

STAT 679 Final Project Proposal

Xiaoyang Wang

Ziang Zeng

1 Astronomical Challenge

Our research focuses on classifying celestial objects into stars, galaxies or quasars using their spectral characteristics. With the advancement of astronomical technology, we can obtain a large amount of data, including images and spectral information, from telescopes and large-scale photometry.

The central question of our research is: “How can we effectively use image and spectral data to accurately classify different types of stellar objects?”

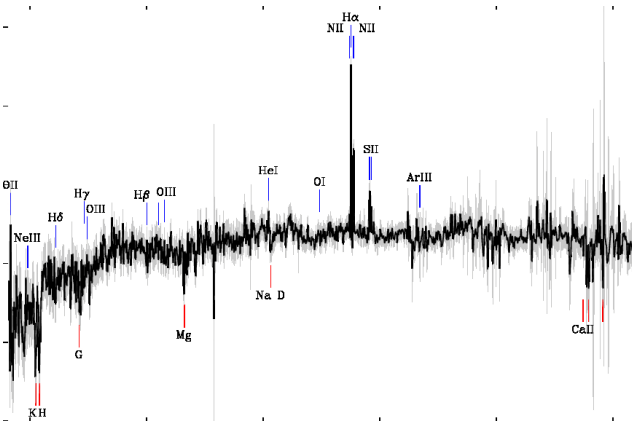
2 Data

We plan to work with the astronomy dataset containing three types of data:

1. Image of the celestial objects:



2. Image of the spectra of the celestial objects.



3. Metadata of the celestial objects, whose variables are as follows:

vars	explanations
objid	Object Identifier
ra	Right Ascension angle (at J2000 epoch)
dec	Declination angle (at J2000 epoch)
u	Ultraviolet filter
g	Green filter
r	Red filter
i	Near Infrared filter
z	Infrared filter
run	Run Number
rerun	Rerun Number
camcol	Camera column
field	Field number
specobjid	Unique ID used for optical spectroscopic objects
class	Object class
redshift	Redshift value based on the increase in wavelength
plate	Plate
mjd	Modified Julian Date
fiberid	fiber ID
plateid	Plate ID

They can be found in this [link](#).

3 Methods

4 Contribution

Our workload is distributed equally in this project. We are going to preprocess the data together by merging and visualizing. As mentioned before, each of us will be responsible to complete one of the separate models with proper tuning and validation. After training the separate models, we will merge the models by combining their results through weighted average or regression to produce a final model with better accuracy expected.