

REPORT



Freshers

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INTRODUCTION

Our exploration starts with the introduction of fits file, where we started to dig what it is, what it stores, how to access it.

Astropy, which helps to do that along with other extensions like ipykernal, panda, matplotlib, and the code guide.

DATA

Output for Task 1:

The contents present in lightcurve_1.fits

S.No	Name	Ver	Type	Cards	Dimensions	Format
0	Primary	1	PrimaryHDU	55	0	
1	Lightcurve	1	BinTableHDU	156	3862R x 20C	[D, E, J, E, E, E, E, E, E, J, D, E, D, E, D, E, D, E, E, E]
2	Aperture	1	ImageHDU	49	(10,9)	int32

The contents present in bonus_image_1.fits

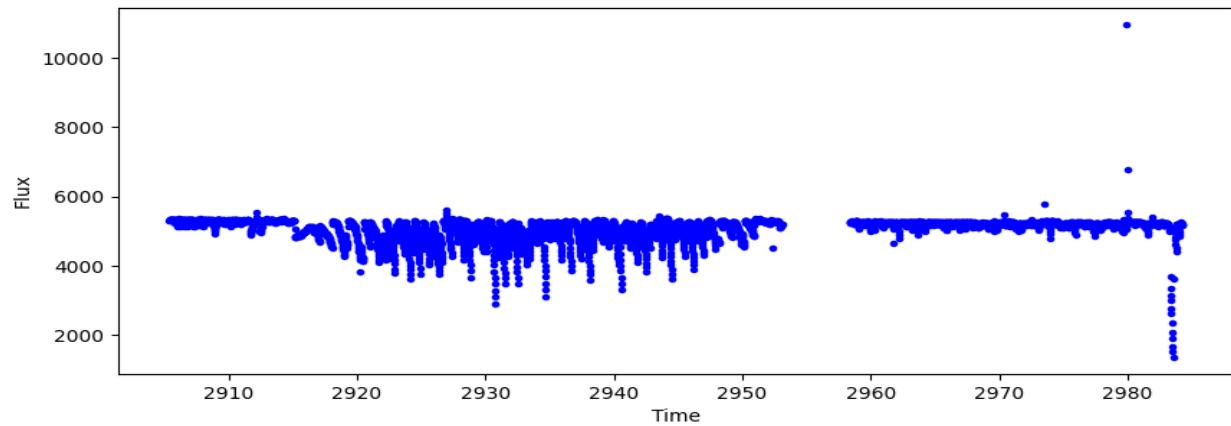
S.No	Name	Ver	Type	Cards	Dimensions	Format
0	Primary	1	PrimaryHDU	161	(891, 893)	int16
1	er.mask	1	TableHDU	25	1600R x 4C	[F6.2, F6.2, F6.2, F6.2]

Outputs

Lightcurve_1

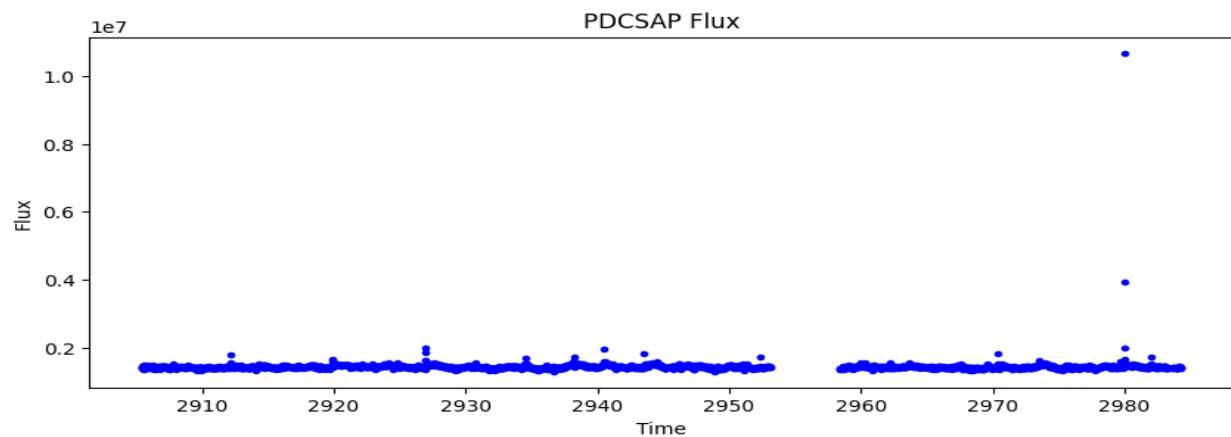
Output for task 2 :

