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15 November 2013

Dear Luiz -

Thank you very much for taking the trouble to come to Fermilab Nov 6 - 8 and make presentations to the Fermilab and NCSA groups. The subjects concerned progress since the review in July on the Science Portal for analysis of DES data, and operational aspects of the survey (specifically, early checks on data quality).

One theme that emerged very clearly was the complementarity of your work with respect to the Data Management effort at NCSA - the Quality Assurance tools and processes you are undertaking are exactly what is needed by operations (data assessment) at NCSA, and you were strongly encouraged to continue that development. The larger context of the meeting was defining the process by which the DES will create official data releases. We made a lot of progress towards that goal, thanks to the existence of the tools in the Science Portal.

Similarly, on the science analysis side, it was commented that the results presented at the DES Collaboration meeting in Barcelona in early October were what was expected at this stage in the project, but that in the future it was essential to impose more discipline on the data sets under analysis - clear definitions of the contents of the data sets, clear provenance of the versions of the codes used, etc. The Science Portal has been designed from the beginning to serve this critical role, that is, enabling the Science Working Groups to efficiently create customized value-added catalogs, so we already have the solution to the problem.

The presentations were very helpful to allow us to see the potential ways the Science Portal can make even greater contributions. In our discussions we arrived at a number of specific conclusions as described below.

In the following I summarize the interactions, relying on Brian Yanny's (DES DM Project Scientist) notes that he distributed to the Science Working Groups.

Best regards,

Richard Kron
Deputy Director, Dark Energy Survey

Science Portal Presentation, Fermilab, November 7, 2013

Executive Summary

We discussed the use of the Science Portal for assisting in coadd quality analysis ahead of official annual data releases, and general tools for browsing and evaluating large numbers of tiles in an 'at-a-glance' fashion.

We anticipate using this method to validate the quality of the Y1P1 and Y1A1 releases to the collaboration (due out in January and August 2014, respectively).

There is also a mechanism for storing, versioning and comparing value-added catalogs generated by the collaboration, as well as matching external catalogs against the DES dataset. In the upcoming weeks and months there will be more uses of the Portal shown to the collaboration.

Minutes

Attending:

Josh Frieman, Don Petravick, Rich Kron, Brian Yanny, Luiz da Costa, Angelo Fausti, Flavia Sobreira, Nikolai Kuropatkin, Huan Lin, Steve Kent, Tom Diehl, Douglas Tucker, Robert Gruendl, Alex Drlica-Wagner, Eric Neilsen

Agenda:

Presentations by Luiz da Costa and Angelo Fausti:

http://des-docdb.fnal.gov:8080/cgi-bin/ShowDocument?docid=7593

1. A guided tour of Science Portal QA tools
2. How to validate DES data releases

portal demo (with SV-A1 loaded) is at testing.linea.gov.br, please contact Angelo for login info

The presentations highlighted these features and capabilities

of the portal:

1. A coadd tile catalog can be ingested into the Science Portal and basic QA run at the rate of 90 sec/tile.

2. Science Portal provides (on an individual tile and aggregate release basis):
   - A. star/galaxy determination and counts vs. mag
   - B. color-color plots generated and fiducial models fit
   - C. astrometry vs. preloaded reference catalogs (2MASS, UCAC-3)
   - D. photometry vs. preloaded reference catalog (APASS)
   - E. view of footprint and overlap of footprint vs. ref. surveys
   - F. rapid, efficient display, browse, zoom and pan of monochrome and color PNGs of all tiles
   - G. timestamp, author-named comment facility for logging and tracking of anomalies
   - H. id and counts of outliers from stellar locus or galaxy locus
   - I. ellipticity, FWHM stats available
   - J. source code and tunable parameters for plots and stats versioned and stored

3. Science Portal provides a mechanism for storing and distributing value-added catalogs generated by the Science Working Groups

Conclusions

1. The Science Portal allows us to do several DESDM QA and development-related operations that we have not been able to do before, and don't have the resources to do at NCSA/FNAL. For example:

DESDM has 'test,' 'preliminary,' and 'annual' coadd releases. Science Portal now can ingest and test the preliminary releases quickly and run basic QA routines on a global scale, enabling outlying tiles to be seen in the context of the surrounding tiles. This capability allows rapid checks of a software fix and rapid identification of a new problem, even in a small number of outlier cases.

This allows DESDM to correct the problem prior to the official 'annual' coadd release and makes an essential contribution to shortening the operations turn-around time. It will also shorten the time for scientists to analyze data, because problems will be discovered before the Science Working Groups start to create value-added catalogs.

2. Efficient browsing, panning and zooming of images is an important capability, for instance, for scientists looking for strong lenses and gravitational arcs or rich clusters.

3. Creating value-added catalogs within the Science Portal enables everyone to see what is going on, allowing an open opportunity for input and participation.

4. Regarding value-added catalogs and displays, it would be useful to pick default settings for flag cuts, star-galaxy separation (maybe more than one), good/bad ellipticity, and outlier threshold sigmas. These initial versions of value-added catalogs can be presented to the DES Collaboration with pointers to the source and notes on all the cuts, allowing (and encouraging) modification to suit individual groups. In this way, final VAC's can be evolved.

5. It was noted that masks were not fully available yet, these were somewhat difficult to usefully incorporate, and some guidance from the collaboration would be welcome.

Wish-List of Future Capabilities

1. Scientists would like to see implementation of coadd object catalogs in connection with the images, for instance, the ability to overlay color-coded ellipses of detected catalog objects over the .pngs (with a WCS for coordinates added), and then determine catalog information about a given object or set of objects with a mouse click or other simple mechanism.

2. Scientists would like to see the coadd tools expanded to include single-epoch tools, with links to single-epoch .pngs (from Michael Johnson, for instance), and populated links to reduced fits images back at NCSA.

3. Would be useful to have a (RA,DEC) oriented entry point to the browser, so that if one had an object near a given (RA,DEC) one could quickly navigate to tiles/images/objects near that RA/DEC.