
Machine learning classification of young stellar objects

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Abstract

The classification of YSOs is traditionally based on the analysis of their spectral energy distribution (e.g. Guthermuth et al. 2009). Supervised machine learning (ML) has been proposed as a relevant tool to identify new YSOs and build large YSO catalogues (Marton et al. 2016,2019, Miettinen 2018). In this approach, previously identified YSOs are used to train a supervised ML algorithm, which can then be used to identify new YSOs in other regions of the sky. I will present the methods explored by Marton et al. and Miettinen, and emphasize their limitations related to the situation of imbalanced learning, where the classes of interest are rare compared to contaminants. I will show an alternative approach (Cornu and Montillaud 2020, under review) where the training data are rebalanced, and where neural networks are used to characterize the reliability of the proposed classes.

Keywords: classification, neural networks, young stellar objects

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