

Motion Emphasis Filter for Making Mental Motion of 3D Characters

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1 Introduction

This paper describes a "Motion Emphasis Filter" for making mental motion of 3D characters in computer animation. Mental motion is an exaggerated motion which human feel as real motion. Emphasized expression is an effective way of making motion in animation [Halas1981]. However, it is difficult to learn and use the expression, because it depends on the experienced hand of the animator. We proposed a "Motion Emphasis Filter". Using this method, we can control and design a character motion. Motion Emphasis Filter accepts keyframes and Motion capture data as input motion and transforms these into emphasized motions. Emphasized motion is controlled by some parameters. It works interactively and is friendly to most users who wish to design animation.

2 Emphasized Motion Effects

In the animation, the exaggerated operation using various techniques has been proposed [Sato1995, Kobayashi1998]. We analyzed an emphasized motion of a character. These can be classified into the following three types. (1) Previous action, (2) Acceleration, (3) Expansion and Squash. Mental Motion is generated using these types.

3 Motion Emphasis Filter Algorithm

This section describes our proposed motion emphasis filter algorithm. Fig.1 shows the pass of an original motion and the emphasis motion of human arm. The process of motion emphasis using the proposed method is the following.

- (1) User input the part (O, P_0) of the 3D character which we want to emphasize.
- (2) The acceleration of the motion of arm is calculated.
- (3) The Timing of original motion is changed to a new timing using the value of the acceleration.
- (4) Expansion and Squash of the shape of 3D characters is changed using the value of acceleration.

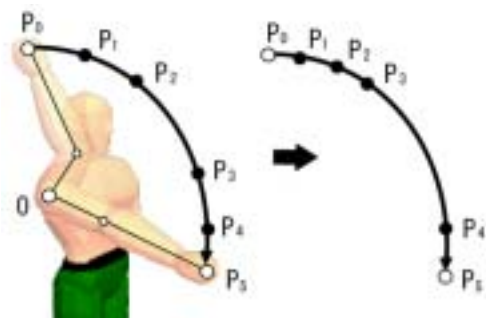


Fig.1 Motion Emphasis Filter Algorithm

4 Examples

Experimental results of making animation are shown Fig.2 and Fig.3. Fig.2(a) shows a jump kick motion by motion capture data and Fig.2(b) shows the emphasized motion. The number in Figure2, and Figure 3 shows a frame number. Fig3 shows a fall back motion.

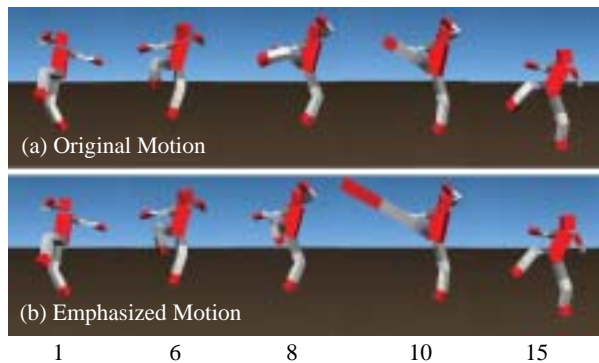


Fig.2 Jump Kick Animation

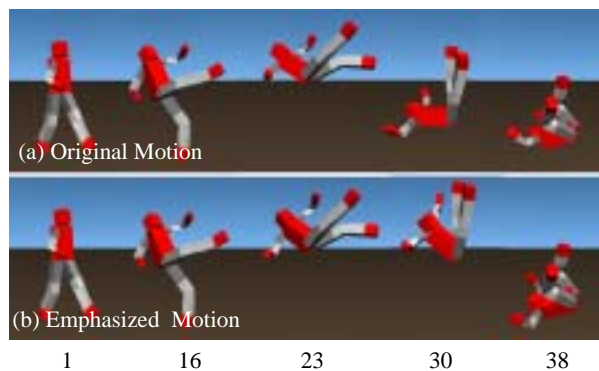


Fig.3 Fall back Motion Animation

5 Conclusions

We proposed a method of Motion Emphasis Filter for generating emphasized motion effects automatically. We analyzed the fundamental method of motion emphasis. Our proposed method is possible to generate the unique emphasized motion using the value of acceleration. We can make an animation with emphasis motion easily.

References

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