Hacking the Kinect

AVI SINGH

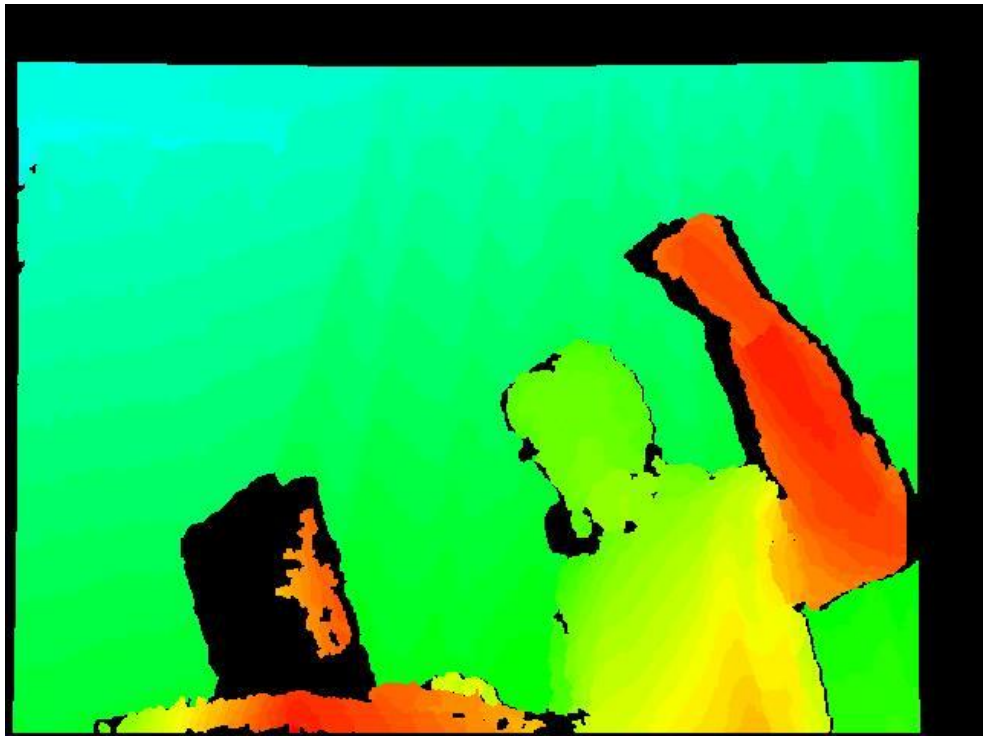
Contents

- The Kinect Hardware
- The Official Microsoft Kinect SDK
- Kinect with open-source libraries (briefly)

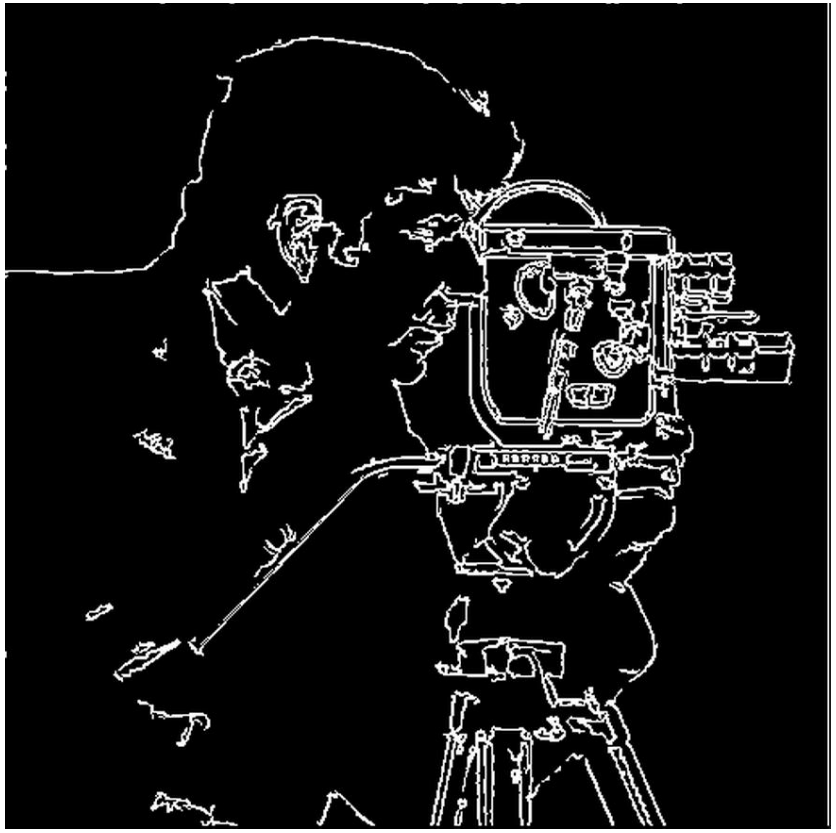
How is the Kinect different from any other camera?

