**ABSTRACT**

***Exoplanet Detection Using Machine Learning***

We present a machine learning approach for exoplanet detection using data from the Kepler space mission. Our method focuses on pre-processing and analysing light curve data through Python scripts, emphasizing feature extraction and pattern training. We utilized several machine learning algorithms, including Random Forest Classifier, Gradient Boosting Classifier, XGBoost Classifier, and LightGBM Classifier. Among these, LightGBM and Random Forest delivered the best performance in terms of accuracy and efficiency.

When tested on the Kepler dataset, our models achieved 96% accuracy, 98% precision, 95% recall, and a 96% F1 score, highlighting their ability to enhance exoplanet detection while minimizing false positives and negatives.

This study demonstrates the capability of machine learning to significantly improve both the accuracy and efficiency of exoplanet detection. Automating the classification process offers a scalable solution for future astrophysical surveys, enabling scientists to analyse large datasets and increase the rate of exoplanet discoveries. Our findings contribute to the field of astronomy and showcase the transformative potential of machine learning in advancing scientific discovery.

**Keywords:** Exoplanet.Random Forest Classifier, Gradient Boosting Classifier, eXtreme Gradient Boosting Classifier, Light Gradient Boosting Machine Classifier, Orbital Characteristics, Accuracy, Precision, Recall, F1 Score, False Positives, False Negatives