

Wii + Python = Intuitive Control

Presented by Asim Mittal @ PyCon India, 2010

What is Intuitive Control ??

“ Instinctive, Natural, no involvement of rational thought ”

“ Power to determine, operate ”

Natural User Interfaces

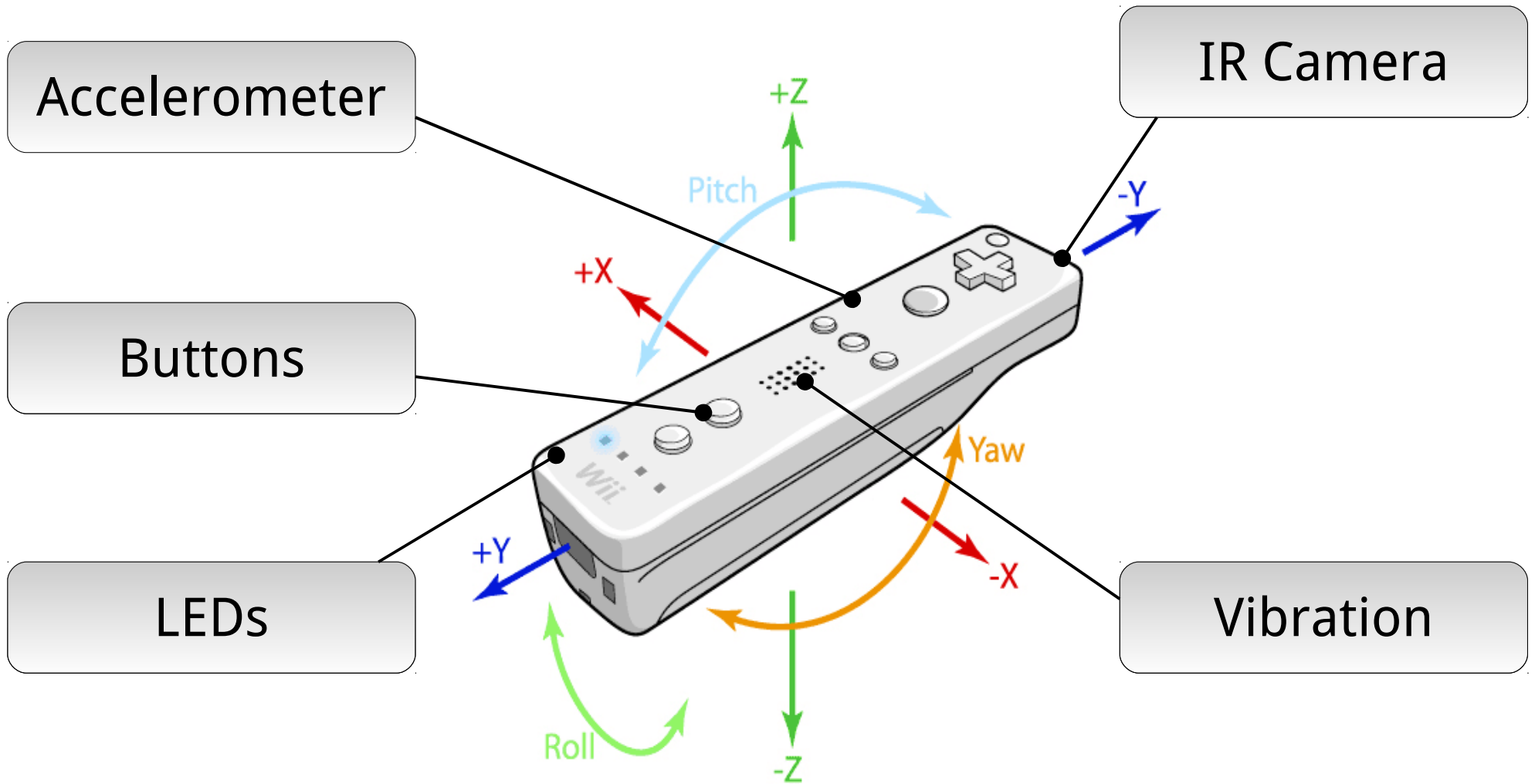
Factors to consider

- Interface practicality
- Complexity of design
- Associated learning curve
- Application support
- **Cost**



