wiiRemote

useR! 2009 Focus Multimedia

Landon Jensen (lsjensen@micron.com)
Vatsal Shah (vshah@purdue.edu)
Nintendo Wii?

http://www.nintendo.com/wii/what/meetwii
A main feature of the Wii Remote is its motion sensing capability, which allows the user to interact with and manipulate items on screen via movement and pointing through the use of accelerometer and optical sensor technology.

Bluetooth connection

Extensions… homebRew

Previous Work: Wii+Matlab = WiiLAB

Wiimote Interactions for Freshmen Engineering Education
Jordan Brindza and Jessica Szweida
Computer Science and Engineering - University of Notre Dame
This work was supported by National Science Foundation Grant CNS-0754933

Introduction
The focus of this project was to develop hands-on laboratory modules and demonstrations involving the Nintendo WiiMote to augment the programming module for the freshmen Introduction to Engineering course. By creating a robust set of MATLAB functions we hope to make the WiiMote accessible to students of all programming levels.

Wiimote
- Feedback:
  - Rumble
  - LEDs
  - Speaker
- Outputs:
  - Buttons
  - Accelerometer
  - Infrared Sensor

Wiimote Class MATLAB
- The MATLAB global functions act as a wrapper for the WiiMote class masking the class/object syntax from the user.
- The WiiMote class contains all of the necessary functions and variables to allow MATLAB programs to control the WiiMote through WiiLAB.

WiiLAB
- A wrapper for WiiMoteLib that exposes the library as a COM interop.
- C# Library that communicates with the WiiMote through a Bluetooth adapter. Developed by Brian Peak with a few of our modifications.

WiiLAB Test
WiiLABTest is a standalone C# application that allows the user to:
- Check that the WiiMotes are able to connect
- Up to four WiiMotes
- Validate operability of WiiMote features
- Verify that WiiLAB was installed correctly without having to go through MATLAB

Wiki
Our work is documented on the NetScale Laboratory’s TWiki:
http://netscale.cse.nd.edu/twiki/bin/view/Edu/WiiMote

- Tutorials
- Installation
- Connecting the WiiMote
- Getting started with WiiLAB
- Wiimote-Bluetooth pairing
- Functions
- Description and usage
- Quick reference guide
- Demo walkthroughs
- WiiLAB Test
- Open-source

References

http://netscale.cse.nd.edu/twiki/bin/view/Edu/WiiMote
Wii + R: Technical Details

Combine

Visual C# 2008 Studio Express
R (via statconnDCOM)
Wii Remote (via WiimoteLib)

Wii Remote sensor data captured by event/polling and sent to R for graphics
// Initiate R
StatConnector test1 = new STATCONNECTORSRVLib.StatConnectorClass();
test1.Init("R");

// create a new instance of the Wiimote
Wiimote wm = new Wiimote();

// connect to the Wiimote
wm.Connect();

// set the report type to return the IR sensor and accelerometer data (buttons always come back)
wm.SetReportType(WiimoteLib.InputReport.IRAccel, true);
for (int count = 1; count < 1000; count++)
{
    // pause for 100ms
    System.Threading.Thread.Sleep(100);

    // get IR status
    state[0, 0] = (double)(wm.WiimoteState.IRState.IRSensors[0].Found ? 1 : 0);
    state[0, 1] = (double)(wm.WiimoteState.IRState.IRSensors[0].Position.X);
    state[0, 2] = (double)(wm.WiimoteState.IRState.IRSensors[0].Position.Y);

    // send IR data to R
    test1.EvaluateNoReturn(string.Concat("xpnt = 3", 1 - state[0, 1], ", ", "- 1.5"));

    // redraw plot in R
    ~~~~
}
Let's have some fun

Use WiiRemote to create/interact with data (1D, 2D, 3D, and beyond)

Possible applications?

- Enhance learning experience
- Check out these simple games…
Live Demo #1

1D SPC/R2R game
Live Demo #2

2D SPC/R2R game
3D scatterplot via rgl or with ggobi
Other games...

6Sigma Samurai

SCHWARZENEGGER
The Outlier

"I'LL BE BACK!"

Variance
Covariance
Matrix
Special thanks...

Johnny Chung Lee for his cool Wii Project ideas

Brian Peek for his WiimoteLib libraries

Jason Smith for Wiimote Presenter

Great packages: rgl, iplots

Micron Technology, Inc and Purdue University for sponsoring our travels