Humanoid Animation

ISO/IEC JTC 1/SC 24 WG 9 & Web3D Meetings

January 15-18, 2018

Myeong Won Lee
ISO/IEC 19774-1 CD2 and 19774-2 CD2 revision
H-Anim CD2 Checklist

• Hand joints
  – midcarpal joint problems

• Size of hand images
  – Left hand and right hand images were corrected
  – Original materials PPT files were uploaded to the Web3D GitHub

• Part 1
  – Table 4.4 LOA4 hand Joint object names
  – Figure 4.6 LOA-4 Joints
  – Figure 4.11 Basic set of Joint:Segment hierarchy for LOA4

• Part 1
  – Table 4.temp - Joint:Segment naming consistency check ??
    – VRML is necessary here ??

• Part 2
  – Figure 4.1 – Procedure of humanoid animation

• Review of collated disposition comments about CD2
Joint names of LOA4 (right hand)

r_radiocarpal
r_midcarpal_3
r_midcarpal_4
r_carpometacarpal_4
r_carpometacarpal_5
r_metacarpophalangeal_4
r_metacarpophalangeal_5
r_carpal_proximal_interphalangeal_4
r_carpal_proximal_interphalangeal_5
r_carpal_distal_interphalangeal_5
r_carpal_distal_interphalangeal_4
l_midcarpal_1
l_midcarpal_2
r_carpometacarpal_1
r_carpometacarpal_2
r_carpometacarpal_3
r_metacarpophalangeal_1
r_metacarpophalangeal_2
r_metacarpophalangeal_3
r_carpal_proximal_interphalangeal_1
r_carpal_proximal_interphalangeal_2
r_carpal_proximal_interphalangeal_3
r_carpal_proximal_interphalangeal_4
r_carpal_proximal_interphalangeal_5
r_carpal_distal_interphalangeal_1
r_carpal_distal_interphalangeal_2
r_carpal_distal_interphalangeal_3
r_carpal_distal_interphalangeal_4
r_carpal_distal_interphalangeal_5
Joint names of LOA4 (left foot)
Joint names of LOA4 (right foot)

- r_calcaneus_cuboid
- r_transverse_tarsal
- r_talocalcaneonavicular
- r_cuneonavicular_3
- r_cuneonavicular_2
- r_cuneonavicular_1
- r_tarsometatarsal_1
- r_metatarsophalangeal_1
- r_tarsal_interphalangeal_1
- r_tarsal_distal_interphalangeal_2
- r_tarsal_proximal_interphalangeal_2
- r_tarsal_proximal_interphalangeal_5
- r_tarsal_proximal_interphalangeal_4
- r_tarsal_proximal_interphalangeal_3
- r_tarsal_distal_interphalangeal_3
- r_tarsal_distal_interphalangeal_5
- r_tarsal_distal_interphalangeal_4
- r_tarsal_interphalangeal_1
- r_metatarsophalangeal_2
- r_metatarsophalangeal_3
- r_metatarsophalangeal_4
- r_metatarsophalangeal_5
- r_talocrural
- r_talocalcaneonavicular
Medical notice

- l_midcarpal_1 : l_trapezium
- l_midcarpal_2 : l_trapezoid
- l_midcarpal_3 : l_capitate
- l_midcarpal_4 : l_hamate

Note: In medical terminology, midcarpal_1, midcarpal_2, midcarpal_3, and midcarpal_4 are not joints, but rather are bone connection points.
Figure 6.71. Bones of wrist and hand. A. In radiographs of the wrist and hand the “joint space” at the distal end of the ulna appears wide because of the radiolucent articular disc. (Courtesy of Dr. E. L. Lansdown, Professor of Medical Imaging, University of Toronto, Toronto, Ontario, Canada.) B. This coronal section of the right hand demonstrates the distal radioulnar, wrist, intercarpal, carpometacarpal, and intermetacarpal joints. Although they appear to be continuous when viewed radiographically in parts A and C, the articular cavities of the distal radioulnar and wrist joints are separated by the articular disc of the distal radioulnar joint. C. This coronal MRI shows the wrist. Structures are identified in part A. (Courtesy of Dr. W. Kucharczyk, Chair of Medical Imaging and Clinical Director of Tri-Hospital Magnetic Resonance Centre, Toronto, Ontario, Canada.)
Part 2:
Figure 4.1 – Procedure of humanoid animation
The followings are slides previously presented at the Arlington SC24 Plenary in 2017
H-Anim Standardization Status
Status of H-Anim Revision

