Game controllers

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Types of controllers

- Keyboard and mouse
- Gamepad controller
- Wheel and joystick
- Infra-red motion capture (Kinect)
- Accelerometer and optical sensor motion control (Wiimote)

More Types

- Potentiometer paddle controller (Atari 2600)
- Throttle Quadrant and Yoke Controller (Flight sim)
- Dance Pads, balance boards
- Robotic Operating Buddy

Grifta game controller

- Morphing gamepad
- Mouldable handle for ergonomic grip
- Gamepad can be split up and work in tandem with the mouse
- Mechanical ABXY buttons
- Sensitive capacitive switch for trigger
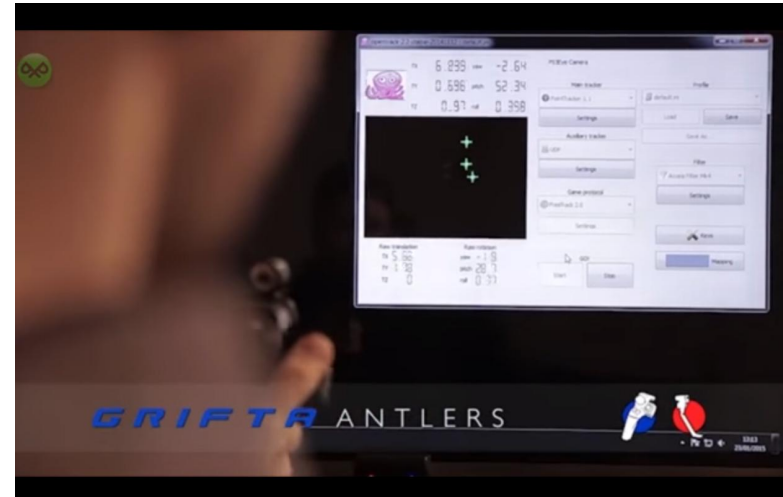
Grifta game controller (Cont.)

- Has an additional infrared point tracking module
- 3 High spec LEDs work in well lit environment and detects 6 degrees of movement
- Works with both PS4 and Xbox one
- driving , flying and shooting action
- Dual connection android module
- Flaw: Controller indentation causes accidental button press

Kinect

- Uses a webcam to take in depth sensor
- Takes video input from two separate cameras
- Determines distance through trigonometry (we know the adjacent and hypotenuse)
- To solve correspondence problem caused by overlapping image, an infrared "grid" is projected
- The object distances triangulated
- Segmentation mask goes through morphological closing to remove cavities
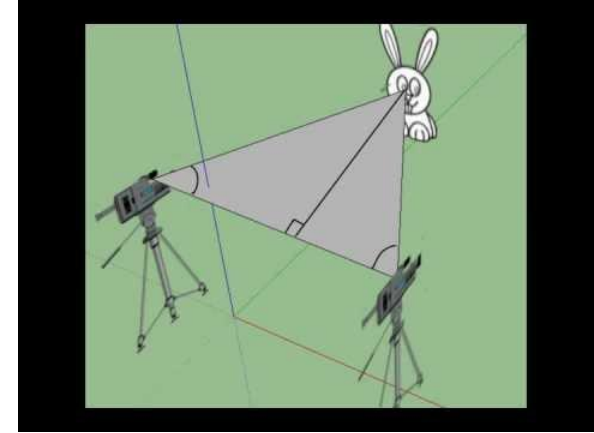
Other features

