



Teddy Go: Automatic Rigging and Virtual Reality Interaction With 3D Models

T – R – I – P

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Outline

- ✓ Methodology
- ✓ System Structure
- ✓ Sketching Interface
- ✓ Auto Rigging
- ✓ Unity VR Presentation



Methodology

Sketching Interface

Takeo Igarashi, Satoshi Matsuoka, Hidehiko Tanaka,
“Teddy: A Sketching Interface for 3D Freeform Design” (1999)



OBJ

Auto Rigging

Ilya Baran & Jovan Popović,
“Pinocchio: Automatic Rigging and Animation of 3D Characters” (2007)

FBXSDK



FBX

Unity VR Presentation

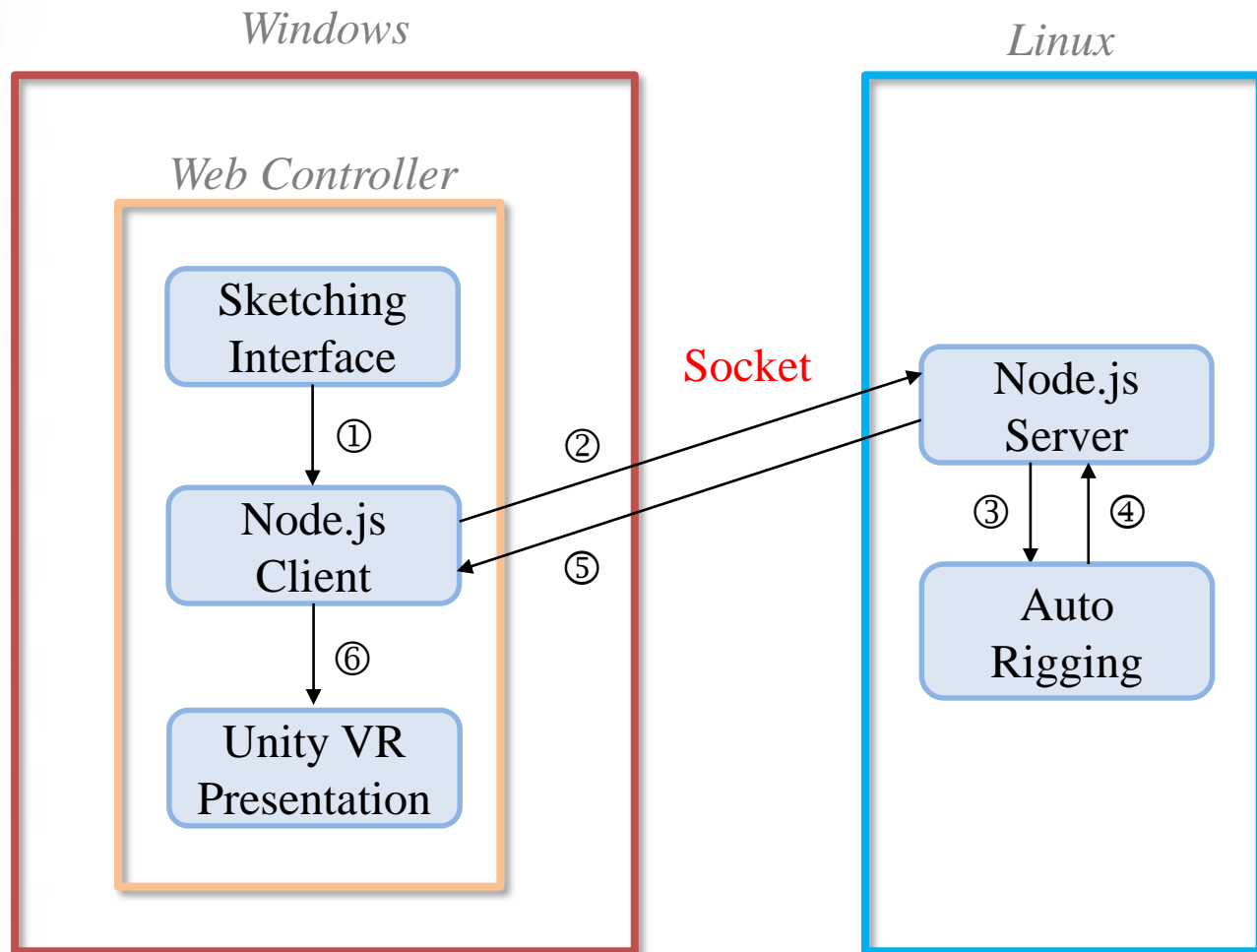
Oculus Rift CV1

Kinect v1

Unity

AssetBundles

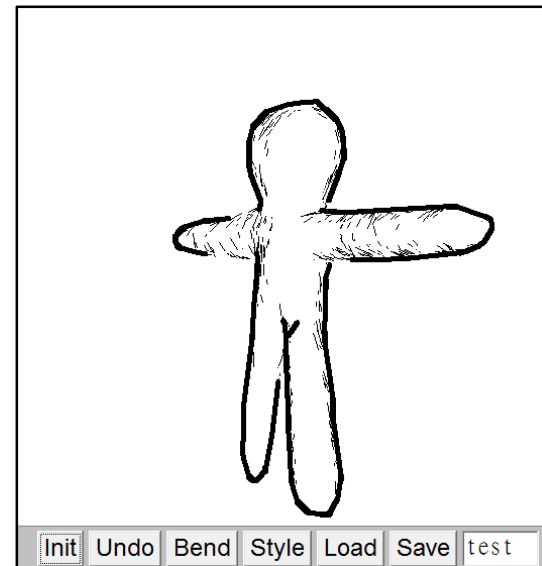
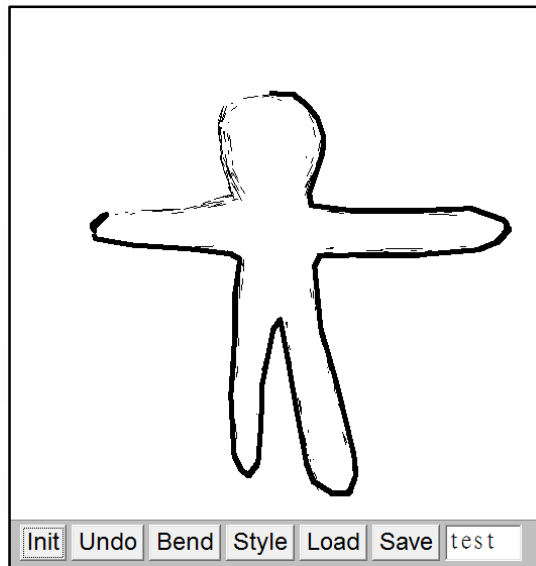
System Structure





Sketching Interface

- ✓ Takeo Igarashi, Satoshi Matsuoka, Hidehiko Tanaka,
“Teddy: A Sketching Interface for 3D Freeform Design”
(SIGGRAPH 1999)
- ✓ 2D Line segment to 3D Mesh

