Motion study of traditional martial arts as visual inspirations for character design style

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Abstract. Watching action flicks, which feature some martial art fight between characters, can be very entertaining. The martial art fight and movement is usually the primary appeal and selling point. In the animation media such as movies or games, the animator does not necessarily have to be a practitioner of any martial art system but the animator will certainly need materials to study as references. This study aims to create alternative styles and poses of character design inspired by traditional martial art styles that often appear in various pictures, comics, and movies. Other goals are also to provide the animators a comprehensive and easy to use reference, for an easier and more effective level of animation production. Method of research is through the stages of observation and demonstration of the movements in the form of digitized data captured from a practitioner of traditional martial art movements, dissecting every meaning, purposes, and philosophy behind movements of the martial arts style. Finding and understanding the core concept of martial art body mechanic and philosophy behind its movements is crucial before turning it into re-illustration art of design. The result is a distinctive visual style and motion with unique traditional martial art poses. This method is expected to be a guide that makes animator has better understanding in the traditional martial art unique and distinctive body mechanic poses.

1. Introduction
As a creature that is constantly thinking and developing, humans have the instinct to struggle and to protect themselves, from any dangers and threats. Humans use logic and reasoning to create tools and methods of defending themselves, as their minds evolving humans also put their philosophy of life and art in their methods of self-defense.

Until recently, we still often see in worldwide film industries even in Hollywood martial arts fighting become the main attraction or the actor with martial arts strong background become the star of the movie. Watching action films with certain martial arts could bring a thrilling sensation for the audience. Martial arts are an attraction, because of the appeal of the actor skill in a martial art. This also applies to the animation that shows the martial art action. However, the body movements of a skilled martial artist are not an easy thing to imitate because it requires skills that are the result of years of training.

What makes animation great is not just the story or the looks of the characters that appealing, but also the movement and actions of the characters are attractive and fun to watch. It requires good technique and artistic sense to be able to animate the characters not just believably but also beautifully. The actors "behind the stage" (animators) must have a comprehensive reference, acting competence,
and artistic style. Therefore, the audience convinced that the character in the movie they are watching is real and following the characters journey through the end of the movie. In the audience perspective animated movie comprised mainly of three things. The first is a story that leads from beginning to end, second is visual design and movements by the characters, and last a sound design consisting of voice actors, accompaniment music and sound effects.

In animation production, the process of designing the character is the first stage before stepping into the process of animating. The process of animating, which brings the animated characters to life, determined first by character designs. The role of an animator is similar to an actor in a movie or play. Animators are essentially actor with a computer and software or an actor with pencil and paper.

In the process of making animated films, there are three stages commonly known as production pipeline. A pipeline is a local organization of the step required to produce animated films. First, is the pre-production stage, second is the production stage and third are the post-production stages. Pre-production becomes the initial foundation of the next process. This stage is where the movie concept, ideas and planning are developed, mainly focused on story and character design. In the production, stage is where the real production is starting, animating take more portion in this stage, knowledge of body mechanic and acting becomes very important. The animation is what supports the story so the audience convinced that they are watching a real character. Stories that contain action martial arts are not easy to build if the animator has only a bit information and knowledge about martial art. This research is not to give an example of martial art animation, but rather to the approach of making martial art, inspired pose of characters or objects based on the style of Indonesian traditional martial art that can be used as inspiration for the development of unique and distinctive character design or animation.

Based on the premise, we try to explore the motion and pose of different styles of Indonesian martial arts and collected into a collection of visual ideas of motion and character poses, which revitalizes the design of Indonesian original characters amidst global competition through a certain visual approach with sort of Visual reconstruction, which reviews the strategy of constructing character designs with empirical data based on Cultural form and could be applied to various forms of media.

2. Method
The method use for the experiments is by recording the movement of the object; in this experiment, we use a trained martial artist to perform some of the movements of traditional Indonesian martial art or penchak silat. Later using the information to animate digital character model in 2D or 3D animation computer. The information is recorded and mapped into a digital character so the digital character is moving the same movements like the actual actor. When capturing the full motion of human body the problem is quite challenging and capturing the martial art movement is even more challenging. The faster the movement the harder for the camera to capture it. In this experiments we shot several times the same movements at different speeds to make sure the camera can capture every details and intricacies of the movements.

3. Results and Discussions
In the experiments, we use the following camera to capture the delicate movement of penchak silat a traditional Indonesian martial art; we used four PlayStation eye cameras. Capable of capturing standard video with frame rates of 60 hertz at a 640×480 pixel resolution, and 120 hertz at 320×240 pixels, which is "four times the resolution" and "two times the frame-rate". In addition, iPi Motion Capture software a scalable marker less motion capture software tool.
Figure 1. We use four-camera setup to capture the movement.

Figure 2. Four cameras view of the object.

The camera first must be calibrated to the software world in order to achieve as accurate as possible result. After the desired result is achieved the actor should stand in T pose for a couple of minutes to make initial alignment of actor model in iPi Mocap Studio, later this will require more manual actions to fit the object proportion with the 3d digital character model.
Figure 3. Calibrating the dense mesh with human actor.

Figure 4. The approach is reconstruct the actor motion into a tracked mesh through a 2d and 3d detection software.

4. Conclusions

The end results is a tracked mesh with motion data captured from the actor performance, the movements is not perfectly captured by the software and the movement still need a manual clean-up, but the result without manual clean-up is quite decent, the animator will benefit both from the tracked motion and the video reference captured from the four camera, this will make a good source of reference for the animator to start working. For the low budgeted animation, the result without manual clean-up will work just fine.

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