USING THE XBOX KINECT™ SENSOR FOR GESTURE RECOGNITION *

CONFERENCE WORKSHOP

Chuck Pheatt
Department of Computer Science
Emporia State University
Emporia, KS 66801
620 341-5637
cpheatt@emporia.edu

Andrew Wayman
Department of Computer Science
Emporia State University
Emporia, KS 66801
620 341-5281
awayman@g.emporia.edu

ABSTRACT

The Kinect sensor was introduced in November 2010 by Microsoft as an accessory for the Xbox 360 video game system. Shortly after the product release, multiple software frameworks became available that allows a personal computer to capture output from a stand-alone Kinect [1,2].

The Kinect contains a RGB camera and a depth sensor using an IR light source that allows the unit to output three dimensional positional data in real time. The Kinect data is organized as a stream of two 640 x 480 images acquired at a rate of 30 frames per second (fps). One of these is an ordinary 24-bit RGB video image. The other is an 11-bit depth image from which (x, y, z) positional data may be calculated. Students are well aware of the Kinect as an input device for the Xbox 360 system which makes it an ideal venue for student experimentation and independent study projects using a personal computer platform.

As part of the OpenNI framework [2], middleware (NITE [3]) is available that allows the Kinect to recognize gestures. The gestures include focus (getting the Kinect's attention), wave, swipe (up, down, left or right) and circle. The gestures may be used to control user interfaces with gesture's as well as being the foundation for gaming activities.

The tutorial presentation will provide attendees with detailed information on the use of the NITE middleware in the C++ development environments for the Kinect. In this tutorial we will present:

- Hardware and software requirements for the development environment.

- Detailed instructions for downloading of device drivers, OpenNI framework and NITE middleware and associated libraries.
- "Hello World" examples for checking the functionality of the NITE middleware with Kinect unit.
- An overview of the NITE middleware capabilities including functionality and limitations.
- A summary of the library structure of the OpenNI and NITE frameworks.
- Several simple examples of the devices capabilities including player tracking and the use of gesture recognition.
- A summary of research opportunities that are student accessible.

All software and materials presented during the tutorial will be provided on the author's web site so that users may quickly get their Kinect applications up and running without significant configuration issues and start-up problems.

REFERENCES

[1] OpenNI, http://openni.org.

[2] Kinect for Windows SDK, http://kinectforwindows.org.

[3] PrimeSense, http://www.primesense.com.