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How to create powerful machine learning projects in astronomy

Large, freely available, well-maintained data sets have made astronomy a popular playground for machine learning projects. Nevertheless, robust insights gained into both machine learning and physics could be improved by clarity in problem definition and establishing workflows that critically verify, characterize and calibrate machine learning models. We provide a collection of guidelines for setting up machine learning projects to make them likely useful for science, less frustrating and time-intensive for the scientist and their computers, and more likely to lead to robust insights. We draw examples and experience from astronomy, but the advice is potentially applicable to other areas of science. The recommendations have been influenced by projects with students, and discussions at conferences including ML-IAP2021 in Paris.

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