INTERNATIONAL SPACE APPS CHALLENGE

ATLAS PROJECT

Challenge: A World Away: Hunting for Exoplanets with AI

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PROBLEM & SOLUTION

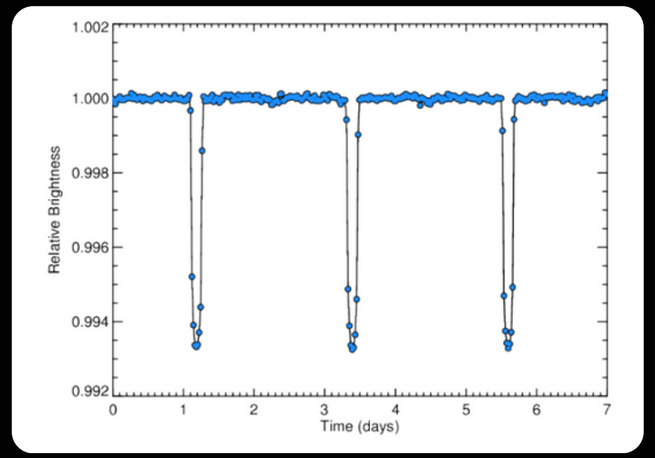
The Detected Problem

There is an inefficiency in the manual identification of exoplanets, which makes it difficult for both professionals and enthusiasts of all ages to study this fascinating topic with ease.

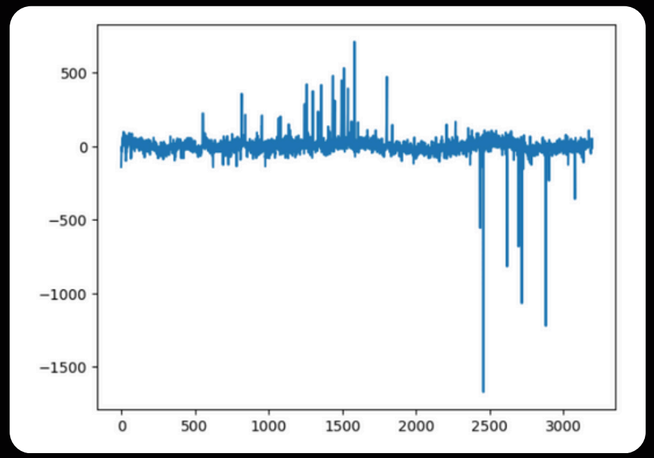
What solution do we propose?

We'll use a machine learning model to classify NASA data and develop an interactive website to analyze and discover exoplanets and their properties!

+ Education
+ Divulgation
+ Innovation
+ For everyone



EXOPLANET



NOT EXOPLANET

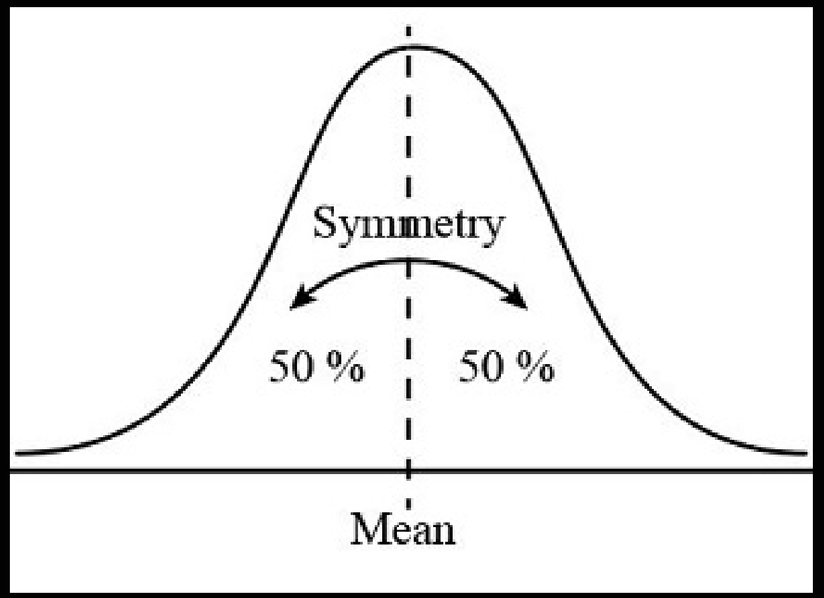
PROJECT DEVELOPMENT

Extraction of variables from NASA's exoplanet database (KOI).

