Abstract: Force Field-Based Control of Dynamic Particles with User-Specified Paths

Muhammad Rusdi Syamsuddin,[1] Jimwook Kim,[2*] and Sung-Hee Lee[3*]
Gwangju Institute of Science and Technology (GIST), Gwangju, Korea[13]
Korea Institute of Science and Technology (KIST), Seoul, Korea[2]
mrusdi@gist.ac.kr,[1] *jwkim@imrc.kist.re.kr,*[2] *shl@gist.ac.kr*[3]

Abstract

We present a framework to design force fields that drive particles to follow a path under the physics-based animation system. In this framework, a user interactively specifies the desired path, represented by a Bezier curve using a GUI and the attraction force that drives a particle toward the target location. Then, the framework automatically defines the steering force to make a particle follow the desired path. To this end, we use B-splines to define the steering force that best approximates the user-specified path. We demonstrate the effectiveness of our method by showing a large number of particles following the desired path and forming an animated human figure. Our method creates a stable behavior of particles and is fast enough to run in real time.

Acknowledgement

This work was supported in part by the IT R&D program of MKE/MCST/IITA (2008-F-033-02), the Sports Industry R&D program of MCST (Development of VR-based Tangible Sports System), and Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the MEST (2011-0027158).