May 29, 2020

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May 28, 2020

- Data downloaded. For 4 files, transfer was shut down before it was complete. Added `--keepalive-time 2` to the curl command and retried the transfer. These are `drz.fits` files. Need `flc.fits` files.
  - Drizzled data from the pipeline have the suffix `drz.fits`, and additionally `drc.fits` for WFC CTE-corrected data. These products are delivered as multi-extension FITS files with three image data extensions: science image [SCI], weight image [WHT], and context image [CTX]. However, **AstroDrizzle** also adds new FITS extensions to the `flt.fits`/`flc.fits` and `drz.fits`/`drc.fits` files, as summarized below. For more information on drizzled data, please refer to the *[The DrizzlePac Handbook](#)*.
- DrizzlePac Handbook: https://www.stsci.edu/scientific-community/software/drizzlepac.html
- Downloading `flc.fits` files following: https://spacetelescope.github.io/notebooks/notebooks/DrizzlePac/align_multiple_visits/align_multiple_visits.html
  - Images are Downloaded. Get CR masks.

May 27, 2020

- HST ACS Database Handbook: http://documents.stsci.edu/hst/acs/documents/handbooks/DataHandbookv6/acs_dhb.pdf
- ESA Hubble Science Archive: http://hst.esac.esa.int/ehst/#search.
  Hubble Legacy Archive: https://hla.stsci.edu/
- Downloading the data listed in Table 1 in Zang & Bloom 2019 from the ESA Archive. *How were the targets selected?* HST file naming convention: https://archive.stsci.edu/hlsp/ipppssoot.html. Downloading the fits file. (Observation ID: training - j97001010, j97005010, j97007010, jbit11010, j9l907010 (neglect the 10-second exposure file), j9l908010, j8z003010, j8z004010, j8z006010, j8z008010, j9el32020 test - jcoz44010, j9l906010 (neglect the 5-second exposure file), j9l909010 (neglect the 40-second exposure file), j90o28050)

  Sample `curl` command:

  ```
  curl -o "hst_10420_05_acs_wfc_f606w_drz.fits"
  "https://hla.stsci.edu/cgi-bin/getdata.cgi?config=ops&dataset=hst_10420_0
  5_acs_wfc_f606w"
  ```
  - ~~Read `AstroDrizzle` documentation~~
  - ~~When download is complete, train the model.~~

May 26, 2020

- Did not allocate more memory to the jupyter notebook, but the kernel does not crash. Reproducing HST results.
- While reproducing HST results:
  - RuntimeError: Cannot initialize CUDA without ATen_cuda library. PyTorch splits its backend into two shared libraries: a CPU library and a CUDA library; this error has occurred because you are trying to use some CUDA functionality, but the CUDA library has not been loaded by the dynamic linker for some reason. The CUDA library MUST be loaded, EVEN IF you don't directly use any symbols from the CUDA library! One common culprit is a lack of -Wl,--no-as-needed in your link arguments; many dynamic linkers will

delete dynamic library dependencies if you don't depend on any of their symbols. You can check if this has occurred by using ldd on your binary to see if there is a dependency on *_cuda.so library.
- ○ ~~Ask about this.~~

May 25, 2020
- Read **https://mwcraig.github.io/ccd-as-book/01-00-Understanding-an-astronomical-CCD-image.html**
- Read **http://slittlefair.staff.shef.ac.uk/teaching/phy217/lectures/instruments/L12/index.html**

May 22, 2020
- The memory-consuming background process ended. Kernel still crashes.

May 21, 2020
- Tried out Quickstar tutorial. All five runs in the quickstart tutorial killed the kernel. The background process is still running, which will end in another day or so.
- Read LeCun et al. 2015
    - mdl.clean(image, threshold = 0.5)
    - mdl.clean(image, threshold = 0.5, inpaint = False)
    - mdl.clean(image, binary=False)
    - mdl.clean(image, threshold = 0.5, n_jobs=-1)
- ○ ~~Ronneberger et al. 2015 (CNN for biomedical imaging convolutional layer)~~
- ○ ~~Find implementation of *DeepCR* and follow the process. Maybe other literature?~~

May 21, 2020
- DeepCR - GitHub, read the paper, add cosmic ray by hand, generate training sets. Set up a research log. PyTorch. Reproduce HST results.
- Went through Zhang & Bloom 2019.
- *Pip* installed *DeepCR,* environment name: *deepcr*
- The kernel crashed while following the Quickstart tutorial. (A memory-consuming job was running in the background)
    - ○ ~~Read LeCun et al. 2015 (Noise and learning/convergence outcome), Ronneberger et al. 2015 (CNN for biomedical imaging convolutional layer)~~
    - ○ ~~Use *DeepCR*~~