Physical Rigging Procedures Based on Character Type and Design in 3D Animation

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***Abstract*: *In 3D (Three-Dimensional) animation pipeline, the term rigging is commonly used to describe the process of creating skeleton system inside the finishing 3D character geometry and assigning animation controllers for animators to animate the 3D character. In order to establish a fluidity movement on the character, the proper setting must be planned and the flexibility of the controller must be setup properly. However, the discussion and understanding about rigging setup for specific 3D characters from previous researcher is very limited. Hence, the process of rigging will take longer time to complete especially for novice rigger artist. This study will explore the fundamental process of character rigging system and identify the method and techniques for rigging characters based on their anatomy designs. The analysis of this study will look on the conceptual design of the character; how to implement proper techniques and workflow based on the primary and secondary data provided in this study. The findings in this paper indicate common techniques for human rig object in 3D characters is using Biped, CAT or auto rigs. From our experiment, we found biped or CAT rigging is the best setting for the animals and realism characters. Custom rig is suitable for cartoony characters. Rigging system for anthropomorphism character is a bit different from the human rigs system. Anthropomorphism character requires several modifications on their physical appearances in which adding or subtracting the limb that physically taken from specific animal or any objects. For this type of character, we suggested to use biped rigging system. However, for complex anthropomorphism characters with many form structures, the study of movement, exaggeration and bone limitation must be analyzed before deciding the proper technique for rigging. Hence, the chain rig system is the best option for this type of anthropomorphism character. Therefore, rigging in animation is the process assembling the skeleton system into the character. The use of proper rigging style will determine how the character move and pose in final animation.*

Keywords*: *Character Rigging; Character Design; 3D Character; Character Animation

I. INTRODUCTION

Character design means the process of creating and establishes new character by the character designer. This process is one of the many complex tasks in animation pipeline. After the story construction, the artist starts to develop and design the appearance, style and concept for the character. It consists of conceptual design; identifying character identity and creating character personality that will drive the storytelling. According to Wyatt [1], he stated that, "the design of the character must be established early on in the process. They are the main vehicle through which the story will be told, and they must be designed with this in mind." The importance of character design and the appealing designs in animated films is significance in order to portray a specific mood or emotion in the storyline. Sajjad.S [2] supported this statement by saying the combination of basic shapes and colors relied heavily on character design and the appealing designs contributes to a sense of emotional engagement between the visual and the audience.

Rigging or Bones Setup in 3D characters can be defined as the process of creating skeleton system inside the character. Once the modeling artist finished the modeling stage, further steps will be taken by the artist who is responsible to assemble the skeleton or bones system, commonly known as Rigger Artist. Normally, the main task that the rigger artist needs to do is to develop a skeleton system that consists of bone object, assign controller for each bone and skinning the 3D mesh which is defined as the process of attaching character limbs to the bones. In 3D animation pipeline, rigging is the most important step in order to create the fluidity of the character movement. All 3D geometry that needs to be animated must have a proper rigging setup in order to control the flexibility of movement for each joint during animation processes. This control system is called rigs [3].

There are several types of rigging system in order to rig the character animation such as traditional bone object, biped and Character Animation Toolkit (CAT). Bone object rigging refers to a standard rigging technique where rigger artist has to place bone objects piece by piece into the character body. These bone objects are linked to each other and once the bones have fully setup, the rigging process is complete. This rigging setup automatically generates a hierarchy system of bones. Hierarchy system means that all bones construction is connected through parenting and child concept. The parenting bones can be rotated, moved and scaled. The characteristic of character rig setup depends heavily on the design and the complete form of the 3D model. It will determine how the character move and perform in the animation stage. In this study, we will explore the process of rigging techniques and identify how character type and design will influence the rigging styles.

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