A brief breakdown of the Sandbox Motion Capture workflow

OVERVIEW & PURPOSE

Sandbox uses emerging technologies such as the Xsens inertial motion capture suits and Unreal Engine to effectively convey our action design.

Step-by-step workflow

1. **Pre-Production**
    a. Stunt Coordinator, Fight Choreographer, and Stunt Vis Coordinator review choreography to determine capture strategy. This phase determines blend points (where we begin and end capture of choreography), what rig may be required for specific action, and splitting responsibilities between post work (additional animation) and performance capture on the day.
    b. Asset prep as needed (Environment, Character, Weapon, etc.)
    c. Consult necessary departments for pipeline integration and information (VFX, PreVis, Art, etc.)
2. **XSens Capture -** ***Xsens suits, Manus Gloves, MVN Animate Pro***
    a. Fit stunt performers for inertial motion capture suits & measure body dimensions for more accurate data.
    b. Proceed with the capture schedule detailed in part 1 of workflow. Capture time is dictated by the length and intricacies of the choreography.
    c. Record all capture from witness cameras for reference in Post.

3. **HD Reprocessing -** ***MVN Animate Pro***
    a. Our first stage in the motion capture clean up. Typically this takes up to a day depending on the amount of data captured.
4. **Retarget + Layout -** ***Motion Builder***
    a. Import HD Reprocessed data into Motion Builder for retargeting the captured data to specific characters.
    b. Rough blend of data captured to assist in layout.
    c. Initial layout is done with rudimentary scene building for geography purposes. Layout includes geography, interaction between characters, and timing of performance.
5. **Camera Pass -** ***Maya/Unreal***
    a. Import rough data into Maya/Unreal for initial camera pass. This will shortcut the amount of work for the motion capture/clean up artists because we can focus efforts on what is seen per shot, rather than cleaning up everything.
6. **Edit -** ***Premiere***
    a. Building a rough cut edit off of our layout shots to ensure the Action Design.
7. **Mocap Data clean up -** ***Motion Builder***
    a. Use the rough cut to determine what is in frame and needs to be cleaned up. I.E. jittering data, clipping of limbs with the body, etc.
    b. Clean up contacts between characters so that the previs represents the action performed accurately.
8. **3D work -** ***Unreal***
    a. Import clean data to Unreal
    b. Clean up camera movement and composition + camera work for additional shots
    c. Add anything necessary to tell the story - IE cape simulations, lighting, etc.
    d. Render all shots out of Unreal
9. **Edit -** ***Premiere, After Effects, Audition***
    a. Import updated shots into timeline
    b. Refine edit
    c. Add extra VFX sweeteners for final polish
    d. Sound Design
    e. Final Render

Hardware required

1. XSens suits
2. Manus gloves
3. Computers
4. Stunt Rigging equipment

Software required

1. MVN Animate Pro
2. Maya
3. Unreal Engine 5
4. Adobe Suite