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Upgrading PlaNET: A Deep Neural Network for Searching for Transiting Exoplanets with the Next Generation Transit Survey

Exoplanet transit surveys produce flux time-series for hundreds of thousands of stars to search for the tell-tale signs of a transiting planet. In the process, they provide a rich dataset for the application of machine learning (ML) methods. One focus so far has been the classification of exoplanet signals as genuine or instrumental false positives, particularly by using deep neural networks. I will discuss one such network, PlaNET, and its ongoing upgrade as part of the Next Generation Transit Survey (NGTS) pipeline. PlaNET has helped vet thousands of candidate signals over the past two years, and in the process we have learnt important lessons about how the network operates in a real-world setting. In particular, interpretability of the results is key, and we show how the application of existing 'explainable AI' methods can greatly illuminate the inner workings of PlaNET. As a result, we have changed the network structure and dataset greatly improving performance. Finally, I will discuss the prospect of other applications of ML to NGTS data such as: identifying unusual variability, searching for clusters of similar stars, and improving the sensitivity of transit searches.

Main Topic

Secondary Topic

Participation mode

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