

Talk at Splinter Meeting

Splinter G

FEATURELESS CLASSIFICATION OF LIGHT CURVES

S. D. Kügler¹, N. Gianniotis¹, K. L. Polsterer¹

¹*Heidelberg Institute of Theoretical Studies (HITS)*

Classification of irregularly sampled time series is extremely difficult because the data cannot be represented naturally as a vector directly useable by a classifier. While in the literature, various statistical features serve as vector representations, time series are represented by a density model in this work. The density model can capture all information available in the static behavior of a light curve and including measurement errors properly. Subsequently, a distance matrix is created, by measuring the similarity of each pair of light curves with an according distance. This distance matrix is then made available to several classifiers. To strengthen the meaning of the new representation, data from the OGLE (Optical Gravitational Lensing Experiment) and ASAS (All Sky Automated Survey) survey are used and it is demonstrated that the proposed representation performs up to par with the best currently used feature-based approaches. Since no a priori knowledge is used in the creation (and normalization) of features, the density representation presents an upper boundary in terms of information made available to the classifier. Finally, the predictive power of the proposed representation depends on the choice of similarity measure and classifier, only and can therefore be seen as a more principled representation, that is also suited for tasks beyond classification, e.g. unsupervised learning.