SAP Graph



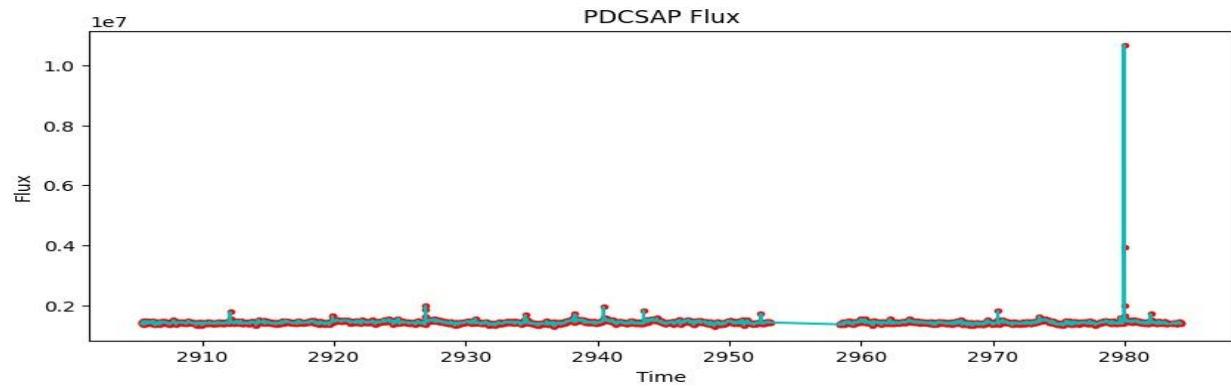
The SAP light curve is calculated by summing together the brightness of pixels that fall within an aperture set by the Kepler mission. This is often referred to as the optimal aperture, but in spite of its name can sometimes be improved upon! Because the SAP light curve is a sum of the brightness in chosen pixels, it is still subject to systematic artifacts of the mission.

PDCSAP Graph



Output for task 3 :

Filtration for sap quality > 0



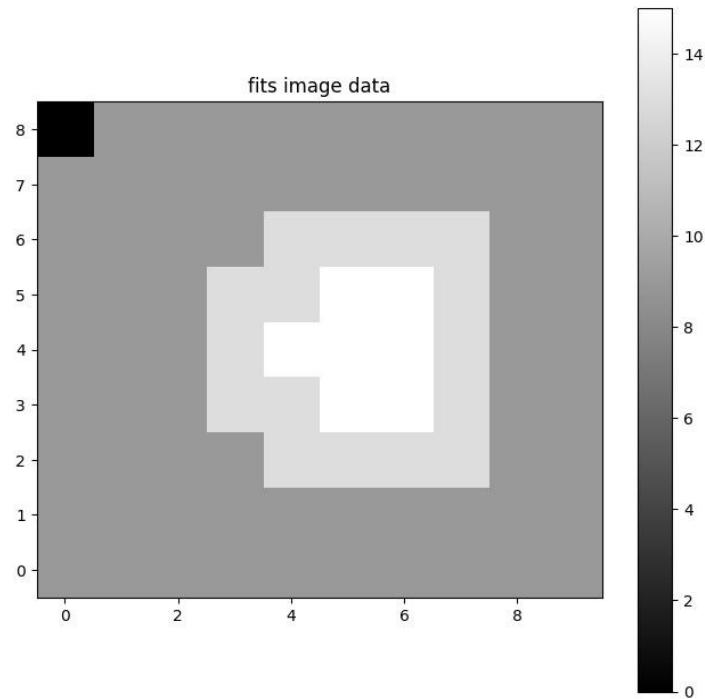
This code first filters the PDCSAP flux data and time data to include only the values where SAP_QUALITY is greater than 0 and then plots them in cyan on top of the original red data points.

The PDCSAP light curve is subject to more treatment than the SAP light curve, and is specifically intended for detecting planets. The PDCSAP pipeline attempts to remove systematic artifacts while keeping planetary transits intact.

