

The Flying : Kinect art using OpenNI and Learning System

Ok-Hue Cho
GSAIM CT / GAME Lab
Chung-Ang University
Seoul, South Korea
pluzzang@hotmail.com

Won-Hyung Lee
GSAIM CT / GAME Lab
Chung-Ang University
Seoul, South Korea
whlee@cau.ac.kr

1. Introduction

Humans have the desire to fly. Out of the desire, they invented the airplane through many processes and today a large number of airplanes are flying to move people from place to place. Every person may feel the desire to fly when they see a bird flying high. Such a feeling and desire were expressed in our digital art work that adopted reinforcement learning concept.

"Bird" is the only animal that can fly among vertebrates. The three most important motions for a bird's flying are flapping, twisting and folding. Flapping is moving both wings up and down, twisting is a motion that twists the two wings in the opposite directions, and folding is a motion that folds the two wings up to the body and then unfolds them. Through our art work, spectators experience such an instinctive system of birds indirectly.

2. Implementation

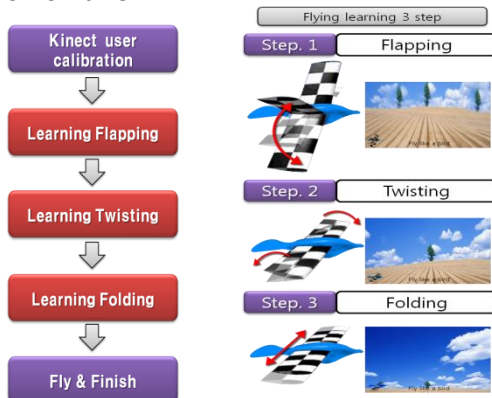


Figure 1. System of 'The Flying'

Making This work was implemented based on reinforcement learning system. The spectator is faced with the work without any prior knowledge of the work. The first image that the spectator sees is a low land. It is the view of land that the young bird sees from above on a tree. Because the image displays fine movements in response even to the spectator's little movements, so by intuition the spectator realizes the fact that the image moves according to his/her motion. Stimulated by the image and phrase, the spectator makes a flapping motion like a bird instinctively or out of curiosity. From that moment, learning is started. Then the screen sways up and down gradually, giving the feeling as if a young bird is trying to flutter.

We used Kinect to recognize gesture of spectator using Simple-OpenNI library in Processing. After a certain amount of motion, the spectator is presented with the next-stage image as a reward. Because the process depends on the measured volume of the spectator's movement, the length of time until the spectator sees the next-stage image varies among spectators. Once the spectator moves over to the next stage, the horizon on the image goes down a little bit. This means that the screen shows more of the sky. If



Figure 2 Result as motion (The image is played only when spectator is moving)

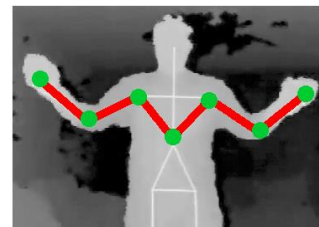


Figure 3 Skeleton tracking (shoulder, elbow, hand, torso)

the spectator does not move the image does not play either. All shown images are from the first-person viewpoint seen with the bird's eye. If the spectator makes bigger motions, he/she can move to the next stage earlier. This is not one-dimensional interaction but staged flying training. This experiment is not a one-dimensional digital art but a digital art for experiencing a reinforcement learning system directly by number of stages. We used 6 skeletons for our work. Spectator's shoulder, elbow, hand, torso are main coordinates. Spectator can see calibrated 6 skeletons in screen and recognize their gesture by themselves. When the spectator stops the motion or disappears from the screen, the screen shows the first image(ground) again. After they learned all the three important movements for bird's flying with continuous motion(movement), the art work finished by showing the flying image in the sky.

4. Conclusions

This work has its meaning in analyzing the results of the application of reinforcement learning as a game implementation technology in the implementation of a digital art work. From the experiment were obtained results as follows. First, when reinforcement learning was applied, the activeness of the spectator's involvement is enhanced in the interaction of digital art. Second, it increases the spectator's immersion in the work and the length of viewing. These results suggest that when reinforcement learning, a game implementation technology, is applied to the implementation of digital art it enhances the spectator's involvement.

References

<http://code.google.com/p/simple-openni/>