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Machine learning as a key component in the science processing pipelines of space- and ground-based surveys?

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Machine learning is becoming an essential component of the science operations processing pipelines of modern astronomical surveys. Space missions such as NASA's Transiting Exoplanet Survey Satellite (TESS) are observing millions of stars each month. In order to select the relevant targets for our science cases from these large numbers of observations, we need highly automated and efficient classification methods. Only afterwards, more detailed astrophysical studies can be done to derive the physical parameters of the selected stars. Given the increasing data volumes, machine learning techniques, and in particular physically interpretable machine learning models, prove to be the ideal instruments to achieve this. In this talk, I will draw from our experiences in developing the TESS Data for Asteroseismology (T²DA) machine learning classification pipeline to (i) discuss the challenges and opportunities associated to the development of such pipelines, (ii) share our insights with regard to the used machine learning techniques and identify where they could be improved, and (iii) give an outlook of how machine learning could be incorporated into the science processing pipelines of ground- and space-based surveys.

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