Order of Attack

- sudo apt-get install checkinstall
- mkdir ~/Downloads/realsense

lz4

- sudo apt-get install liblz4-dev

cmake

- sudo apt-get install software-properties-common
- sudo add-apt-repository ppa:george-edison55/cmake-3.x
- sudo apt-get update
- sudo apt-get install cmake
- sudo apt install cmake-curses-gui
- sudo apt-get update && sudo apt-get upgrade

libusb

- sudo apt-get install libusb-1.0-0-dev pkg-config

OpenGL GLFW v3

- sudo apt-get install libglfw3-dev

librealsense 1.12.1

- *Copy into ~/Downloads/realsense/librealsense-1.12.1*
- cd ~/Downloads/realsense/librealsense-1.12.1
- mkdir build
- cd build
- cmake ..
- sudo make
- sudo make install
  - N
  - Y
- cd ..
- sudo cp config/99-realsense-libusb.rules /etc/udev/rules.d/
- sudo udevadm control --reload-rules && udevadm trigger
- ./scripts/patch-uvcvideo-16.04.simple.sh
- sudo modprobe uvcvideo

Note that all Nvidia and Cuda installs are for sake of Cuda and were later nullified/ignored due to installation issues with VTK/OpenCV. There is room for future work here but nothing promised beyond a good starting point

Nvidia Drivers w/ Compiz

- sudo apt purge nvidia-*
- sudo add-apt-repository ppa:graphics-drivers/ppa
- sudo apt update
- sudo apt-get install nvidia-367
- sudo apt-get install --reinstall ubuntu-desktop unity compizconfig-settings-manager upstart

Cuda 8.0

- *Install Cuda 8.0 to ~/Downloads*
- Cd ~/Downloads
- sudo dpkg -i cuda-repo-ubuntu1604-8-0-local-ga2_8.0.61-1_amd64.deb
- sudo apt-get update

- sudo apt-get install cuda
    - Install and use patch??

CudaDNN (deep neural net library for GPU accel)

- *Download cudaDNN to ~/Downloads*
    - V5.1 for Linux
- sudo tar -xvf cudnn-8.0-linux-x64-v5.1.tgz -C /usr/local
- Add to ~./bashrc paths
    - gedit ~/.bashrc
        - export LD_LIBRARY_PATH=/usr/local/cuda/lib64
        - export PATH=$PATH:/usr/local/cuda-8.0/bin

VTK

- sudo apt-get install libpthread-stubs0-dev
- sudo apt-get install libxt-dev
- sudo apt-get update
- Download VTK 7.1
- cd vtk-7-1.1
- mkdir build
- cd build
- cmake ..
- sudo make
- sudo make install
- sudo apt-get install
    - trying vtk5.10.0
        - need to change line in 'rendering/vtkXOpenGLRenderWindow.cxx'
            - uncomment line 30 '#define GLX_GLXEXT_LEGACY'
        - cmake with 'BUILD_SHARED_LIBS=ON'??
            - not tested or followed through on

OpenCV 3.1 w/o Cuda Support (can also try w/ OpenCV 3.3)

- Note: Attempted to integrate Cuda but was unable to compile
    - Believe is because of GCC version being too high for Cuda
    - Also, issues w/ opencv_contrib/modules not recognizing VTK
        - Could explore linking as problem?
- https://medium.com/@vivek.yadav/deep-learning-setup-for-ubuntu-16-04-tensorflow-1-2-keras-opencv3-python3-cuda8-and-cudnn5-1-324438dd46f0
    - Suggested tutorial for installs

  https://gist.github.com/filitchp/5645d5eebfefe374218fa2cbf89189aa

- sudo apt-get install cmake cmake-qt-gui
- mkdir ~/Downloads/opencv-3.1.0
- cd ~/Downloads/opencv-3.1.0
- git clone https://github.com/opencv/opencv.git
- cd opencv
- git checkout 3.1.0
- sudo apt install --assume-yes build-essential cmake git pkg-config unzip ffmpeg qtbase5-dev python-dev python3-dev python-numpy python3-numpy
- sudo apt install libhdf5-dev
- sudo apt install --assume-yes libgtk-3-dev libdc1394-22 libdc1394-22-dev libjpeg-dev