- CD 2
  - ISO/IEC 19774 Humanoid Animation – Part 1: Architecture
  - ISO/IEC 19774 Humanoid Animation – Part 2: **Motion Data Animation**

- Implementation software and examples for H-Anim modeling and motion capture animation
  - H-Anim modeling
    - H-Anim modeling guidelines for general graphics tools
    - Wrl-to-x3d H-Anim model converter for **LOA-0, LOA-1, LOA-2, LOA-3 and LOA-4 H-Anim models**
  - H-Anim motion capture animation
    - Mocap parameters to X3D interpolators converter
    - H-Anim motion viewer for **LOA-0, LOA-1, LOA-2, LOA-3 and LOA-4 H-Anim models**
    - H-Anim motion editor with **LOA-0, LOA-1, LOA-2, LOA-3 and LOA-4 H-Anim models and motion capture animation**
ISO/IEC 19774 Humanoid Animation V1.0: 2006

- Foreword
- Introduction
- 1. Scope
- 2. Normative references
- 3. Terms and definitions
- 4. Concepts
- 5. Abstract data types
- 6. Object interfaces
- 7. Conformance
- Annexes
  - A. Nominal body dimensions and levels of articulation
  - B. Feature points for the human body
  - C. VRML binding
  - D. X3D binding
  - E. Guidelines for H-Anim in VRML and X3D worlds
- Bibliography
• 26.1 Introduction
  – 26.1.1 Name
  – 26.1.2 Overview
• 26.2 Concepts
• 26.3 Node reference
  – 26.3.1 HAnimDisplacer
  – 26.3.2 HAnimHumanoid
  – 26.3.3 HAnimJoint
  – 26.3.4 HAnimSegment
  – 26.3.5 HAnimSite
• 26.4 Support levels
• Table 26.1 – Topics
• Table 26.3 – H-Anim component support levels
Humanoid Animation V1.0 - Part 1: Architecture

- Foreword
- Introduction
- 1. Scope
- 2. Normative references
- 3. Terms, definitions, symbols, and abbreviations
- 4. Concepts
- 5. Abstract data types
- 6. Object interfaces
- 7. Conformance
- Annexes
  - A. Nominal body dimensions and levels of articulation
  - B. Feature points for the human body
  - C. VRML binding
  - D. X3D binding
  - E. Guidelines for H-Anim in VRML and X3D worlds
  - F. Guidelines for H-Anim character design
- Bibliography
Humanoid Animation-Part 2: Motion Data Animation

Foreword
Introduction
1 Scope
2 Normative references
3 Terms, definitions, acronyms, and abbreviations
4 Concepts
4.1 General
4.2 Introduction to animation using motion data
4.3 Humanoid animation data
4.4 H-Anim joint mapping for motion capture animation
4.5 Composition of motion capture data
4.6 Transformation of H-Anim motion capture animation
4.7 H-Anim animation data for keyframe animation
4.8 H-Anim animation definition for motion capture animation
5 H-Anim motion capture animation using interpolators
5.1 General
5.2 Definition of captured motion data for interpolators
5.3 Comparison of different LOA motion capture animation using interpolators
6 H-Anim motion definition using motion node
6.1 General
6.2 Introduction to Motion objects
6.3 Data structure of Motion objects
6.4 Joint mapping definition
6.5 Location of Motion object
7 Conformance
Annex
A (informative) Motion capture file examples
B (informative) An example of H-Anim keyframe animation using interpolators
C (informative) An example of H-Anim motion capture animation using interpolators
D (informative) An example of H-Anim motion capture animation using Motion object
E (informative) An example of programming code for Euler to SFRotation angle conversion
Bibliography
H-Anim Part 1: Architecture
H-Anim Hierarchy

