Robotics

Nao's at BSU
Admin

- Be careful with these robots – they are not cheap.
Nao Robots

- Nao Robots are a new popular robot from Aldabaran Robotics
Target Audience

- Nao is marketed to multiple audiences
  - Education people
  - K-12 STEM people
  - Undergraduate robotics
  - Research robotics
Target Audience

- Nao is marketed to multiple audiences and has interfaces for each audience
  - Education people
    - Mostly built in programs
  - K-12 STEM people
    - Choregraphe suite:
      - Very expensive at last check. One copy per robot, add more and looking at $500/user
  - Undergraduate robotics
    - Python/java sdk
  - Research robotics
    - C++ sdk
Note on versions

- If you search for NAO sdk – you will get the old version
  - If you see 1.4.x you are working on the wrong version
  - We will be using the Nao 2.x sdk.
  - As of 2015, that was not easy to find.

- Furthermore:
  - While the license for the SDK allows anyone with access to a NAO to use it – they hide the SDK
  - So see flash drives.
C++ API

- Alternative APIs for possible future directed study/research projects.
  - C++ API works on Windows with visual studio
  - And on Mac and Linux with the gcc cross compiler toolchain.
    - How many of you have done some cross compiling?
  - Java
    - Well its java
    - And apparently as of 2015 needs a unique Naoqi OS
So Python

- So we will use python
  - C++ might be better, but I want to focus on programming robots in this class
  - Not cross compiling
    - Though important skill for lots of research robotics.
    - Cross compiling?
  - Warning: python2.7
    - Not 3.x
  - Mac:
    - Reports: can only use if system default python is the only python installed.
Python SDK continued

- **Linux**
  - Should work with recent versions of Ubuntu/Mint
    - LTS 12.04 (Ubuntu) or LTS 13 (mint) or newer
  - Need either 64/32 bit python 2.7
- **Windows:**
  - Install python 2.7 32 bit.
  - Install the python naoqi sdk
    - Choose the right 32 bit version of python during the install
  - Yes it will install into lots of versions including 64 bit python3
    - And then it will crash
Did you succeed? (part 1)

- To check if you got the SDK working:
  - Run python (in pycharm or command line)
    - import naoqi
    - Is the command line silent? YES!!! you are ready to move on
    - Did you get an exception? Hmmm there is a problem.

See the install docs for more:

http://doc.aldebaran.com/2-1/dev/python/install_guide.html
Programming the Nao

- Programming a Nao starts with the Naoqi framework
- Naoqi framework
  - Distributed
  - "cross platform"
    - Works on linux/mac/windows
  - "Cross language"
    - Python/c++
      - "skilled users" should develop behaviors in python and modules in c++ (official Aldabaran recommendation)
  - Blocking and non-blocking calls possible.
ALProxy

- ALProxy is the key to running useful stuff on the NAO
  - ALProxy(name, ip, port)
    - name is the name of the module,
    - ip is the IP of the broker in which the module is running,
    - port is the port of the broker. (default is 9559)
  - ALProxy(name)
  - See demo
Nao Robots

- **Nao hints and issues**
  - SetStiffness(0) #this is bad
  - Eventually one or more of the robots motors will get too hot.
  - Have the robot sit down and “rest”
  - motionProxy = ALProxy("ALMotion", robotIP, PORT)
  - motionProxy.rest()}
Assignment

- Work through the Nao basic tutorial:
- Look through all 4 sections – try them out.
- Odd numbered groups use Nao 1
- Even Numbered groups use Nao 2
Assignment

- Work through the Nao basic tutorial:
  - http://doc.aldebaran.com/2-1/dev/python/tutorials
- Look through all 4 sections – try them out.
- Odd numbered groups use Nao 1
- Even Numbered groups use Nao 2
- Then Do project 2 – lets look at that.