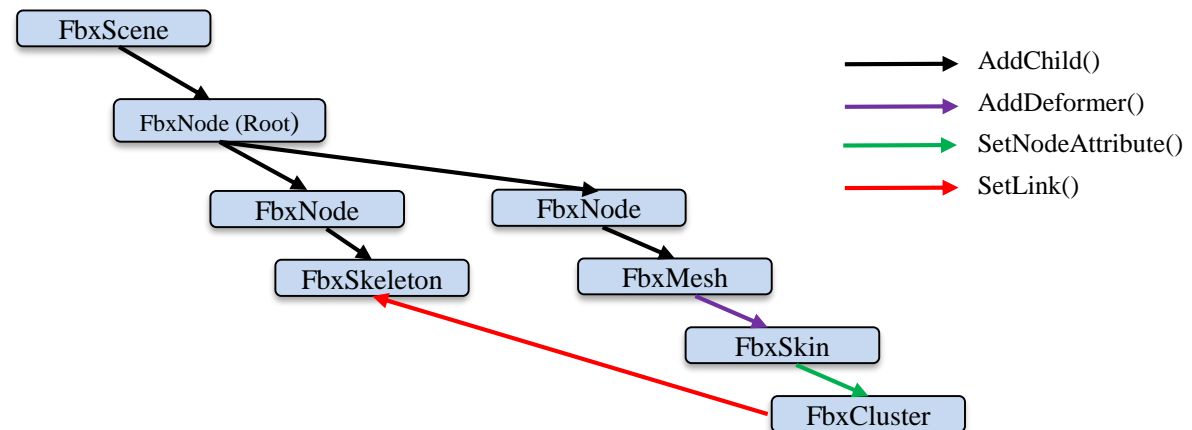


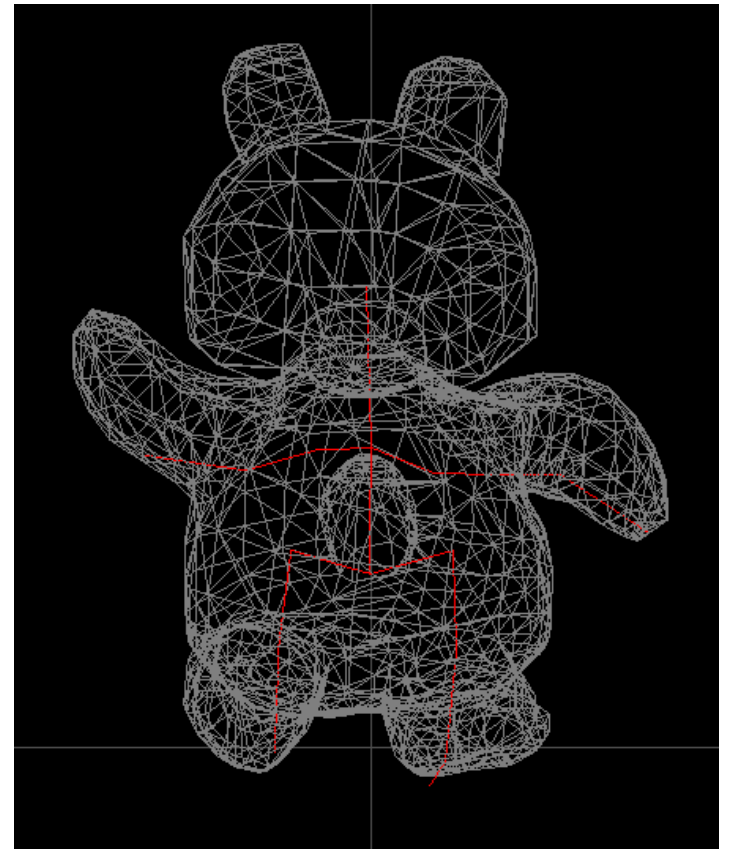
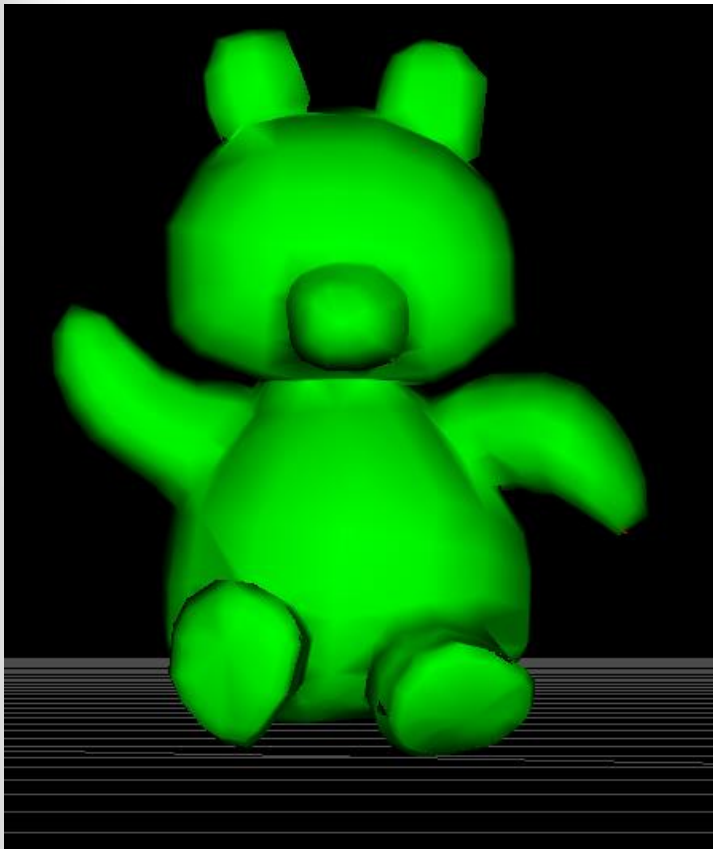


Auto Rigging

- ✓ Ilya Baran & Jovan Popović, “Pinocchio: Automatic Rigging and Animation of 3D Characters” (SIGGRAPH 2007)
- ✓ Bone Mapping & Binding Weight Calculation
- ✓ Format Conversion : FBX ASCII

FBX Basic Structure





Our Result
(FBX, Smooth Shading & Wireframe)



Unity VR Presentation

- ✓ Oculus Rift CV1 & Kinect v1
- ✓ Automatically configuring imported models
- ✓ Optimizing Unity Compilation:
Achieved significant performance increase of 1786%

Draw Cells: 700k

Hardware Specification	Compile Time
7200 rpm HDD	300s
7200 rpm HDD + AssetBundles	20s
SSD	120s
SSD + AssetBundles	10s



Unity VR Presentation (Cont'd)

- ✓ How to accomplish immersive experience in VR
 - ✓ First person view
 - ✓ Make user move VR headset
 - ✓ Use 3D sound instead of 2D sound
- ✓ How to prevent nausea in VR
 - ✓ Higher/Faster frame rate
 - ✓ System behavior consistent to user expectation
 - ✓ Adjust sampling rate for smoother camera movement

The top of the slide features a dark background with several hand-drawn lightbulbs. One lightbulb is illuminated with yellow rays. A thick yellow arc curves across the top of the slide.

End of presentation

Appreciated for your listening



References

1. Takeo Igarashi, Satoshi Matsuoka, Hidehiko Tanaka, “Teddy: A Sketching Interface for 3D Freeform Design”, SIGGRAPH 1999
2. Ilya Baran & Jovan Popović, “Automatic Rigging and Animation of 3D Characters”, SIGGRAPH 2007
3. Lauren Cairco Dukes, Example scripts of human description, Unity forums, 2014
4. RF Solutions, Kinect with MS-SDK, Unity Assets Store
5. Unity Technologies, VR Samples, Unity Assets Store
6. Tutorial from Unity official website