libpng12-dev libtiff5-dev libjasper-dev

- sudo apt install --assume-yes libavcodec-dev libavformat-dev libswscale-dev libxine2-dev libgstreamer0.10-dev libgstreamer-plugins-base0.10-dev
- sudo apt install --assume-yes libv4l-dev libtbb-dev libfaac-dev libmp3lame-dev libopencore-amrnb-dev libopencore-amrwb-dev libtheora-dev
- sudo apt install --assume-yes libvorbis-dev libxvidcore-dev v4l-utils
- sudo apt-get -y install python-numpy python3-numpy
- sudo apt-get -y install build-essential cmake git pkg-config
- sudo apt-get -y install libjpeg8-dev libtiff-dev libjasper-dev libpng12-dev
- sudo apt-get -y install libavcodec-dev libavformat-dev libswscale-dev libv4l-dev
- sudo apt-get -y install libgtk2.0-dev
- sudo apt-get -y install libatlas-base-dev gfortran
- sudo apt-get -y install python3.5-dev
- sudo apt-get -y install python2.7-dev
- sudo apt-get -y install libhdf5-dev
- sudo apt-get -y install libqt4-dev
- cd /usr/include/linux
- sudo ln -s ../libv4l1-videodev.h videodev.h
- sudo apt-get install libv4l-dev
- sudo apt install gphoto2 libgphoto2*
- sudo apt-get install libvtk6.2 libvtk-java
- sudo apt-get install libgstreamer1.0-0 gstreamer1.0-plugins-base gstreamer1.0-plugins-good gstreamer1.0-plugins-bad gstreamer1.0-plugins-ugly gstreamer1.0-libav gstreamer1.0-doc gstreamer1.0-tools
- sudo apt-get install tcl-vtk vtk-doc
- sudo apt-get install libgstreamer-plugins-base1.0-dev
- sudo apt-get install python-numpy python-scipy python-matplotlib
- sudo apt-get install libopencv-dev
- sudo apt-get update
- sudo apt-get upgrade
- cd ~/Downloads/
- git clone https://github.com/opencv/opencv_contrib.git
- cd opencv_contrib
- git checkout 3.1.0
- cd ~/Downloads/opencv-3.1.0
- mkdir build
- cd build
- gedit ../cmake/OpenCVDetectVTK.cmake
    - change ‘vtkRenderingOpenGL’ in line 6 to ‘vtkRenderingOpenGL2’
- cmake -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local -D WITH_CUDA=OFF -D WITH_CUBLAS=ON -D WITH_TBB=ON -D WITH_V4L=ON -D WITH_QT=ON -D WITH_TIFF=OFF -D WITH_OPENGL=ON -D BUILD_PERF_TESTS=OFF -D BUILD_TESTS=OFF -DCUDA_NVCC_FLAGS="-D_FORCE_INLINES" ..
- ~~cmake -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local -D WITH_CUDA=ON -D WITH_CUBLAS=ON -D WITH_TBB=ON -D WITH_V4L=ON -D WITH_QT=ON -D WITH_OPENGL=ON -D BUILD_PERF_TESTS=OFF -D BUILD_TESTS=OFF -DCUDA_NVCC_FLAGS="-D_FORCE_INLINES; --expt-relaxed-constexpr" -D OPENCV_EXTRA_MODULES_PATH=../../opencv_contrib/modules ..~~

    - Use if trying to get Cuda to work
- sudo make
- sudo make install

Apache log4cxx
- sudo apt-get install liblog4cxx-dev liblog4cxx-doc liblog4cxx10v5

Realsense (RS) SDK
- sudo update-grub && sudo reboot
- export OpenCV_DIR=~/opencv/build
    - May not be necessary?
- cd ~/Downloads/realsense
- git clone https://github.com/IntelRealSense/realsense_sdk_zr300.git
- cd realsense_sdk_zr300/
- gedit CMakeLists.txt
    - Add to line 5
        - find_package(OpenCV REQUIRED)
- mkdir build
- cd build
- cmake ..
- sudo make
- sudo make install

Point Cloud Library
- sudo apt-get install libeigen3-dev
- git clone https://github.com/huningxin/install_pcl_deps.git
- cd install_pcl_deps
- chmod +x install_pcl_deps.sh
- ./install_pcl_deps.sh
- cd ..
- Sudo rm -rf install_pcl_deps
- From deb (recommended)
    - Install .deb file to Downloads
        - Linked website
        - Actual Download Link
    - cd ~/Downloads
    - sudo dpkg -i PCL-1.8.0-Linux.deb
    - sudo apt-get install -f
    - sudo dpkg -i PCL-1.8.0-Linux.deb
- From source (for newer versions, untested and takes longer)
    - git clone https://github.com/PointCloudLibrary/pcl.git
    - cd pcl
    - git checkout pcl-1.8.0
        - can replace 1.8.0 w/ desired version
        - v1.7.2 was most recent stable supposedly
            - Doesn't work with VTK-7.
    - mkdir build
    - cd build
    - cmake ..
    - sudo make
    - sudo make install

Python Installs

- sudo apt-get install python-pip
- pip install PyYAML numpy scipy
- pip install Cython==0.25.2
- sudo apt-get install python-rosinstall
- sudo apt-get install python-opencv
- cd ~/Downloads/realsense
- git clone https://github.com/toinsson/pyrealsense.git
- cd pyrealsense
- python setup.py build
- sudo python setup.py install
- cd ~/Downloads
- git clone https://github.com/strawlab/python-pcl.git
- cd python-pcl
- sudo python setup.py build
- sudo python setup.py install
- sudo apt-get install python-matplotlib
- sudo apt-get remove libgstreamer0.10-dev
    - can’t have 0.10 and 1.0