To Install and Run NCS6

-Instructions *using Linux OS*

Required Packages: Install before running NCS6

- cuda (CUDA 4.0)
  - Use the link below as reference for CUDA installation:
    http://sn0v.wordpress.com/2012/05/11/installing-cuda-on-ubuntu-12-04/
    - visit http://developer.nvidia.com/cuda/cuda-toolkit-40
    - choose and download the correct version for your machine
- bison
  - 'sudo apt-get install bison'
- flex
  - 'sudo apt-get install flex'
- openmpi
  - visit http://www.open-mpi.org/software/ompi/v1.6/ ◦ choose the correct file for your machine
- g++ 4.4 and 4.6
  - 'sudo apt-get install g++ g++-4.4 g++-4.6
- doxygen
  - 'sudo apt-get install doxygen'
- graphvis
  - 'sudo apt-get install graphviz'
- cmake
  - 'sudo apt-get install cmake'

Installing NCS6

- Go to the NCS Project Page and click on the download link for the zip file (NCS6.zip)
    - Download the file in the location you wish to have NCS6
- Extract the files: there are multiple ways to do this
    - Right click on the zip file ◦ Choose *Extract Here*

    - Open a terminal
    - Navigate to the directory where the zip file is located
    - type 'unzip *NCS6.zip -d <extraction_directory>'*

- Open a terminal
    - With Ubuntu, simply press Ctrl+Alt+T
- Navigate to the 'brainslug' directory (this is the extracted directory from the NCS6 zip file)
- Create a build folder
    - *'mkdir build'*
- Enter the build directory
    - *'cd build'*
- Make the program (this process may take awhile)
    - *'cmake ..'*
    - *'make'*

Run NCS6 on Your Machine

Follow these steps from within the 'brainslug/build' directory

STEP 1: Set the cluster of devices to be used for the simulation

- *'applications/clusterSpecifier/clusterSpecifier -nocpu <options> <outputFile>'*
  - The option available for this command is '-nocuda'
  - 'nocuda' will stop the machine from using cuda
  - The outputFile is the name of the file containing the cluster information. Specify the name to later reference the file.

STEP 2: Set the cluster in brainslug

- 'applications/clusterInfo/clusterInfo <clusterFile>'
  - The clusterFile is the name of the outputFile created by the Step 1 command.

STEP 3: Run the NCS Distributor

- *'applications/ncsDistributor/ncsDistributor <NCSFile> <clusterFile> <distributor>'*
  - The NCSFile options can be found in sub-directories located in the "files" directory of brainslug (*../files*)
  - ex) *../files/simple/Simple.in*
  - The clusterFile is the specified cluster file in the build directory (file created in Step 1 command)
  - The distributor is created by the NCSDistributor command. Specify the name to later reference the distributor for use in the simulator.

STEP 4: Run the Izhikevich Distributor

- *'applications/izhDistributor/izhDistributor <neuronFile> <synapseFile> <currentFile> <numNeurons>*

<clusterFile> <distributor>'

- The neuronFile, synapseFile, and currentFile options can be found in sub-directories located in the "files" directory of brainslug (../files)
- The clusterFile is the specified cluster file in the build directory (file created in Step 1 command)
- The distributor is created by the izhDistributor command. Specify the name to later reference the distributor for use in the simulator

STEP 5: Run the simulator

- *'applications/simulator/simulator <distributor>'*
  - The distributor option is the name of a distributor created in Step 3 and 4

Run NCS6 on Multiple Machines

Follow these steps from within the 'brainslug/build' directory

STEP 1: Create an MPI file

- using a text editor, create new file: <fileName>.mpi

STEP 2: List the names of the computers and the number of slots to be used

- ex) <computerName> slots=1

  <computerName2> slots=1

- save the file

STEP 3: Set the cluster of devices to be used

- *'mpirun -np 2 --hostfile <fileName>.mpi applications/clusterSpecifier/clusterSpecifier -nocpu <options> <outputFile>'*

- *ex) mpirun -np 2 --hostfile myComps.mpi applications/clusterSpecifier/clusterSpecifier -nocpu test.cluster*

  - The option available for this command is '-nocuda'

  - 'nocuda' will stop the machine from using cuda

  - The outputFile is the name of the file containing the cluster information. Specify the name to later reference the file.

STEP 4: Set cluster to be used in brainslug

- *'mpirun -np 2 --hostfile <fileName>.mpi applications/clusterInfo/clusterInfo <clusterFile>'*
    - The clusterFile is the name of the outputFile created by the Step 3 command.

STEP 5: Run NCS Distributor

- *'applications/ncsDistributor/ncsDistributor <NCSFile> <clusterFile> <distributor> '*
- ex) *applications/ncsDistributor/ncsDistributor ../files/simple/Simple.in test.cluster foo*
    - The NCSFile options can be found in sub-directories located in the *'files'* directory of brainslug (../files)
        - ex) *../files/simple/Simple.in*
    - The clusterFile is the specified cluster file in the build directory (file created in Step 3 command)
    - The distributor is created by the NCSDistributor. Specify the name to later reference the distributor for use in the simulator.

STEP 6: Run the simulator

- *'mpirun -np 2 --hostfile <fileName>.mpi applications/simulator/simulator <distributor>'*
    - The distributor option is the name of a distributor created in Step 5