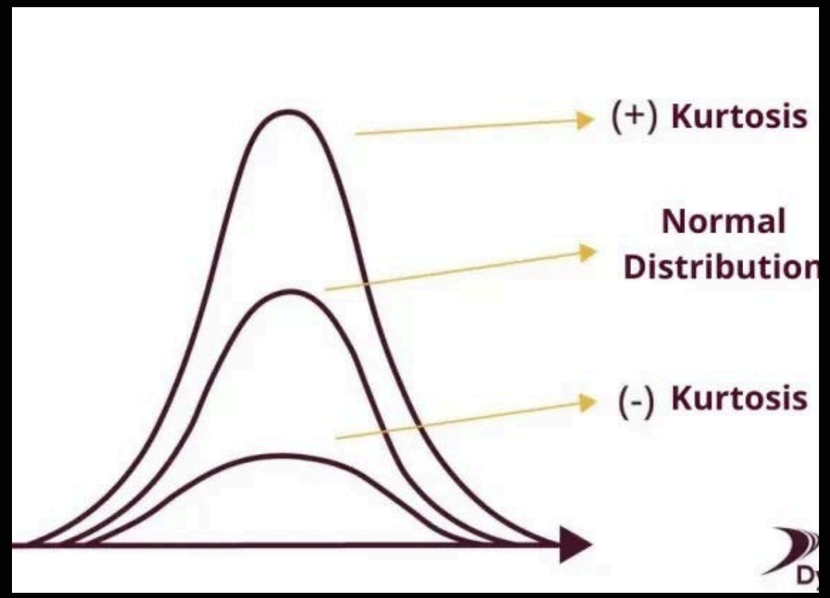
Creation of a machine learning AI through light curve data reduction and new features.

Development of an interactive website that displays processing results.

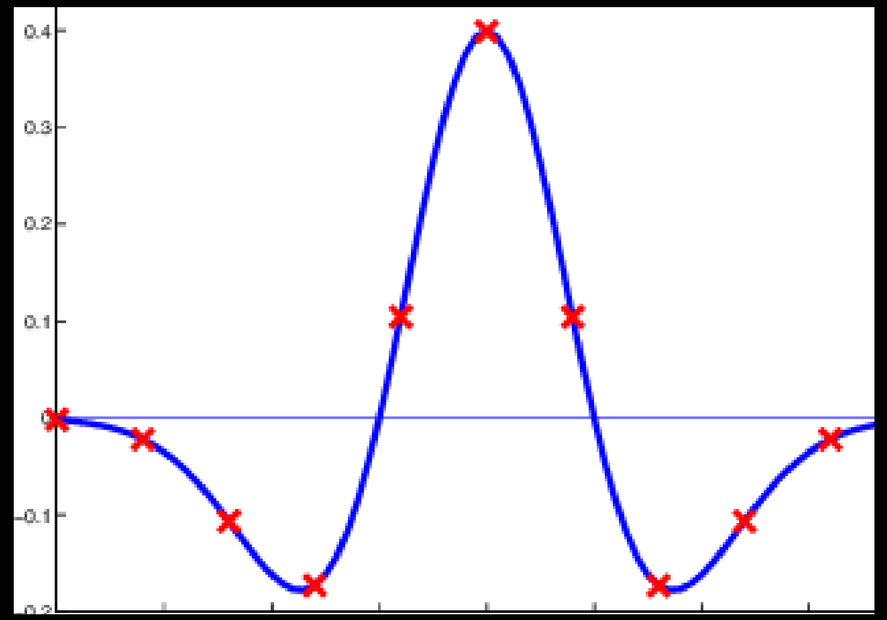
Used Parameters for determinating Exoplanets



