. What we learned during that process allowed for us to imagine methods of building the Dance Tron.

Our approach was two-fold: first, capture the movements of breakdancers for the dancing motion of the giant, and second, construct a practical rig able to both support real people and perform the captured motion. The rig for the upper body consisted of a spine, shoulders, and arms, articulated to be able to mimic the dancers’ movements. Additionally, a gimbal was created on stage to mimic the movement captured from the dancers. After we selected dance moves from the skeleton pre-visualization in Maya, we translated these movements into motion control for the onstage rig. Along with the three hydraulic arms controlling the gimbal, a moving camera was used to create the motion of the Dance Tron. E.g., in a shot showing the giant stepping forward, the upper body was a practical element – the onstage rig and dancers. Their rotation and translation were re-created (from the motion capture) with a novel combination of gimbal and camera motion; we were able to zero the transforms and layer the action of the rig and the camera together. This live-action shot was blended with the CG elements of the legs.

We always prefer to combine real and CG elements to create the most believable shot. Every CG segment in the commercial also contains live shots. Since we had the motion capture data usable in both Maya and the onstage rig, mixing the movement of real shots with the portions that could only be done using CG was seamless.

3 End product

Necessity is the mother of invention. Our need for a quick turnaround, coupled with our desire for the most photorealistic appearance possible, spurred us to create this process of combining motion captured data, CG pre-visualization, and onstage motion control.