

■ Predictive Detection Methodology - NandiTESS.ai Project

NandiTESS.ai employs a **predictive analytics model** trained on TOI (TESS Objects of Interest) data to estimate the **probability that a given candidate is a real exoplanet**. Unlike direct *infrared (IR)* detection or conventional photometric methods, our approach is **statistical and inferential**, applying **artificial intelligence and machine learning** to physical and orbital parameters.

■■ Analysis Pipeline

Cross-validation and consistency

The model is tested against records of confirmed exoplanets and false positives, tracking metrics such as:

1 **Accuracy**

1 **Predictive precision**

1 **False-positive rate**

1 **Adjusted R²**

1 **TOI data ingestion and normalization**

Raw NASA records are cleaned to remove noise, duplicates, and outliers, retaining relevant columns such as *orbital_period*, *planet_radius*, *stellar_radius*, *transit_depth*, and *disposition*.

2 **Metric weighting**

Each parameter receives a **weight proportional to its historical correlation** with validated exoplanets. For example, *planet_radius* and *transit_depth* exert higher influence, while *stellar_temperature* and *ra/dec* (coordinates) carry lower weight yet contribute to spatial context.

3 **Predictive modeling**

The core function applies a **weighted combination of parameters** within an optimized probabilistic equation (logistic regression with empirically tuned weights), returning a percentage that represents the **estimated chance of candidate validation**.

4 Continuous validation ensures the system learns and recalibrates as new discoveries are published.

■ Transparency & Metrics

The displayed percentages for each candidate reflect:

1 The weighted sum of analyzed parameters

1 Calibration using NASA-validated exoplanets

1 A **model-level statistical confidence**

This enables **fast, reproducible, and scientifically interpretable** assessments, giving researchers a tool for **smart prioritization** of future observations.

NandiTESS.ai doesn't merely observe — it **thinks like an observatory**. Our mission is to transform astronomical data into predictive insight, anticipating telescope time and broadening the frontier of exoplanet discovery.