ISO/IEC 19774
Humanoid Animation

H-Anim 1.1

Joint Segments Sites

Joint

Spinal Joint Recommended by Spec

Typical Minimal Humanoid Joints

Indicates Children of Joint

Segment

Example Sites

Objects with names beginning with _have a corresponding object with a name starting with r_(left/right).

Indicates Item Added in 1.1

Chart by J. Eric Mason and Veronica Polo, VTI Telekom Inc.
Elbow

Radiocarpal_joint (wrist): hand
  midcarpal_Joint_12: trapezoid
    carpometacarpal_Joint_1: metacarpal1
    metacarpophalangeal_Joint_1: proximal_phalanges1
    interphalangeal_Joint_1: distal_phalanges1
  carpometacarpal_Joint_2: metacarpal2
    metacarpophalangeal_Joint_2: proximal_phalanges2
    proximal_Interphalangeal_Joint_2: middle_phalanges2
    distal_Interphalangeal_Joint_2: distal_phalanges2
  midcarpal_Joint_3: capitate
    carpometacarpal_Joint_3: metacarpal3
    metacarpophalangeal_Joint_3: proximal_phalanges3
    proximal_Interphalangeal_Joint_3: middle_phalanges3
    distal_Interphalangeal_Joint_3: distal_phalanges3
  midcarpal_Joint_45: hamate
    carpometacarpal_Joint_4: metacarpal4
    metacarpophalangeal_Joint_4: proximal_phalanges4
    proximal_Interphalangeal_Joint_4: middle_phalanges4
    distal_Interphalangeal_Joint_4: distal_phalanges4
    carpometacarpal_Joint_5: metacarpal4
    metacarpophalangeal_Joint_5: proximal_phalanges5
    proximal_Interphalangeal_Joint_5: middle_phalanges5
    distal_Interphalangeal_Joint_5: distal_phalanges5
LOA 4 Foot

Tibia
- Talocrural Joint: talus (hindfoot)
- Talocalcaneonavicular Joint: navicular
  - Cuneonavicular Joint 1: cuneiform 1
    - Tarsometatarsal Joint 1: metatarsal 1
      - Metatarsophalangeal Joint 1: proximal phalanges 1
        - f_ Interphalangeal Joint: distal phalanges 1
  - Cuneonavicular Joint 2: cuneiform 2
    - Tarsometatarsal Joint 2: metatarsal 2
      - Metatarsophalangeal Joint 2: proximal phalanges 2
        - f_Proximal Interphalangeal Joint 2: middle phalanges 2
        - f_Distal Interphalangeal Joint 2: distal phalanges 2
  - Cuneonavicular Joint 3: cuneiform 3
    - Tarsometatarsal Joint 3: metatarsal 2
      - Metatarsophalangeal Joint 3: proximal phalanges 3
        - f_Proximal Interphalangeal Joint 3: middle phalanges 3
        - f_Distal Interphalangeal Joint 3: distal phalanges 3
- Calcaneocuboid Joint: calcaneus
- Transversetarsal Joint: cuboid
  - Tarsometatarsal Joint 4: metatarsal 4
    - Metatarsophalangeal Joint 4: proximal phalanges 4
      - f_Proximal Interphalangeal Joint 4: middle phalanges 4
      - f_Distal Interphalangeal Joint 4: distal phalanges 4
  - Tarsometatarsal Joint 5: metatarsal 5
    - Metatarsophalangeal Joint 5: proximal phalanges 5
      - f_Proximal Interphalangeal Joint 5: middle phalanges 5
      - f_Distal Interphalangeal Joint 5: distal phalanges 5

