Hacking the Kinect
Contents

- The Kinect Hardware
- The Official Microsoft Kinect SDK
- Kinect with open-source libraries (briefly)
How is the Kinect different from any other camera?

- Kinect is a 3D camera!
- Along with the RGB values of every pixel, it also gives you the depth values associated with every pixel.
- It uses structured infrared light to determine depth values.
False Colour Depth Image
Edge Detection with the Depth Data
The Kinect Hardware
The Kinect Hardware

1. Infrared optics
   A projector and sensor map over 48 points on the human body.

2. RGB camera
   The camera combines with the 3D map to create the image you see on screen.

3. Motorized tilt
   Mechanical gears at the base let the game follow you.

4. Multi-array microphone
   Four microphones cancel out ambient noise and pinpoint where you are in the room.
Microsoft Kinect SDK
Microsoft Kinect SDK

- The official software development kit from Microsoft.
- Closed-Source binary (black boxes)
- Skeleton Tracking
- Gesture Recognition
- Facial Recognition and tracking
- Microsoft Speech APIs
- Kinect Fusion
- Apart from these, you also have access to raw RGB-D data, and even the raw infrared data (disparity map).
- Program in C#, C++
Kinect Fusion
Kinect and open-source
To use Kinect with openCV / PCL

- You will first need to install the open source Kinect drivers i.e. OpenNI 1.5.x
- You will then need to compile and install openCV (configured to be used with Kinect or other 3D sensors)
- A similar process needs to be followed when using the Point Cloud Library.
Why open source libraries?

- There are no black-boxes!
- Use on any platform (UNIX/Linux/OS-X), not just windows.
- You can view any piece of code in the library, and edit it if you want.
- openCV is useful when you need a strong mix of RGB + Depth Image processing
- Point Cloud Library is useful for reconstructing 3D scenes, and for applying complex point cloud algorithms.
The Alternatives:

Asus Xtion PRO

PrimeSense Carmine
Kinect 2.0
The Future- The Project Tango
Questions?