Symmetry variation



Kurtosis evaluation

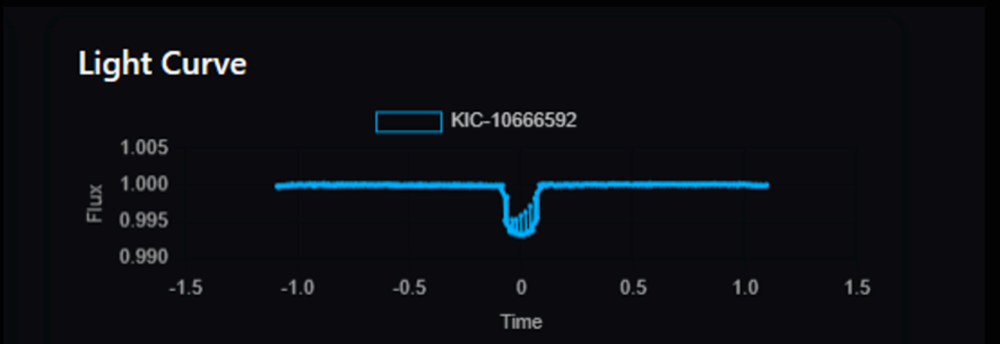


First derivate criterion for light curves

Exoplanet Explorer

97.68% accuracy

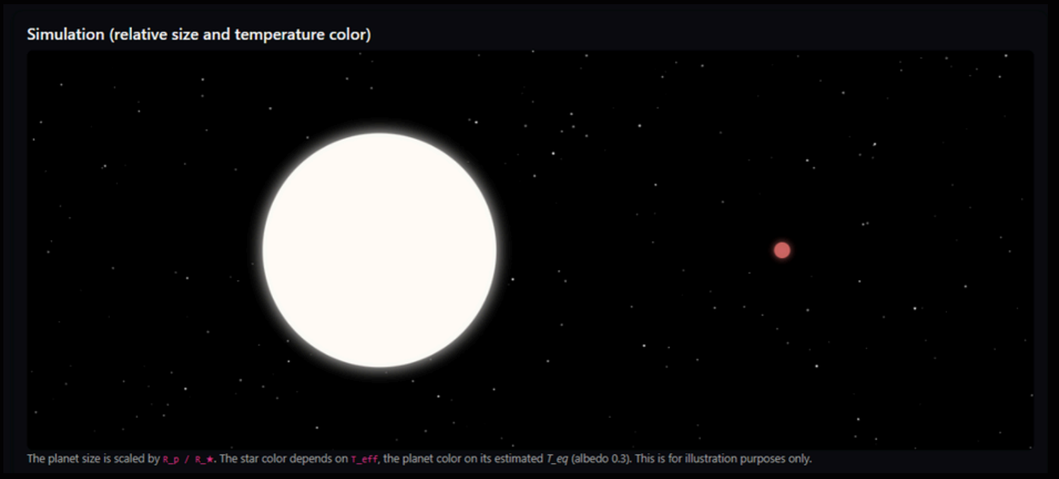
UNNAMED: 0	ASYMMETRY_INDEX	V_U_KURTOSIS	EGRESS_SLOPE	KOI_DISPOSITION	KOI_PERIO
0	0.2021382184139636	2.6867345507782088	0.0007152607022607	1.0	9.4880355
1	0.8582623064551309	1.6447837903946332	nan	0.0	1.7369524
2	0.0660676388902675	2.370115747549324	-0.0005827634480477	1.0	2.5255917
4	0.3450749911617335	2.8518403973323565	0.0003727239403875	0.0	7.3617895
6	0.1135499186808306	2.249447012815887	0.0003484975591749	1.0	2.4706133
7	0.0133044212326133	2.014387052902485	0.0818534063195159	1.0	2.2047354
8	0.1555906165597718	4.482408464709618	0.0002936998173575	1.0	3.5224984
9	0.1937432401999013	2.886499584661734	0.0021304012688056	1.0	3.7092141
10	0.3805303239374794	2.9284152449452567	0.0124817380157521	0.0	11.521446
11	0.4877705496013959	2.051359275397835	0.0147686303528243	0.0	19.403937
12	0.1284471340541507	2.960672854495772	0.0057186613426085	0.0	19.221388
13	0.0920656570309303	3.6663777837871057	0.0141563397800189	0.0	16.469837



Result:

Stellar radius (R⊙)	Stellar mass (M⊙)	Stellar Teff (K)
1.952	1.449	6440

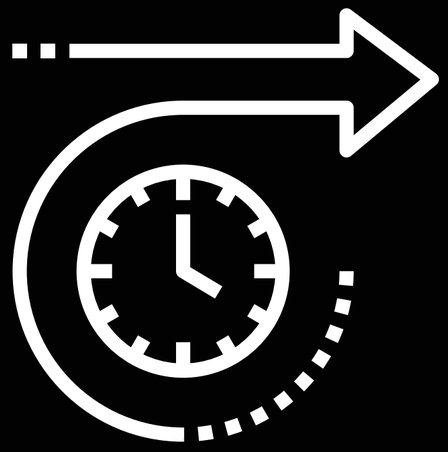
Planet mass (M⊙)	Planet Teff (K)
16.1	2048



What benefits does it have?

Universal access to digital platforms for scientific projects, like exoplanet research:

- Reduces inequalities and enriches education.
- It inspires future scientists and drives scientific progress, benefiting society.



Upcoming challenges

The upcoming challenges will involve collaborating with other NASA databases or similar missions that focus on transits, and soon engaging with a database of radial velocities. Additionally, there‘s the exciting opportunity to explore the characteristics of these exoplanets to generate groundbreaking new science.