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Provided by Kwan-Hee Yoo (Chungbuk National Univ.)
## LOA Comparison

<table>
<thead>
<tr>
<th></th>
<th>LOA 1</th>
<th>LOA 2</th>
<th>LOA 3</th>
<th>LOA 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of joints</strong></td>
<td>18</td>
<td>71</td>
<td>94</td>
<td>144</td>
</tr>
<tr>
<td><strong>No. of segments</strong></td>
<td>18</td>
<td>71</td>
<td>94</td>
<td>144</td>
</tr>
<tr>
<td><strong>Representation details</strong></td>
<td>Basic joint hierarchy</td>
<td>More backbone joints compared to LOA1, addition of finger joints</td>
<td>More backbone joints compared to LOA2, 7 eye joints in face</td>
<td>More hands and feet joints compared to LOA3</td>
</tr>
<tr>
<td><strong>Motion capture devices</strong></td>
<td>MS Kinect</td>
<td>Subset of LOA2 joints available depending on mocap devices (between LOA1 and LOA2)</td>
<td>None (possible using increased motion sensors)</td>
<td>None (possible using increased motion sensors)</td>
</tr>
<tr>
<td><strong>Animation levels</strong></td>
<td>Simple humanoid animation</td>
<td>More detailed animation such as finger animation (e.g. for piano and guitar) compared to LOA1</td>
<td>Detailed animation upgraded with facial animation (such as eyeball and other eye joint animation), more natural animation compared to LOA2</td>
<td>Detailed animation upgraded with anatomical hands and feet joints</td>
</tr>
</tbody>
</table>
### Joints composition for each LOA (No. of joints)

<table>
<thead>
<tr>
<th></th>
<th>LOA 1</th>
<th>LOA 2</th>
<th>LOA 3</th>
<th>LOA 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Waist</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Backbone</td>
<td>1</td>
<td>8</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Arm</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Leg</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Hands</td>
<td>2</td>
<td>40</td>
<td>40</td>
<td>46</td>
</tr>
<tr>
<td>Feet</td>
<td>2</td>
<td>8</td>
<td>8</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>71</td>
<td>94</td>
<td>144</td>
</tr>
</tbody>
</table>
LOA 1 Modeling example

l_shoulder
l_acromioclavicular
l_sternoclavicular
l_shoulder
l_acromioclavicular
H-Anim Part 2: Motion Capture
Humanoid Animation Generation Using H-Anim

Motion Capture Animation

- **Motion Capture Data**
- **3D Scanner Data**
- **3D Model Data**

**Joint Mapping**

**3D Model Data Converter**

**H-Anim X3D Model**

**Motion Definition Component**

**Motion by Interpolator nodes**

**New H-Anim Schema**

**Keyframe Animation**

**Keyframe Animator**

**Motion File**

**Motion Parser**

**Motion Viewer**

**Motion Algorithm**

**Motion Capture Animation**
Modeling an H-Anim Character

- Design using general tools (e.g. 3ds Max)
  - Model a segment with H-Anim joint name, define center of each joint, integrate segments, and complete an H-Anim human figure

- Design using 3D scanner data
  - Obtain scanner data, divide each segment data, provide each segment with an H-Anim segment name, provide each joint with a center point, and integrate segments, and complete an H-Anim human figure
### Mocap and H-Anim LOA1 Joint