Output for task 4 :

Image data of lightcurve_1.fits file

Gray scaling



Without gray scaling (plasma)

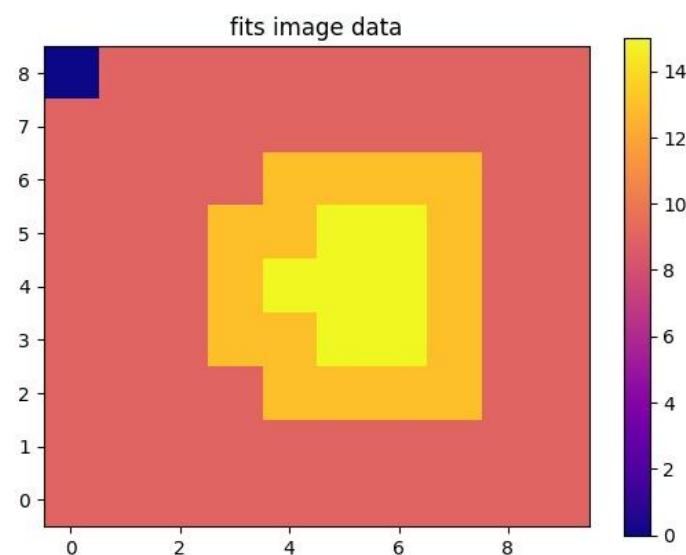
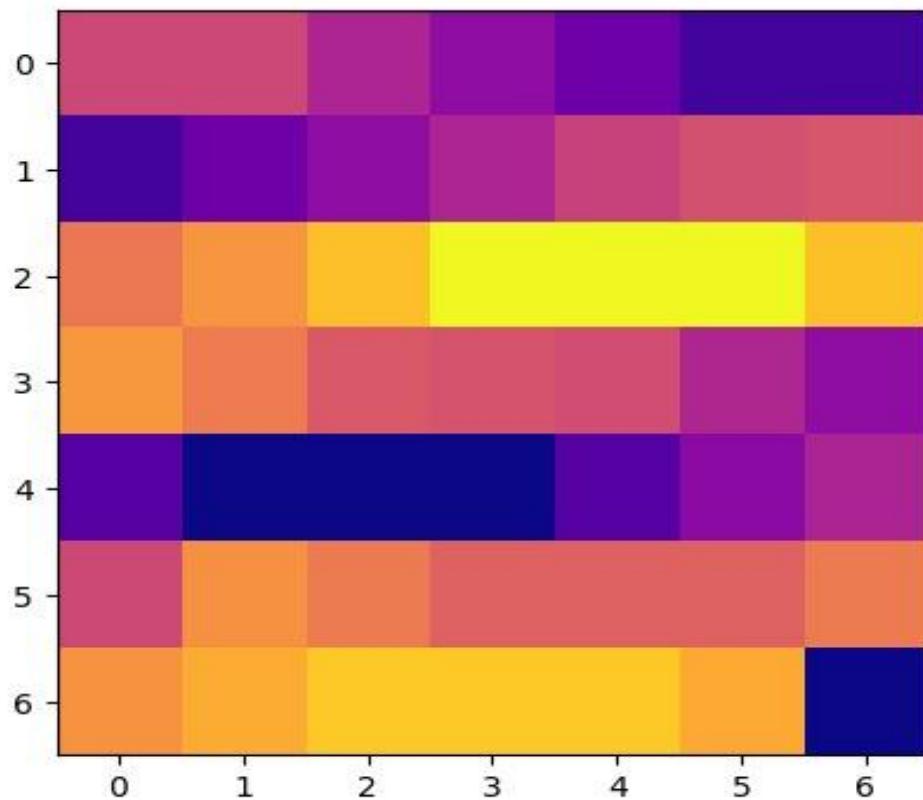