- Features are recorded in a database
- skeletal tracking subsystem is added to motion capture
- Stabilizing algorithm also added to take into account player movement
- Limited to indoor used as sunlight can interfere with infrared projection
- Can only set up one Kinect in the region at a time
- Gesture recognition
- Affinity fields prediction
- Facial recognition and voice recognition
- Motion analysis
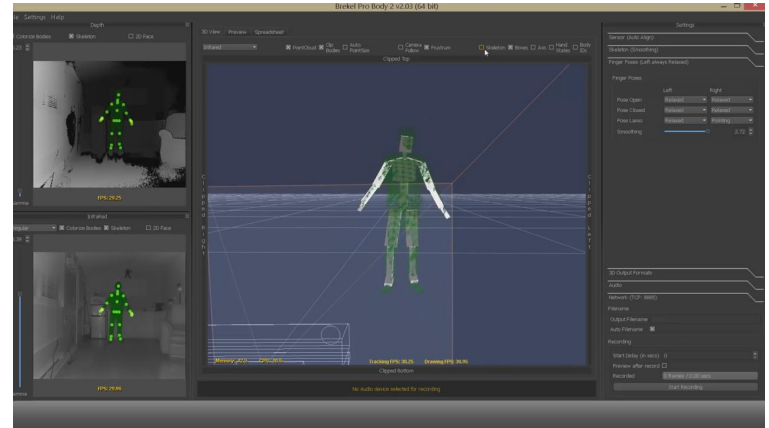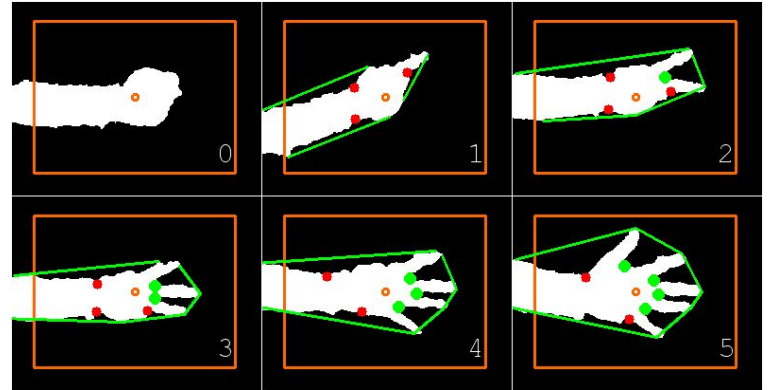
Issues with the Kinect

- Infrared motion tracking is limited and intermittent, sometimes affected by latency
- Initial designs was supposed to add finger tracking
- this was abandoned, instead, taking in only whole body movements.
- hand tracking was okay, but the body-bending controls caused nausea.
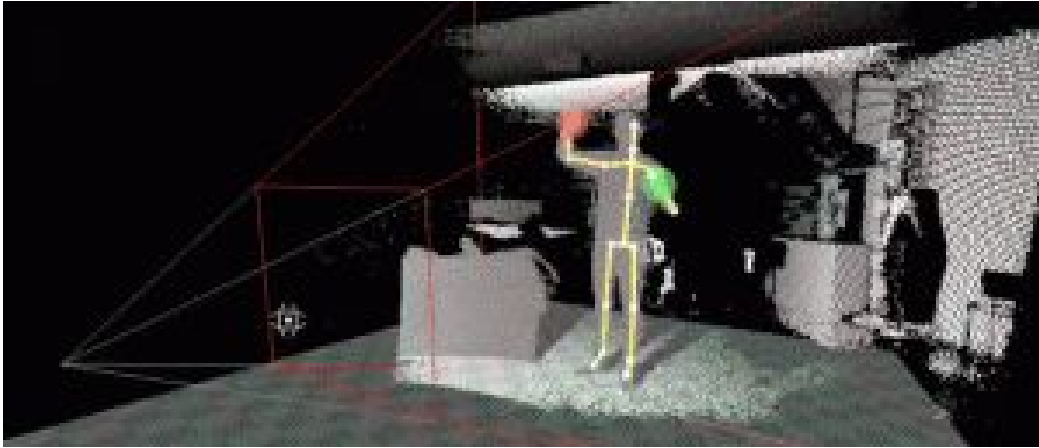
Virtual Reality

- Another example would be the emergence of the oculus rift Virtual Reality headset.
- the idea here is to immerse the player in a first person environment and to allow the use of interaction with virtual objects
- However, the controller is a little bit more awkward in principle

GOODBYE, REAL WORLD.

