Herzsprung Russel Diagrams for Star Clusters

By

Louis Griffiths

## Objective

Can you describe what we wanted to do?

## Introduction

What is the SDSS? Why are we using it?

What is a herzprung russell diagram?

How do we measure color using the SDSS?

Look at color in SDSS why do we use scatter plots of r veresu g-r to build the H-R diagram?

Hint: see <http://skyserver.sdss.org/dr4/en/proj/advanced/hr/globularcluster.asp>

And see

<http://skyserver.sdss.org/dr4/en/proj/advanced/color/>

## Method

What did we do and how did we do it?

Hint describe what each of the following jupyter notebooks does if you don’t know what they do then look at them

Hr-pal3-cluster.ipynb

Globcluster\_processloop.ipynb

Globularcluster\_plothr\_loop.ipynb

Globclustering\_classificationanalysis.ipynb

What libraries are we using in python (hint matplotlib, astropy,scikit-learn )

You used astroquery to query SDSS using sequential query language (SQL)

How did you test the scripts to make sure they give you the right results?

What problems did we have , what went wrong and did not work properly?

## Results

Paste some pictures from the python into here

What do the results show

E.g. show pictures of the HR diagrams, show pictures of the star clusters

## Conclusion

What did we actually find?

## Future Work

Complete the hr diagram for nearer stars

More complete HR diagram query hipparcos data using astroquery e.g.

<https://astroquery.readthedocs.io/en/latest/esasky/esasky.html>

Or may be using

<https://skyview.gsfc.nasa.gov/current/cgi/query.pl>

1. <https://www.cosmos.esa.int/web/hipparcos/search-facility>

## References

1. Based on the SDSS exercise<http://skyserver.sdss.org/dr4/en/proj/advanced/hr/globularcluster.asp>
2. <https://arxiv.org/pdf/0808.0001.pdf>
3. <https://arxiv.org/pdf/1511.03606.pdf>
4. Color in SDSS <http://skyserver.sdss.org/dr4/en/proj/advanced/color/>
5. Astropy tutorials <https://github.com/astropy/astropy-tutorials>
6. Astroquery <https://astroquery.readthedocs.io/en/latest/sdss/sdss.html>
7. <https://apps.sciserver.org/dashboard/>
8. Skyserver finding and navigation <http://skyserver.sdss.org/dr14/en/tools/chart/navi.aspx>
9. <http://scikit-learn.org/stable/>
10. http://skyserver.sdss.org/dr6/en/proj/advanced/hr/hrdiagram2.asp
11. Use happarcos to measure distance to stars <https://www.cosmos.esa.int/web/hipparcos/search-facility>