- 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

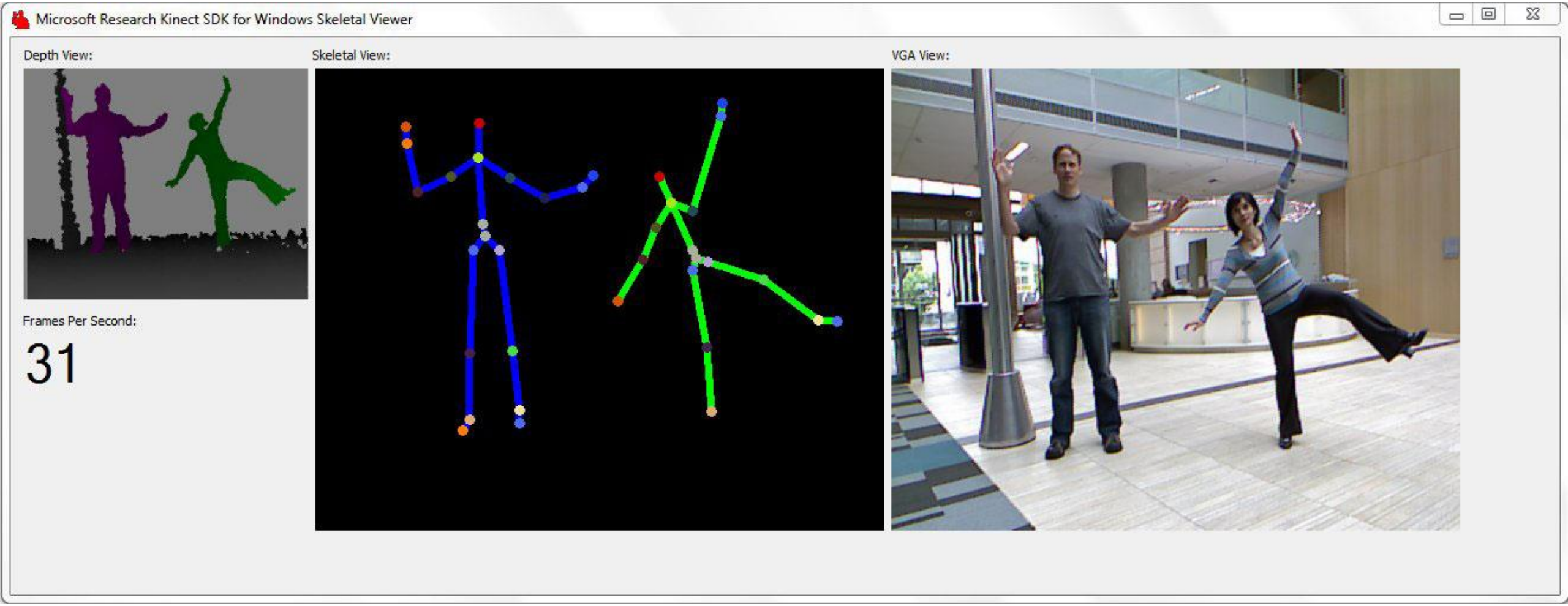
The Kinect Hardware

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

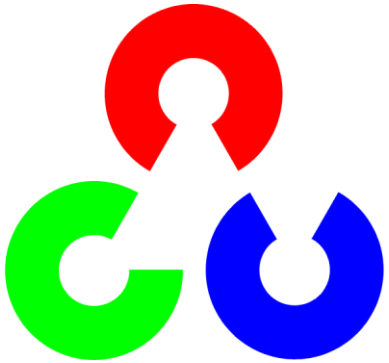
- Apart from these, you also have access to raw RGB-D data, and even the raw infrared data (disparity map).
- Program in C#, C++


Microsoft Research Kinect SDK for Windows Skeletal Viewer
Depth View:
Skeletal View:
VGA View:
Frames Per Second:
31

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.

