



AstraScope – AI-Powered Exoplanet Classifier

AstraScope is a machine learning-based platform that classifies potential exoplanets using NASA's open datasets from the Kepler, K2, and TESS missions. Its goal is to make exoplanet discovery accessible to everyone – from researchers to space enthusiasts – through intelligent automation and intuitive visualization.



Turning data into discovery.



Jonathan Cárdenas – Software Engineer

Exploring the universe through code and AI.

Inspiration

The search for new worlds has always inspired humanity. What if we could make this search accessible to everyone – not just scientists? Our goal was to use AI to help anyone classify potential exoplanets from NASA's data.

AI meets the Cosmos

democratizing exoplanet discovery



The Solution: AstraScope

We built AstraScope – an AI-powered platform that analyzes NASA's open datasets (Kepler, K2, and TESS) to classify planetary candidates, confirmed exoplanets, or false positives.



Exoplanet AI Classifier

Classification Demo
Upload exoplanet data for AI-powered classification

Upload Dataset
CSV file with required and optional columns
Required fields:
`koi_fpflag_nt` `koi_fpflag_ss` `koi_fpflag_co` `koi_fpflag_ec` `koi_period` `koi_duration` `koi_depth` `koi_impact` `koi_model_snr` `koi_num_transits` `koi_steff`
`koi_slogg` `koi_smst` `koi_sradd` `koi_ror` `koi_prad`
Optional fields (for control):
`kepid` `kepoi_name`

You can download NASA mission data (KOI or TESS) and test it: [NASA Exoplanet Archive](#)

x (1).csv
Supports CSV files up to 10MB

Run Prediction

Prediction Results

Each row corresponds to one detected object from your dataset.

#	PREDICTION	KEPID	KEPOI NAME	KOI PERIOD	KOI DURATION	KOI DEPTH	KOI IMPACT	KOI MODEL SNR	KOI NUM TRANSITS	KOI STEFF	KOI SLOGG	KOI SMET	KOI SRAD	KOI ROR
1	CONFIRMED	10797460.000	K00752.01	9.488	2.958	615.800	0.146	35.800	142.000	5455.000	4.467	0.140	0.927	0.022
2	CONFIRMED	10797460.000	K00752.02	54.418	4.507	874.800	0.586	25.800	25.000	5455.000	4.467	0.140	0.927	0.028
3	CANDIDATE	10811496.000	K00753.01	19.899	1.782	10829.000	0.969	76.300	56.000	5853.000	4.544	-0.180	0.868	0.154
4	FALSE POSITIVE	10848459.000	K00754.01	1.737	2.406	8079.200	1.276	505.600	621.000	5805.000	4.564	-0.520	0.791	0.387
5	CONFIRMED	10854555.000	K00755.01	2.526	1.655	603.300	0.701	40.900	515.000	6031.000	4.438	0.070	1.046	0.024
6	CONFIRMED	10872983.000	K00756.01	11.094	4.595	1517.500	0.538	66.500	95.000	6046.000	4.486	-0.080	0.972	0.037
7	CONFIRMED	10872983.000	K00756.02	4.134	3.140	686.000	0.762	40.200	240.000	6046.000	4.486	-0.080	0.972	0.026
8	CONFIRMED	10872983.000	K00756.03	2.567	2.429	226.500	0.755	15.000	355.000	6046.000	4.486	-0.080	0.972	0.015
9	FALSE POSITIVE	6721123.000	K00114.01	7.362	5.022	233.700	1.169	47.700	185.000	6227.000	3.986	0.000	1.958	0.183
10	CONFIRMED	10910878.000	K00757.01	16.069	3.535	4914.300	0.052	161.900	69.000	5031.000	4.485	0.160	0.848	0.062

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Summary Metrics
Confirmed: 2750 Candidate: 1975 False Positive: 4839

Learning Center

Understanding exoplanet detection parameters and stellar characteristics

Transit Characteristics

Key parameters describing the planet's passage in front of its host star

`koi_period` Orbital Period
Time it takes for the planet to complete one full orbit around its star.

