Advanced Use Cases for Animation Rigging in Unity

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Figure 1: Animation Rigging package for Unity 2019.1+

ABSTRACT

The Animation Rigging package for Unity enables users to setup rigs to procedurally control skeletal animations as a post-process. Attendees of this Studio Workshop will get hands-on experience working with this system in step-by-step tutorials. We will also show how to extend the package functionalities using C#.

CCS CONCEPTS

• **Computing methodologies → Procedural animation**.

KEYWORDS

rigging, animation, real-time animation, procedural animation, animation authoring, keyframing, control rigs, deformation rigs, skeletal animation, inverse kinematics

1 WORKSHOP OVERVIEW

Attendees will be instructed how to manually set up rigs and rig constraints on the provided example character skeleton and animations. We will explore the library of constraints included in the package and understand how these can be used to address specific needs in the context of real-time animation for games. Attendees will construct a skeletal deformation rig to counteract visual artifacts on a skinned mesh character model. We will explore how to use physics-based constraints to add dynamic secondary motion to characters. Next, attendees will be instructed how to assemble a rigging solution for the character interacting with the world. By experiencing the manual process of setting up rigs, attendees will gain insight into ways of automating artist workflows for the specific production needs of their own projects and teams.

The second section of the workshop will provide instructions for developing custom constraints using the Animation Rigging package, which enables safe multi-threading for optimal performance in real-time. The package was designed with extensibility in mind so that developers can write tailored solutions for specific production requirements. We will give an overview of available tools shipping with the package and write a custom rig constraint with attendees for a specific use case which can serve as an example to follow in the future. We will then explore how rig constraints interface with the Unity Animation Window and visual manipulators in the scene view for keyframe animation authoring workflows.

1.1 Learning Objectives

Attendees of this workshop will be given instruction for the following learning objectives:

- How to manually set up rigs and rig constraints for animated characters and objects
- Understand how the library of rig constraints can be used in the context of real-time animation for games
- How to construct a skeletal deformation rig to counteract visual artifacts on a skinned mesh character
- How to use physics-based constraints for dynamic secondary motion during gameplay
- How to assemble a rigging solution for a character interacting with the world
- Gain insight into automating artist workflows for the specific production needs
- Understand the architecture of the animation rigging toolkit and write a custom rig constraint tailored to their needs using C#.
- Explore how rig constraints interface with keyframe authoring workflows and visual manipulators in the scene view

2 WORKSHOP MATERIALS

Attendees will be provided with an example project to accompany the workshop lessons so that they may follow along with step-by-step instructions on their own workstations. The example project includes a high-end character model with skeletal animations, which we will use to explore manually building solutions to practical gameplay production scenarios. The example project contains all of the content and C# scripts necessary to complete the workshop lessons and continue exploring further rigging solutions independently.

3 WORKSHOP SYLLABUS

(total workshop length: 1.5 hours)

3.1 Section 1, Hands-on introduction to the Unity Animation Rigging package

30-min tutorial by David Hunt - Lead Technical Artist, Unity

- Introduction to the Animation Rigging package for Unity
- How to set up rigs on animated characters
- Advanced use cases for game productions including skeletal deformation rig setups, physics-based secondary motion, world interactions.

3.2 Section 2, Extending the Animation Rigging package with C#

60-min tutorial Unity Animation Developers: Simon Bouvier-Zappa and Olivier Dionne

- Instruction for how to build custom rig constraints
- Integration of C# rig constraints for authoring workflows in Unity.
- Overview of rig visualization systems and how to extend functionality for C# developers.

REFERENCES

4 ONLINE RESOURCES

Here are links to further resources about the Animation Rigging Unity package.

Link to the Animation Rigging package documentation
Link to the Unity forum section for Animation Rigging package