How it works

- High resolution screen a few inches in front of user's eye
- Stereoscopic projection uses binocular vision to create depth
- Gyroscope, accelerometer and compass tracks user's head and correlates that to the 3 dimensional virtual space
- External Infrared sensors and camera to track head tilt and orientation to improve positional accuracy
- Head Related Transfer Function tech to create 3D audio spatialisation

Issues with the Oculus Rift

- Firstly, the user would also have to set the dimensions of the play area in order to calibrate it.
- Different games have different dimensional requirements
- In some applications, the remote would not be shown in-game, so if the player drops his remote, he'd have to remove his headset and find the controller, breaking immersion.
- Users experience motion sickness after a while of playing
- The headsets are also strapped onto the player's head, making things uncomfortable.
- Though you are also able to turn with the use of the keyboard, users would tend to turn their heads to look behind, causing strain to their necks.
- Most players traversing first person exploration games move on a point by point basis, breaking immersion even further.
- Textures appear to be blurry as player camera isn't constrained
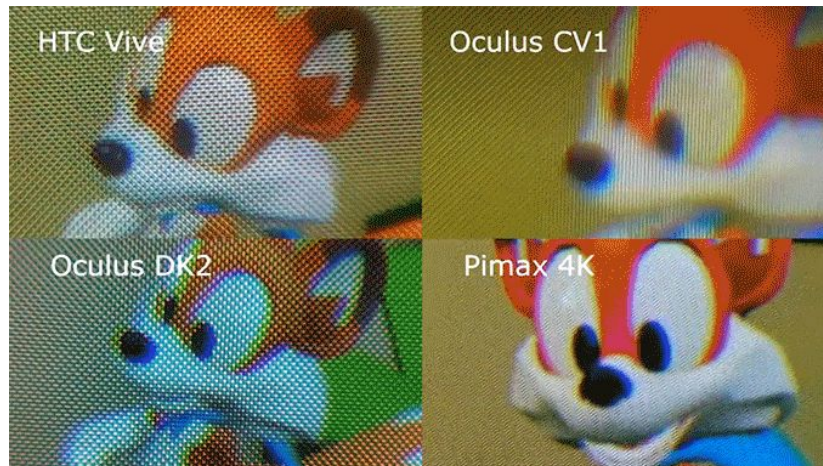
Other VR headsets

- HTC vive
- Pixmax 4K
- Sony Playstation VR
- Samsung Gear VR
- Samsung Odyssey
- Google Daydream View
- Google Daydream View 2
- Google Cardboard
- Merge VR goggles
- Oculus Santa Cruz
- Razer OSVR HDK 2
- Fove O

PIMAX 4K UHD

OUTSTANDING 4K UHD
IMAGE, 3840 X 2160P
RESOLUTION, 8.29MP

CLICK TO KNOW MORE

HTC Vive

Oculus CV1

Oculus DK2

Pimax 4K

Omnidirectional treadmill

- Full body Haptic controller
- Cyberith Virtualizer treadmill
- Uses low friction surfaces, a suspended harness that is spring loaded
- Detects walk, run, backtracking and crouch in 360 degrees and mimics it in-game
- Virtualizer is $1,249 and the Omni is $699

Issues with omnidirectional treadmills

- Harnesses are cumbersome and tiresome
- Not appealing to casual gamers, who aren't willing to spend a lot
- Not appealing to Pro gamers who play for hours on end
- Treadmill may also exacerbate nausea
- Below: Other forms of VR rigs
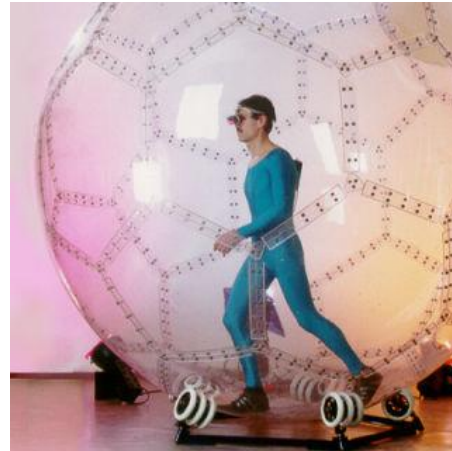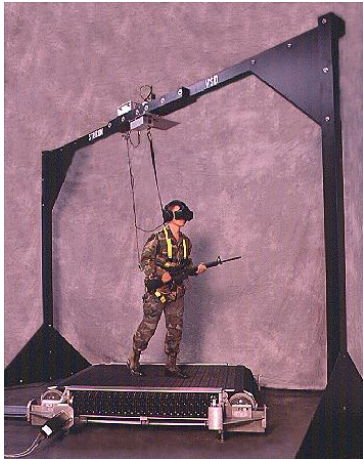
The End

Thank you

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