<table>
<thead>
<tr>
<th>Mocap (BVH) Joint Name</th>
<th>H-Anim Joint Name (19774:2006 v1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hips</td>
<td>HumanoidRoot</td>
</tr>
<tr>
<td>LeftHip</td>
<td>l_hip</td>
</tr>
<tr>
<td>LeftKnee</td>
<td>l_knee</td>
</tr>
<tr>
<td>LeftAnkle</td>
<td>l_ankle</td>
</tr>
<tr>
<td>RightHip</td>
<td>r_midtarsal</td>
</tr>
<tr>
<td>RightKnee</td>
<td>r_hip</td>
</tr>
<tr>
<td>RightAnkle</td>
<td>r_knee</td>
</tr>
<tr>
<td>Chest</td>
<td>r_ankle</td>
</tr>
<tr>
<td>LeftCollar</td>
<td>vl5</td>
</tr>
<tr>
<td>LeftShoulder</td>
<td>l_shoulder</td>
</tr>
<tr>
<td>LeftElbow</td>
<td>l_elbow</td>
</tr>
<tr>
<td>LeftWrist</td>
<td>l_wrist</td>
</tr>
<tr>
<td>RightCollar</td>
<td>l_midtarsal</td>
</tr>
<tr>
<td>RightShoulder</td>
<td>r_shoulder</td>
</tr>
<tr>
<td>RightElbow</td>
<td>r_elbow</td>
</tr>
<tr>
<td>RightWrist</td>
<td>r_wrist</td>
</tr>
<tr>
<td>Neck</td>
<td>sacroiliac</td>
</tr>
<tr>
<td>Head</td>
<td>Skullbase</td>
</tr>
</tbody>
</table>
Motion Definition Using Motion Capture Data

- Definition using X3D Interpolator (1)
  - Conversion of motion capture data (e.g. bvh) to X3D Interpolator
  - Bvh to X3D interpolator conversion
    - Requires conversion between motion capture rotation angles such as euler angles and SFRotation angles
    - Requires conversion between the orders of parameter values

- Definition of Motion Object (2)
  - Motion object
    - Define motion capture animation for an H-Anim character model
    - Define an H-Anim model, joint mapping, motion capture data
      - An H-Anim model is specified.
      - For joint mapping, joints array for joint mapping of a motion capture figure to the H-Anim model, and channels array for specifying the number of channels and channel types corresponding to the motion capture data are specified.
      - Motion capture data are specified.
Converter Program: WRL to X3D H-Anim (1)

WRL File

Definition of H-Anim structure with joint hierarchy, joint center, and segment geometry

X3D H-Anim File

DEF skullbase Transform { ...
  Shape { ...
}
DEF vc4 Transform { ...
  Shape { ...
}
DEF vl1 Transform { ...
  Shape { ...
}
DEF humanoidRoot Transform { ...
  Shape { ...
}

<Scene>
...
<HAnimHumanoid DEF="Ru" ...>
<HAnimJoint DEF="Ru_HumanoidRoot" center= ...
<HAnimJoint DEF="Ru_sacroiliac" center=...
<HAnimSegment DEF="Ru_pelvis", ...
<Transform ...>
<Shape>
...
</Shape>
</Transform>
</HAnimSegment>
<HAnimJoint DEF="Ru_l_hip" center=...
H-Anim Character Modeling File (X3D H-Anim)

- H-Anim modeling file

```
<Scene>
  <NavigationInfo speed='1.5' type="EXAMINE" "ANY"/>
  <Viewpoint centerOfRotation='0 1 0' description='Jin' position='0 1 3'/>
  <HAnimHumanoid DEF='Jin' info=""humanoidVersion=2.0"" name='Jin' scale='0.0225 0.0225 0.0225' version='2.0'>
    <HAnimJoint DEF='Jin_HumanoidRoot' containerField='skeleton' name='HumanoidRoot'>
      <HAnimJoint DEF='Jin_sacroiliac' center='0.000000 35.830002 -0.707600' name='sacroiliac'>
        <HAnimSegment DEF='Jin_pelvis' name='pelvis'>
          <Transform translation='0.000000 35.830002 -0.707600'>
            <Shape>
              <Appearance>
                <Material diffuseColor='0.588000 0.588000 0.588000'/>
              </Appearance>
              <IndexedFaceSet coordIndex='0 1 2 -1 0 2 3 -1 0 3 4 -1 0 4 5 -1 0 5 ...
              <Coordinate point='0.0000 5.4970 0.1424 0.0000 4.7610 -2.8250 -2.2830 4.7610 -2.4280 -3.9540 4.7610 -1.9480 -4.5660 4.7610 0.1424 -3.9540
```
LOA1  H-Anim Characters (X3D H-Anim) - 18 joints