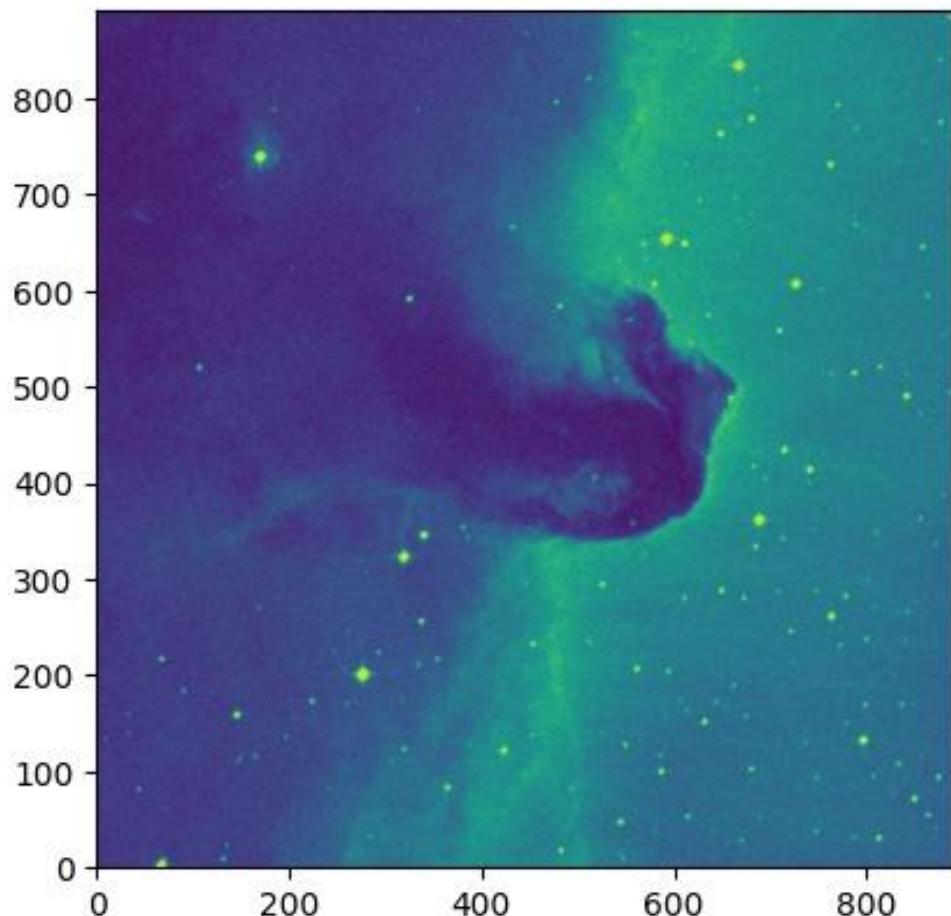
Image which represents array of pixels from lightcurve 1



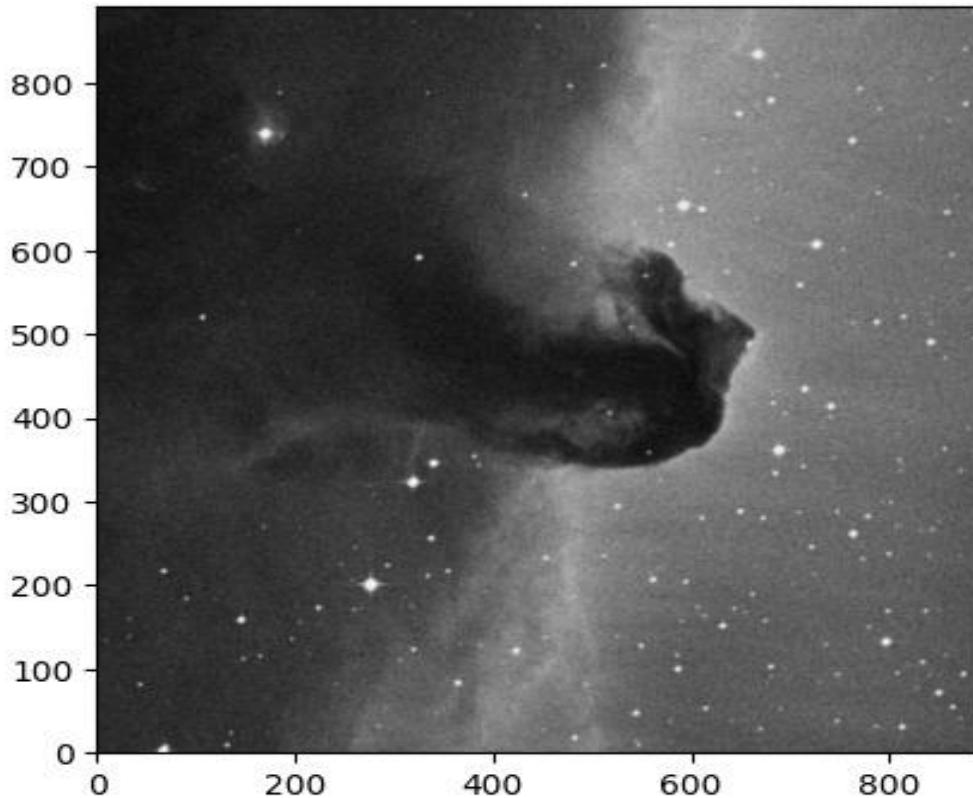
Bonus_image_1.fits

Outputs

1-Before gray scaling



2-After gray scaling



REFERENCES

1. Astropy guide
2. IIT-madras Python for Astronomy
3. Git-Hub

WHAT NEW THINGS WE GOT TO LEARN

- Basics of python
- How to extract data from fits file
- What is SAP and PDCSAP light curve