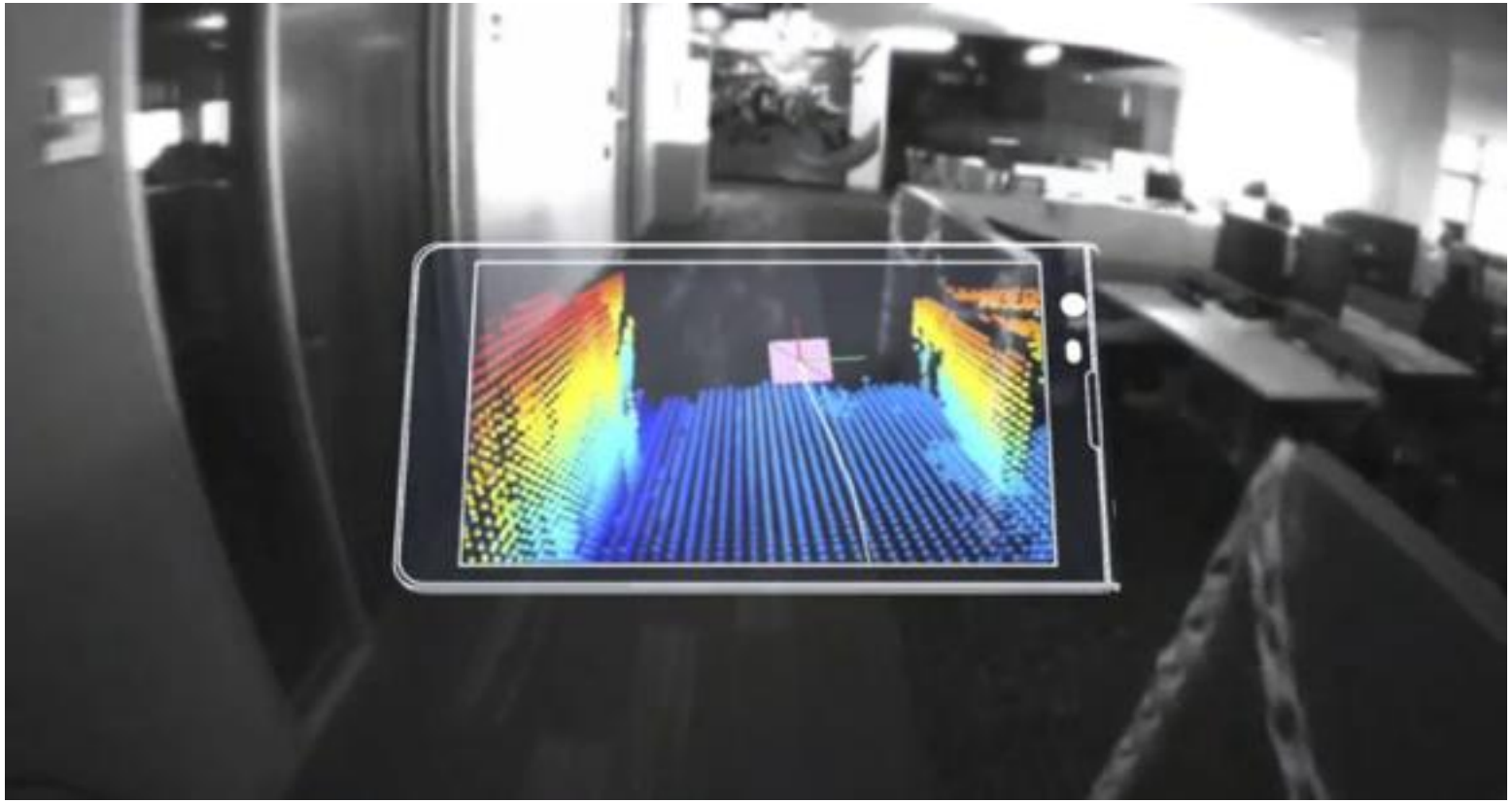
The Alternatives:

Asus Xtion PRO

PrimeSense Carmine

Kinect 2.0

The Future- The Project Tango



Questions?