1. Jin
2. Chul
3. Hyun
4. Young
5. Ju
6. Ga
7. No
8. Da
9. Ru
10. Mi
11. Min
12. Sun

2018-1-15
SC24 WG9 & Web3D Meetings
LOA2  H-Anim Characters (X3D H-Anim)  - 71 joints

1. Jin  
2. Chul  
4. Young  
11. Min
LOA3  H-Anim Characters (X3D H-Anim) - 94 joints
H-Anim Behavior Animation Using X3D Interpolators

LOA 2 character (Chul)
H-Anim
Motion Capture
using
X3D Interpolators

BVH Converter

H-Anim Editor
BVH Converter
Interpolator Generator

Jin.x3d
Dance.bvh

Jin dancing

Load
Load
Load

C++
JAVA

EXPORT

Behavior file
Composed Character behavior file

Coordinate Interpolators Orientation Interpolators EXPORT statements

Script Controller Inline “Jin.x3d” Inline “Dance.x3d” ROUTE statements

Jin dancing

Jin dancing
### H-Anim Character Animation Using Motion Capture

<table>
<thead>
<tr>
<th>Motion Capture (BVH)</th>
<th>H-Anim Animation</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Motion Capture Images]</td>
<td>![H-Anim Animation Images]</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LOA 1 and LOA 2 H-Anim Motion Capture Animation

LOA 1

LOA 2
H-Anim Motion Viewer
H-Anim Editor

• Objectives
  • Generate H-Anim human animation using motion capture data
  • Edit motion capture animation
  • Edit model hierarchy
  • Edit joint
  • Edit segment
H-Anim character animation & music 3D

- http://www.youtube.com/watch?v=hFz3WU3JIU0
  H-Anim Music 3D Animation - Sundays

- http://www.youtube.com/watch?v=0gsRNN9gfSM
  H-Anim Music 3D Animation - Sundays

- http://www.youtube.com/watch?v=TiUskQ0DTqY
  H-Anim Music 3D Animation - Travels

- http://www.youtube.com/watch?v=MlGwSHI8aGA
  H-Anim Music 3D Animation - The Present

- http://www.youtube.com/watch?v=R_uYm-pyJxU
  H-Anim LOA2 Music 3D Animation - Travels
Work in progress

• Tools and examples
  – LOA0, LOA 1, LOA 2, LOA 3, LOA 4 model converter: wrl-to-x3d
    hanim
  – LOA0, LOA 1, LOA 2, LOA 3, LOA4 H-Anim motion viewer
  – LOA0, LOA 1, LOA 2, LOA 3, LOA4 H-Anim motion editor
  – LOA 4 H-Anim hands and feet
  – LOE1, LOE2, LOE3 H-Anim facial animation

• ISO standards development
  – ISO/IEC 19774  Humanoid Animation Part 2: Motion Capture  (CD)
    (NWIP)
H-Anim 3D Music Video Competition

2016 & 2017
ISO H-Anim 3D Animated Music Video Competition (1)

- 3D H-Anim character animation and music composition
- Online international contest
- LOA1, LOA2, LOA3, LOA4 H-Anim character modelling and animation
- LOE1, LOE2, LOE3 H-Anim facial expression animation

- http://www.web3d.org/competition
ISO H-Anim 3D Animated Music Video Competition (2)

