

Exoplanetary Signal Processing using Machine Learning

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October 22 | 15:00-19:00 | Room 1

Registration Link

<https://forms.office.com/r/j7YpbR7By8>

Abstract

This tutorial provides a comprehensive introduction to the transit method of exoplanet detection, focusing on the application of machine learning techniques. We will cover the basics of light curve analysis, the limitations of traditional methods, and the advantages of using machine learning-based approaches. Through hands-on exercises, participants will learn how to apply these techniques to real-world data, gaining practical experience in identifying candidate exoplanets and understanding their properties.

Target Audience

- Undergraduate Students: Students in astronomy, astrophysics, or related fields who are interested in learning about machine learning techniques and their applications in exoplanet detection.
- Researchers and Professionals: Scientists, researchers, and professionals working in universities, research institutes, or industry who want to gain a basic understanding of machine learning-based approaches for transit signal detection.

Pre-requisites

- Basic knowledge of astronomy and astrophysics concepts
- Basic knowledge of Python programming
- Basic knowledge of Statistics

Technical requirements

Hardware Requirements:

- Computer with a 64-bit operating system (Windows or macOS)

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- Minimum Intel Core i5 or equivalent processor
- Minimum 8 GB of RAM (16 GB recommended)

Software Requirements:

- Python 3.9 or later installed on the computer
- NumPy, Pandas, Scikit-learn, and Matplotlib libraries installed in Python
- Jupyter Notebook for interactive data analysis and visualization

Software Setup:

- Participants are expected to bring their laptops with the required software pre-installed.
- A brief setup process will be provided at the beginning of the tutorial to ensure that participants can access the necessary resources.