Motion Generation of Digital Human

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Recently, various motion generation of virtual human agent (digital human) is in high demand in the field of 3D-CG for the entertainment use such as computer games and movies and also in the ergonomics use such as computer manikin. Computer manikin is a CAD like software that uses both the model of the product and a human. In these areas, it is expected to generate various motions with individuality that comes from two aspects: external and internal. External factors are such as environmental condition or task to do. Internal ones are such as physique, age, distress, and so on. The aim of our research is to generate the motion that reflects individuality based on such factors under the consideration of dynamics.

Here we deal with motion generation by optimizing performance index that reflects intension of human. We believe performance index for each motion is composed of several sub-functions and that it will change during the motion. Candidates of the sub-functions are torque, manipulability, ZMP and so on. First, we propose the method to generate motion according to the external factors as follows: [Step1] Measure real human motion in several conditions; [Step 2] Identify performance index for each measured motion; [Step 3] Estimate performance index for unmeasured condition from the already-identified performance indexes (Fig. 1).

Lift-up motion has been simulated using performance indexes composed of single sub-function and mixture of several sub-functions (Fig. 2)(Fig. 3)(Fig. 4). Now we are extending our system so that it deals with various sub-functions, especially dynamic ones.

Keywords: Computer manikin, Motion generation, Optimization of performance indexes

References

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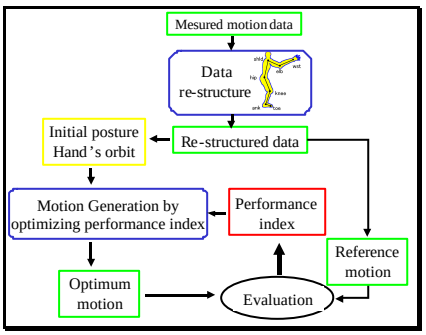

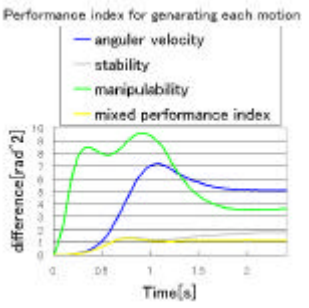

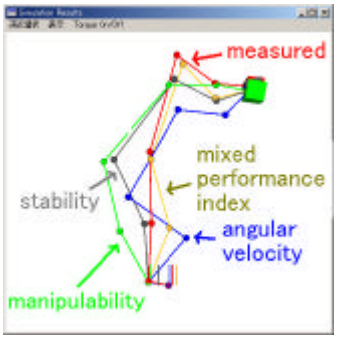

Fig. 1 Motion generation system Fig. 2 Difference from measured motion Fig. 3 Performance indexes of motion

Fig. 4 Simulation of Lift-up Motion Generation