UMASS BOSTON

Invention Available for Licensing ***Computer and Gaming Technologies***

Title: ***Exercise Intensity Driven Level Design***

UMB18-04

Inventors: ***Lap-Fai Yu, Ph.D. et al.***

Applications:

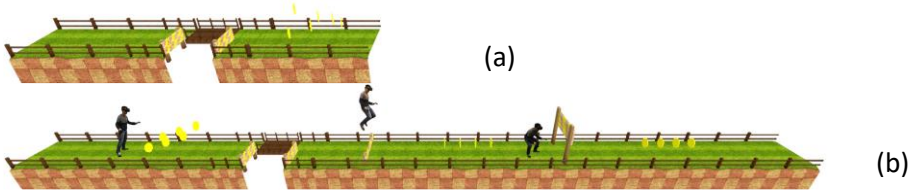
- Automated optimization of intensity of video gaming levels
- Automated personalization of exercise regimes in fitness devices
- Applicable to video games, exergaming, and VR fitness devices

Benefits:

- Attractive new feature for exergames and VR fitness software to allow user personalization of exercise levels
- Can be incorporated into existing software at minimal added cost

Technology Description: This invention is a method for use in movement-related video games, to allow the system to set the different levels of the game to desired degrees of difficulty for any given user. The method uses algorithms to process data from human movement to determine whether a given level of the game is too strenuous (or too easy) for a given user, and allowing the game to modify the level to create a degree of strenuousness that is desired and appropriate for the user. Specifically, the method decomposes a game level into assembly of chunks, and each of them imposes different exercise intensity on players. These chunks are then characterized with exercise science metrics, and game level synthesis is formulated as an optimization problem. This technique allows the creation of an optimizer that automatically synthesizes a suitable game level to reflect desired exercise parameters such as exercise intensity level, exercise duration and calories burned. The invention could be employed to generate appropriate game levels for various motion-based games, as well as videos or software accompanying exercise bicycles and other fitness devices.

Patent and Publication Status: UMass Boston has filed a U.S. utility patent application on this invention. The research underlying the invention has been published as Xie, et al. "Exercise Intensity-driven Level Design", IEEE Transactions on Visualization and Computer Graphics, vol. 24, NO. 4, April 2018.



Synthesized levels of a runway in a video game created through an optimization according to the invention: (a) Iteration 10; (b) Iteration 200.

For more information:

David J. Glass, Ph.D.
University of Massachusetts Boston
Office: 617-287-5710
Cell: 617-653-9945
david.glass@umb.edu