Kepler Exoplanet Search:

The Problem is Are We Alone?

The search for habitable planets outside our solar system has fascinated us for some time. Once theorized and now confirmed that there are many exoplanets (3,700 and counting), the search for life outside our solar system is now in full swing.

Exoplanets can be identified as Points of Interest for the Scientific Research Community

The Transit method identifies possible planets crossing the path of stars from the Kepler camera's point of view. This object of interest can then be directed to other telescopes for further analysis to determine and verify an exoplanet. Other details such as chemical composition of the star and by inference the chemical composition and possible atmosphere of the exoplanet can also be determined.

Data from Kepler Mission 2 'Hunt for Exoplanet Kaggle competition

The data set contains over 5500 stars with 42 confirmed exoplanets. It is a time series with 3198 measurements of light intensity at 30 minute intervals. The data has been cleaned to remove known artifacts from the Kepler camera.

Fluctuations in Star Brightness at 30 min Intervals over 80 Days

	LABEL	FLUX.1	FLUX.2	FLUX.3	FLUX.4	FLUX.5	FLUX.6	FLUX.7	FLUX.8
0	2	93.85	83.81	20.10	-26.98	-39.56	-124.71	-135.18	-96.27
1	2	-38.88	-33.83	-58.54	-40.09	-79.31	-72.81	-86.55	-85.33
2	2	532.64	535.92	513.73	496.92	456.45	466.00	464.50	486.39
3	2	326.52	347.39	302.35	298.13	317.74	312.70	322.33	311.31
4	2	-1107.21	-1112.59	-1118.95	-1095.10	-1057.55	-1034.48	-998.34	-1022.71

Solving the Problem using suite of Classifiers to create a model

I will put the data through a suite of classifier models and fine tune the hyper parameters to identify transit planets. For the 80 day period these samples were taken should show a pattern of light intensity dimming, but occasionally amplifying when the reflected light of the exoplanet is seen as it passes behind the star. Other factors that affect the light intensity are sun spots and solar flares.

Deliverables

A report, Python code with algorithm for classifying exoplanets and a presentation slide deck.