`koi_duration` Duration
How long the transit lasts, i.e., the passage of the planet in front of its star.

`koi_depth` Depth
The amount of starlight blocked during transit; indicates how large the planet is compared to its star.

`koi_impact` Impact Parameter
How centered or offset the transit is relative to the star's center; low values indicate a more central passage.

`koi_model_snr` Signal-to-Noise Ratio
How clear or reliable the transit signal is; high values mean more confident detections.

`koi_num_transits` Number of Transits
How many times the planet has been observed passing in front of its star.

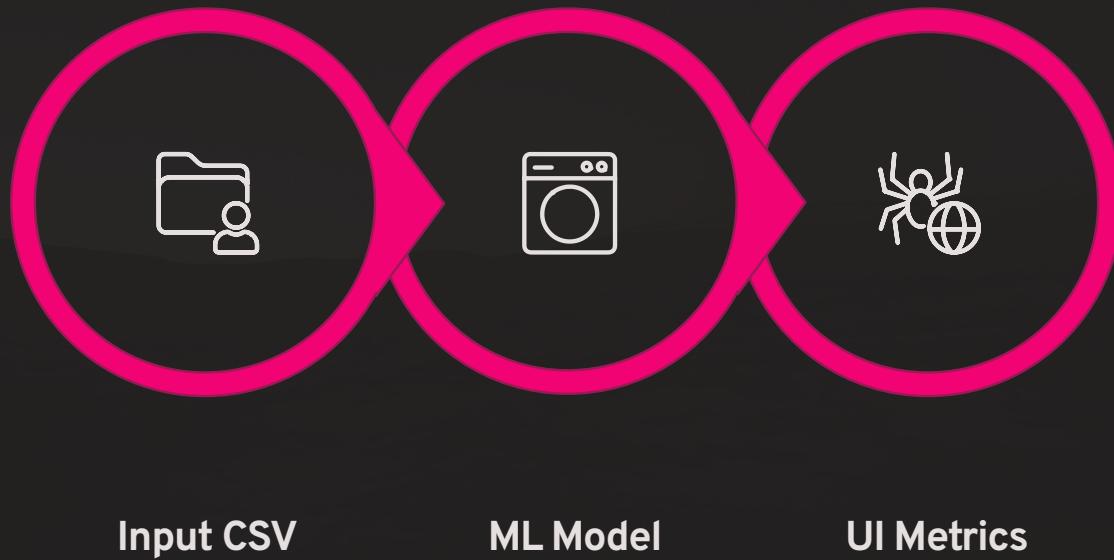
 Candidate

 Confirmed

 False Positive

How It Works

AstraScope uses an XGBoost machine learning model trained on curated NASA datasets. Users can upload their own CSV files, and our system predicts classifications while showing model confidence, feature importance, and confusion matrix metrics – all in real time.



↗ Feature Importance Ranking

Most influential features in classification



User Experience

We designed an interface that allows scientists, students, and enthusiasts to visualize results intuitively. Even without ML knowledge, users can explore how planetary features like orbital period or stellar temperature affect predictions.



Upload CSV

Easily import your datasets to begin classification predictions.



Prediction Table

View classification results with confidence scores in an intuitive table format.



Real-time Metrics

Understand model performance with feature importance and confusion matrix insights.

