Bringing First Responders to Life Through Art, Animation, and AI

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DISCLAIMER

Certain commercial entities, equipment, or materials may be identified in this document in order to describe an experimental procedure or concept adequately.

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* Please note, unless mentioned in reference to a NIST Publication, all information and data presented is preliminary/in-progress and subject to change
PRODUCTION PIPELINE

- Modeling
  - 3D Asset

- Texturing
  - Visual

- Rigging
  - Controls

- Animation
  - Movement

- AI
  - Interaction
Modeling and Texturing

Jeff Karhoff – 3D Modeler, UI/UX Designer

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HIGH TO LOW MODELING PROCESS

1. Reference Collection
2. Block Out Phase (Maya)
3. High Poly Model (ZBrush)
4. Low Poly Model (Maya)
5. Texturing (Substance Painter)
REFERENCE COLLECTION

• Collect Reference
  • Turnout Gear
  • Accessories
  • SCBA
BLOCK OUT PHASE

- Creating Basic Structure
  - Quick iterations
  - Start collaborating with animator
  - Main structure of the character
HIGH POLY MODEL

- VR Consideration
  - Block out is what is used to sculpt on detail
  - This model won’t be used in the engine
  - Color ID’s are used to create material separation
Low Poly Model is created from the High Poly model by retopology
UV UNWRAPPING
SUBSTANCE PAINTER: TEXTURE BAKE

- VR Considerations
  - Texture Size: 1024, 2048, 4096
  - Polygon Count
  - Texel Density
  - Lighting/Dynamic
Rigging & Animation

Ted Conry – Animator
RIGGING AND ANIMATION

Rigging
Applying bone structure that is used to manipulate the 3D model

Animation
Applying motion to the bone structure to give the appearance of movement
• Geometry
  • Vertices
    • Point position in space
  • Edges
    • Connection between two vertices
  • Faces
    • Connection between three or more vertices
RIGGING: CONSTRUCTION

- Rigging
  - Joints
    - Deforms the geometry
  - Controllers
    - Drives the Joints
RIGGING: CONTROLS

- Forward Kinetics
  - Controls joint rotation
- Inverse Kinetics
  - Controls limbs translation and rotation
- Constraints
  - Controls external equipment
ANIMATION: BASICS TERMS

- Keys
  - Set value on the control rig
    - Timeline
    - Space
- In-betweens
  - Keys are added between two keys
    - Smoother transition
    - A sense of motion

Video not Shown
ANIMATION: METHODS

- Pose to Pose
  - Keys are set on major poses
    - Blocking major poses
- Straight Ahead
  - Keys are applied sequential order
- Motion Capture
  - Keys are applied based on camera and live actor
ANIMATION: GRAPH EDITOR

- Tangents
  - Spline
  - Linear
  - Stepped
ANIMATION: LAYERS

- Adds or subtracts fidelity to the motion
  - Isolating controls
  - Layering details

Video not Shown
ANIMATION: TIME EDITOR

- Clips
  - Relocated Animation
  - Warp Time

Video not Shown
ANIMATION: REFERENCE & EXPORTING

• Using Reference
  • Capture live video
  • Web resources
• Exporting Animation
  • FBX
• Unreal Engine Basics
  • Blend spaces
UP NEXT

Engine & AI

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UNREAL ENGINE & AI
UNREAL ENGINE & AI
THANK YOU!

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