

Skeleton-based diverse creature design tool for mass production

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Figure 1: a series of creature design using our software solution.

1 Motivation

The purpose of our project is to develop digital tools that will help to simplify the task of creature design in large-scale media projects. When working on an animation or game that requires hundreds of unique creature designs, many artists find it challenging to maintain consistency and quality in every new design. As a result, even the most creative artists must often go through a long and tedious period of revisions before they arrive at final creature designs that are satisfactory to the director. To reduce the amount of time and resources needed for this critical revisions stage, we have designed a prototyping tool which can use existing designs to rapidly generate unique iterations.

2 Backgrounds

There have been attempts to create prototyping tools in the past, but with limited success. Asset management software programs such as Shotgun have prototyping capabilities, but are not integrated into standard workbenches such as Maya and thus are not part of most artists' workflows. Genetic Algorithm (GA) based creature exploration tools have also been used for generating new designs automatically, but this software allows for an infinite number of possible combinations, requiring substantial human input to focus its designs to match the originals. In response, we have designed our software to interface more seamlessly with existing animation tools, as well as simplified its functionality to make it more intuitive for artists.

3 Current Workflow

The Art Director then reviews the new designs to determine if they match his or her original concept, and will ask for revisions when necessary. This is a vital step, because it is often the Art Director's last opportunity to make sure that all the creature designs are aesthetically consistent with each other and with the environment of the game or film. After the designs are approved, they are modeled, textured, and rigged for animation and final rendering. At this stage, it is difficult for the Art Director to modify unsatisfactory designs. As such, the Art Director will sometimes restrict character designs from passing through the 3d production pipeline, until all the designs for the characters have been finalized first as concept drawings.

4 Skeleton-based diverse creature design

We propose a software solution which will speed the iterative process by designing creature skeletal structures before sketches and mesh modeling. The advantage to this new order of stages is that by modifying a simple skeleton, artists are able to create and judge new designs semi-automatically much more quickly than if they must fully re-model the character for each iterations. This faster work-flow can also be used to test less conventional creature designs, such as radical monsters or mechanical designs that have no predecessors in existing media. This tool is structured by 13 buttons of template structure, 1 scale slider and 4 relation controllers which is written in 319 lines of MEL (Maya Embedded Language) script. Artists can load this MEL tool in earlier stage of their workflow to explore their own creature. It based on template structure like Human body, head, arm-L, arm-R, leg-L and leg-R or Dragon body, head, wing-L, wing-R, leg-L, leg-R, tail. Artists can add body parts by clicking a button and change their scale and relations by other controllers. They can explore the character design by adding, removing and moving body parts in 3D view. This tool can be ignored and it has a compatibility in current workflow.

5 Result and Conclusion

User testing provided essential feedback during the development of our software, indicating both its successes and possible improvements for later iterations. In our most recent tests, an artist who can create tarot 22 creatures in 20 days in sketch based workflow was able to create 10 base creatures in 3 days with skeletal structures and sketches. Evaluating artists also found the value of our tool, it can expand creature diversity with biological growth and it can also useful to avoid conflicting with past similar creations. In future versions of this software, we hope to make the graphical user interface (GUI) more structured and intuitive, and to include more creature types, such as mollusks, insects, and plants as additional design sets. We also hope to better integrate our tools with physics simulations and artificial intelligence engines for increased compatibility with other programs.

Our goal is to streamline the workflow of professional production pipelines through the design and implementation of innovative digital tools. Interacting with professional designers has informed us of the challenges they face in their everyday work, and helped us refine and focus our software to become a powerful imagination aide for artists.

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