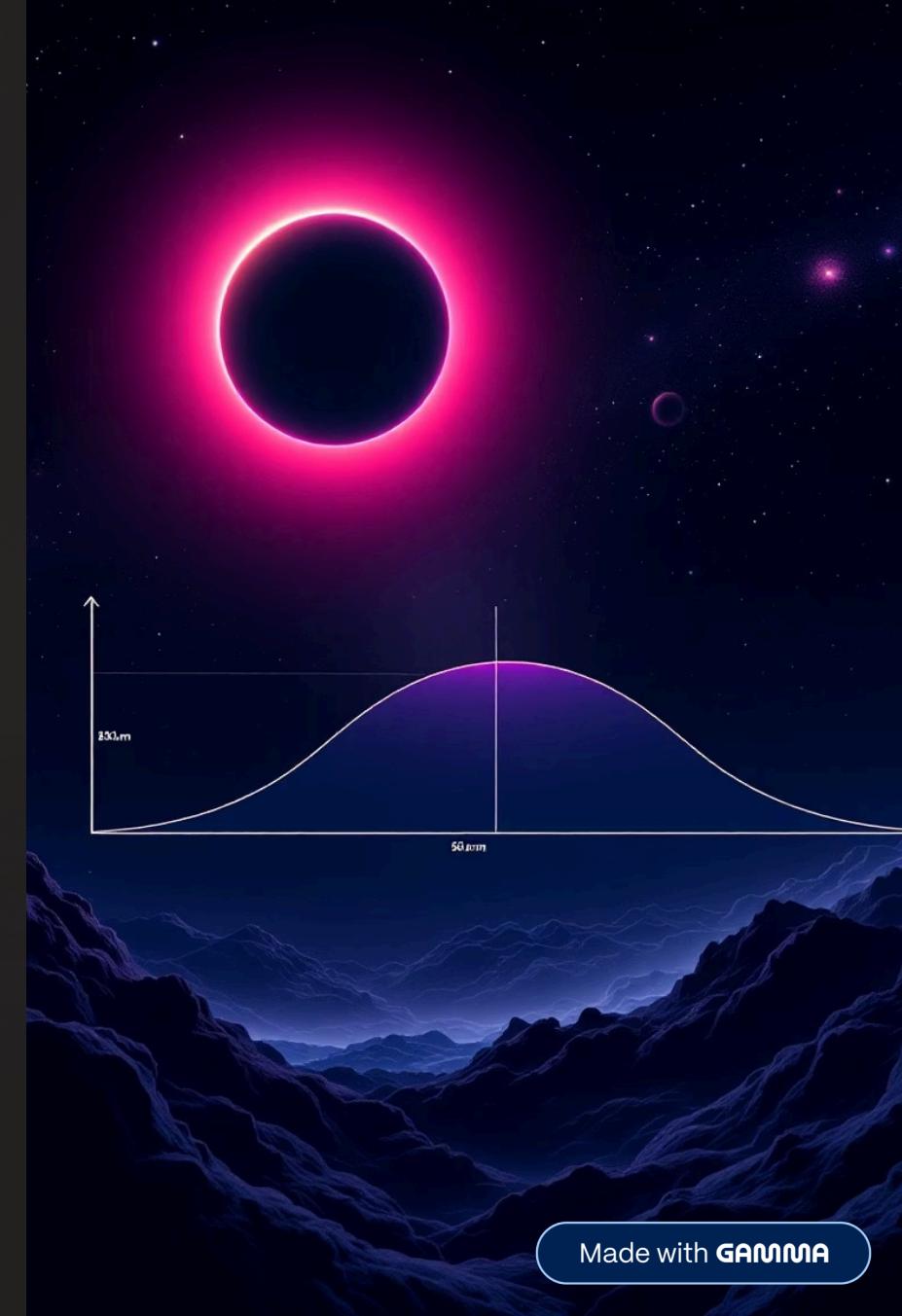
Accessible Science for Everyone.

Data Foundation

Our model was trained using real NASA data: the Kepler Objects of Interest (KOI), K2 Candidates, and TESS Objects of Interest (TOI). We focused on high-impact features such as transit depth, orbital period, and signal-to-noise ratio.

Key Features Analyzed:

- Transit depth
- Orbital period
- Signal-to-noise ratio



Impacting the Future

AstraScope bridges science and accessibility – empowering anyone to contribute to exoplanet discovery. In the future, it could evolve into a collaborative tool where users help refine models and accelerate planetary science.



We're not just finding planets – we're building the tools to find
the next Earth. 