Courtesy edbrophy.com

The Nintendo Wii

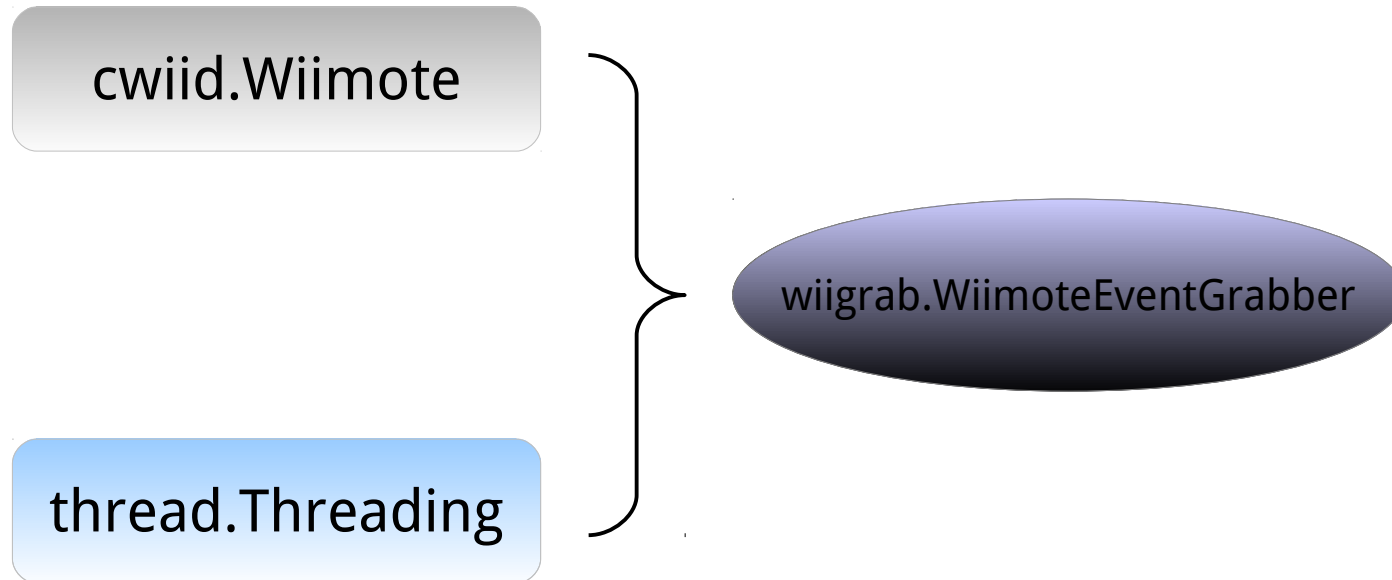


What is the CWiiD project??

(Visit <http://abstrakraft.org/> for more info)

- Open Source C library for the Wii remote
- Comes with a Python wrapper (python-cwiid)
- API driven architecture – Easy to use
- Integrates bluetooth connectivity

What did I do?



- Creates an event based structure (just like mouse events etc.)
- Easy integration of the wiimote object with any python app
- Makes this a “plug and play” module
- Convenience through abstraction

Wiimote Sensor Report

Accelerometer	Measures the change along three axes. Tuple.
Buttons	It is a numerical value. Each button has been assigned a numerical code. Multiple key presses cause sum/addition
LED	Its a number varying between 0 (0b0000) and 15 (0b1111). Each bit representing an LED on the remote
Battery	A positive integer with a maximum value around 200
IR Points	Tracks up to four IR points in 2D space. Each point may vary in position from (0,0) to (1024,768)
Vibration	Binary value (0,1) indicating off or on state of the internal motor

External Joystick	This usually grabs similar data from an additional controller that can be connected to the wiimote (e.g. a Nunchuk joystick)
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Getting started...

- Creating an event grabber
- Connecting to the wiimote
- Setting the report type
- Capturing and processing reports
- Terminating before closing



simpleConnect.py

Doing something useful

- First real application
- Using buttons
- Simultaneous button presses
- Using the vibration mode



simpleButtons.py

Iterative Displacement

- Human beings are used to 'Continuity'
- The concept used behind every mouse
- Physical movement translates to relative displacement
- Scaling of physical movement allows larger coverage

The same concept will be used to translate the movement of IR points in two dimensions into an equivalent movement of objects on the screen

Tracking Infra-Red Points

- The IR Sample space
- Tracking two points
- Using iterative displacement
- Motion capture



runDualPointDemo.py

You can track up to **four** IR points in two dimensions using a single remote

Having a little fun...

- Revitalizing simple games
- IR sensitive objects
- Touch-less workspace

runBounce.py

runPaddleWar.py

runVirtualObject.py

runPuzzle.py

Re – inventing the “Mouse”

Why is the mouse important?

- OS level integration
- Most commonly used
- Works for all applications

So how do we do it?

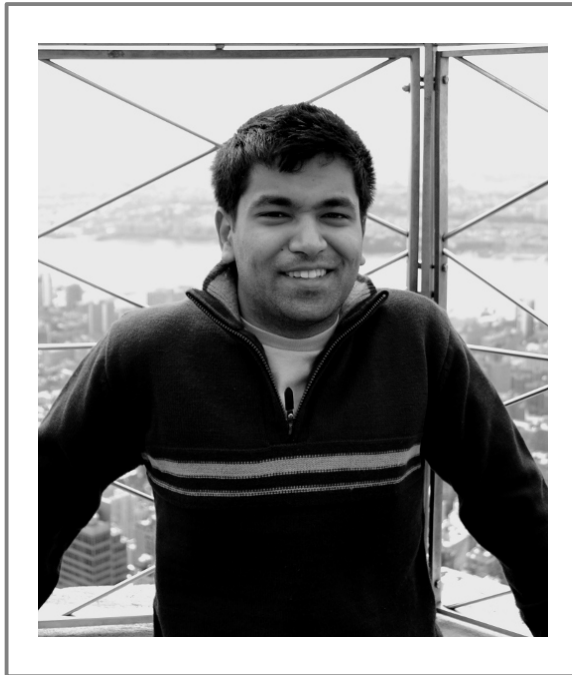
- GUI automation toolkits for X11
- Tie up mouse events to the Wii
- Use dwell click if necessary

runMouseMover.py



Courtesy quickstep.com

Final Words...



You may download this presentation and all associated content from [my blog](#).

Please feel free to contact me via email. I am passionate about open source software, improving exiting methodologies for Human Computer Interaction and anything with creative potential.

Hope to see you next year at PyCon India!

Asim Mittal



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