- Background and history
  - Proposal: H-Anim WG Meeting, January 2015
  - 2016 the first competition
    - Organized by Web3D Consortium & Web3D Korea
    - Supported by KSA (Korean Standards Association), SSA (Society for Standards and Standardization) and Web3D Consortium
  - 2017 the second competition (planned)
    - Organized by Web3D Consortium & Web3D Korea
    - Supported by KSA (Korean Standards Association), SSA (Society for Standards and Standardization) and Web3D Consortium
ISO H-Anim 3D Animated Music Video Competition (3)

• Process for 2016 competition
  – Announcement: October 2015 via Web3D mailing list
  – Submission deadline: June 30 2016
  – Submission files and format: character and virtual stage x3d files, avi (or mp3)
  – Judging: July 1-20, 2016
  – Announcement of winners: July 24, 2016 at Web3D Conference or via mail and email

• Process for 2017 competition (tentative)
  – Announcement: October 2016 via Web3D mailing list
  – Submission deadline: June 30 2017
  – Submission files and format: character and virtual stage x3d files, avi (or mp3)
  – Judging: July 1-20, 2017
  – Announce prizes: H-Anim BoF at SIGGRAPH 2017
  – Winners submissions demo: H-Anim BoF at SIGGRAPH 2017
ISO H-Anim 3D Animated Music Video Competition (4)

• Competition entry submission requirements:
  – An X3D virtual stage (x3d file required, media files optional)
  – An H-Anim character (H-Anim x3d files required)
  – License free music (mp3 or avi file required with proof of license free status)
  – A 90 to 120 second video (avi file), along with the associated X3D files and media files
  – A completed contest entry summarizing your submission. Details include title, author, a summary about the character (maximum three lines), and 1-2 representative screen shots from the video.

• Competition details are maintained on the Web3D mailing lists and the Web3D Consortium website
ISO H-Anim 3D Animated Music Video Competition (5)

- Contest Judging Criteria:
  Each entry will be judged on the following:
  - creativity of 3D character animation,
  - use of the ISO/IEC 19774 specification (LOA1, LOA2, LOA3) for character models,
  - creativity of the virtual stage,
  - use of the ISO/IEC 19775-1 X3D specification.
H-Anim 3D Music Video Demo

2017 Winners
2016 Winner’s Video

Minjoo Lee

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2017 Winner’s Video

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Design guidelines for H-Anim 3D characters
H-Anim Character Animation Using a General Graphics Tool

- LOA1, LOA2, LOA3
  - LOA modeling guideline
- H-Anim modeling using a 3D tool
- WRL
  - H-Anim modeling directly
- WRL-to-X3D H-Anim conversion
  - H-Anim model
    - Data format
- X3D
  - H-Anim model and motion
    - Data format
      - (X3D Interpolators OR Motion node def)

General 3D tools

Motion capture data

H-Anim modeling definition part

H-Anim motion definition part
All joints of an H-Anim figure must be represented as a tree hierarchy starting with the HumanoidRoot joint. Each joint may or may not have a segment. The figure shows an LOA1 example hierarchy used for an H-Anim character. 18 joints and 18 segments are specified.
Uniquely identify each segment according to the naming scheme of H-Anim.
Integrate all the segments to form a complete character.
In the front view, the character is looking forward and the origin of the coordinate system is located between the two feet.
For each segment, a pivot point, which is initially located at the center of an object, must be moved to the H-Anim joint center. The pivot point becomes the center value for each H-Anim joint. In the figure, an arrow denotes each pivot point at a joint.
This figure shows the pivot points of the H-Anim skullbase and vl1 joints.
If necessary, the H-Anim figure can be scaled, at this stage considering real length. Otherwise, the real length of each segment can be taken into consideration at the beginning, when each segment is modelled, if exact length is required. In this example, the character was initially designed considering only the length ratio of each segment. Then, at this stage, the segments were scaled according to real length (e.g. the height of the character).
Store the designed H-Anim character as a wrl file if the general graphics tool has this capability, which is usually the case. The wrl file can be converted to an x3d H-Anim file using a converter program.
Design Guidelines Demo
(Key Points)