Title of invention: THE PROJECTION OF IMAGES FOR INTERACTION WITH A FORCE-SENSING OBJECT

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Abstract: Projection of images for interaction with a force-sensing object described. Example embodiments described in the context of gaming. Figures display example embodiments and processes. Force-sensing object defined as an object with a variety of force-sensing capabilities. Camera to track force-sensing object and force-sensing object's interaction with a projection is described. Claims related to the apparatus of the projection of images for interaction with a force-sensing object are listed.

BACKGROUND

This relates generally to the projection of images for interaction with a force-sensing object. A variety of devices can be used to project images. Projection display may be connectable to a device such as a laptop, personal computer, or cellular device. A force-sensing object, such as a ball, may have a variety of sensors including but not limited to an accelerometer and a pressure sensor. This allows a system to track movements of a force-sensing object. A force-sensing object can be tracked using a camera that can record a force-sensing object.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a third person view of an embodiment of the present system in operation;

FIG. 2 is a schematic description for an embodiment of the system in FIG. 1,

FIG. 3 is a flow chart for one example embodiment of the present invention;

FIG. 4 is an exemplary view of one embodiment of the present invention; and

FIG. 5 is a flowchart for another embodiment of the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to FIG. 1, a device 100 may have a projector 102 that projects a projected image 110 onto a surface 120. The surface projected upon may be a floor, wall, table, or other surface. A force-sensing object 130 may have a number of sensors to sense movements of the force-sensing object 130 and impacts upon the force-sensing object 130. Device 100 may also have a camera 104 that tracks projected image 110, force-sensing object 130, and interactions between projected image 110 and force-sensing object 130. Device 100 may be a gaming console, laptop computer, cellular phone, or wearable computing device. Force-sensing object 130 may be a ball, puck, or other projectile.

In accordance with some embodiments of the present invention, device 100 may project a projected image 110 so that user of device 100 may throw force-sensing object 130 at projected image 110. Camera 104 enables device 100 to detect whether the force-sensing object 130 hit projected image 110. Force-sensing object 130 will detect the contact with surface 120 and then send information to device 100 to indicate the time, force, and other information about when and how the force-sensing object 130 hit surface 120. The information may allow device 100 to make additional determinations about how the force-sensing object 130 hit projected image 110 and may increase the accuracy of the determination of whether to not projected image 110 was hit.

In one example embodiment, device 100 may enable the user of the device to play a game. In one example game, projected image 110 may be a character such as a bug. The force-sensing object 130 would be launched at the projected image 110 at which point a camera 104 would make the determination in accordance with the force-sensing object 130 as to whether the projected image 110 had been hit or missed with the force-sensing object 130.

Referring to FIG. 2, a sensor array 200 could possibly include a gyroscope 202, a piezoelectric sensor 204, and an accelerometer 206. Information from a sensor array 200 would then be sent to a control 208, which could be a remote or controller device, which control 208 could then interpret. The information is then sent to a network interface controller 210 which sends the information to network interface controller 220 of device 212. The information is then sent from the network interface controller 220 to control 218 of device 212 to be interpreted for the device 212. The information is then sent to storage 222 of device 212.

Referring to FIG. 3, an image is projected 300 which is then monitored by a camera to detect a force-sensing object interacting with the projected image 302. Timing of the force sensing object is then detected 304 and interaction feedback is provided 306.

Referring to FIG. 4, in an example embodiment of the console, network communication between a force-sensing object and control is established 400 to allow user to choose a game and allow the camera to begin monitoring the force-sensing object 402. The force sensing object then activates the necessary sensors for the selected game 404 and the camera monitors the location of the force-sensing object through visual analysis 406. The activated sensors in the force-sensing object then indicate to the console through the network communication a hit or miss, game then ends according to application 408.

CLAIMS

1. An apparatus comprising: a projector to project an image; a force-sensing object to interact with the projection; and a camera to detect interaction between projected image and pressure-sensing object.
2. An apparatus of claim 1 wherein said apparatus includes a gaming console.
3. An apparatus of claim 1 wherein said apparatus includes a laptop, personal computer, cellular device, or wearable computing device.
4. An apparatus of claim 1 including force-sensing hardware for the force-sensing object.
5. An apparatus of claim 4 wherein the force-sensing hardware includes at least one of an accelerometer, gyroscope, and a pressure sensor.
6. An apparatus of claim 1 including image tracking software to track a projected image and a force sensing object and the interaction between a projected image and a force sensing object.
7. An apparatus of claim 1 to implement a game.
8. A method comprising: Projecting image from first device using first device to track the projection, a second device that includes force-sensing capabilities, which is tracked by said first device
9. A method of claim 8 including a game where the interaction between a force sensing object and a projection is tracked.
10. A method of claim 8 including multiple selectable options on the projection which can be selected using an object tracked by a camera with tracking software.
11. A method of claim 8 including interaction with the force sensing object or projection by a user in order to provoke feedback from a control.
12. A method of claim 8 including projecting the image using a laptop, personal computer, cellular device, or wearable computing device.
13. A method of claim 8 including a multiplayer interface to interact with another user.
14. A method of claim 12 including a multiplayer interface to interact with a remote user via a network.
15. A computer readable medium storing instructions executed by a computer for: a projection; a force-sensing object; a camera to record said projection; and to identify interaction between a force-sensing object and a projection.
16. A computer readable storage medium to store information received from the computer.