Finding Other Worlds

Identifying Exoplanets From Kepler Data
Proposal 1 | Emily Levis

Background

On March 6th, 2009, NASA launched the Kepler Telescope in order to detect exoplanets - planets orbiting stars outside of our own solar system. To do this, Kepler observed a patch of sky and mapped the brightness of the stars over time, called the light curve. As an exoplanet passes in front of its star relative to Earth, called the transit, it causes a slight decrease in the star's light curve. This dip, called the transit depth, is what NASA uses to detect potential exoplanets. However, data from Kepler can also be used to determine a lot more about an exoplanet, including its size, orbital period, distance from star, and more.

My goal is to find correlations between the data parameters and create predictive models from these correlations.

Project Goals

MVP:
* Test correlations between parameters
* Find distribution of parameters and parameter correlations and determine validity of models

MVP+:
* Create a predictive model that determines whether or not an object is an exoplanet candidate
* Classify known exoplanets by planetary type (Terrestrial Planet, Super-Earth, Gas Giant, Hot Jupiter, or Rogue Planet) and look at their relative frequencies
* Create a predictive model to determine if an exoplanet is potentially habitable based on its distance from its star

Preliminary Look at Data

Looking only at data marked with confirmed status (disposition):
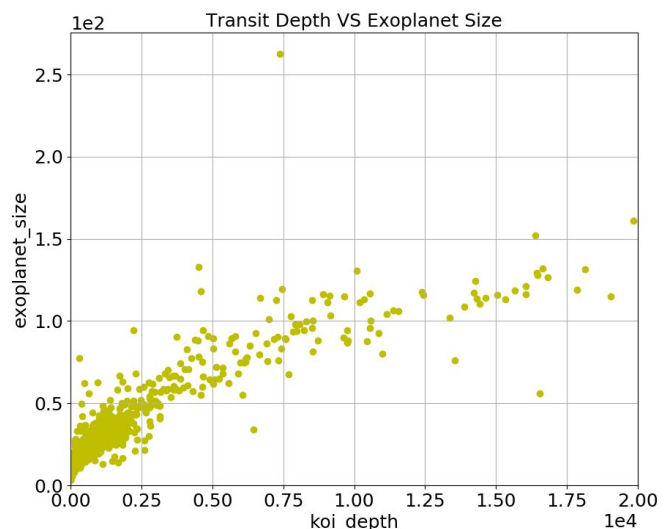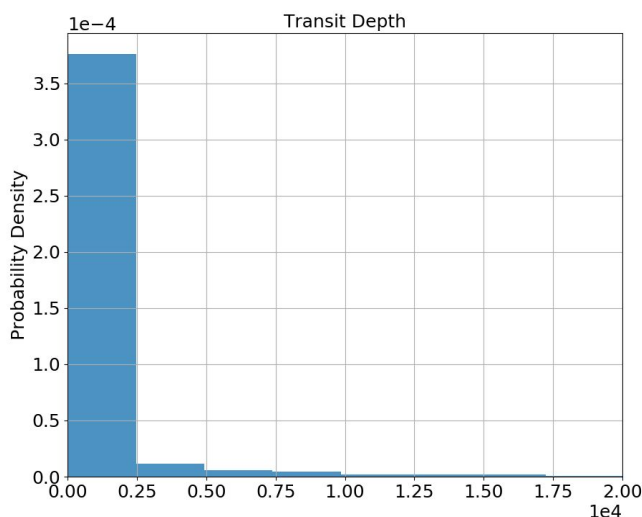
Data is originally from the NASA Exoplanet Archive