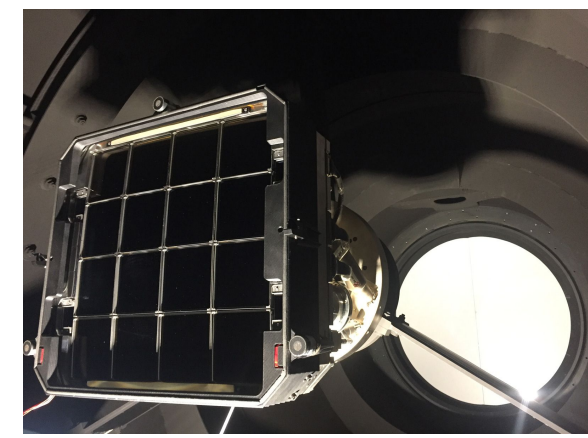


ZTF-SCoPe

Zwicky Transient Facility



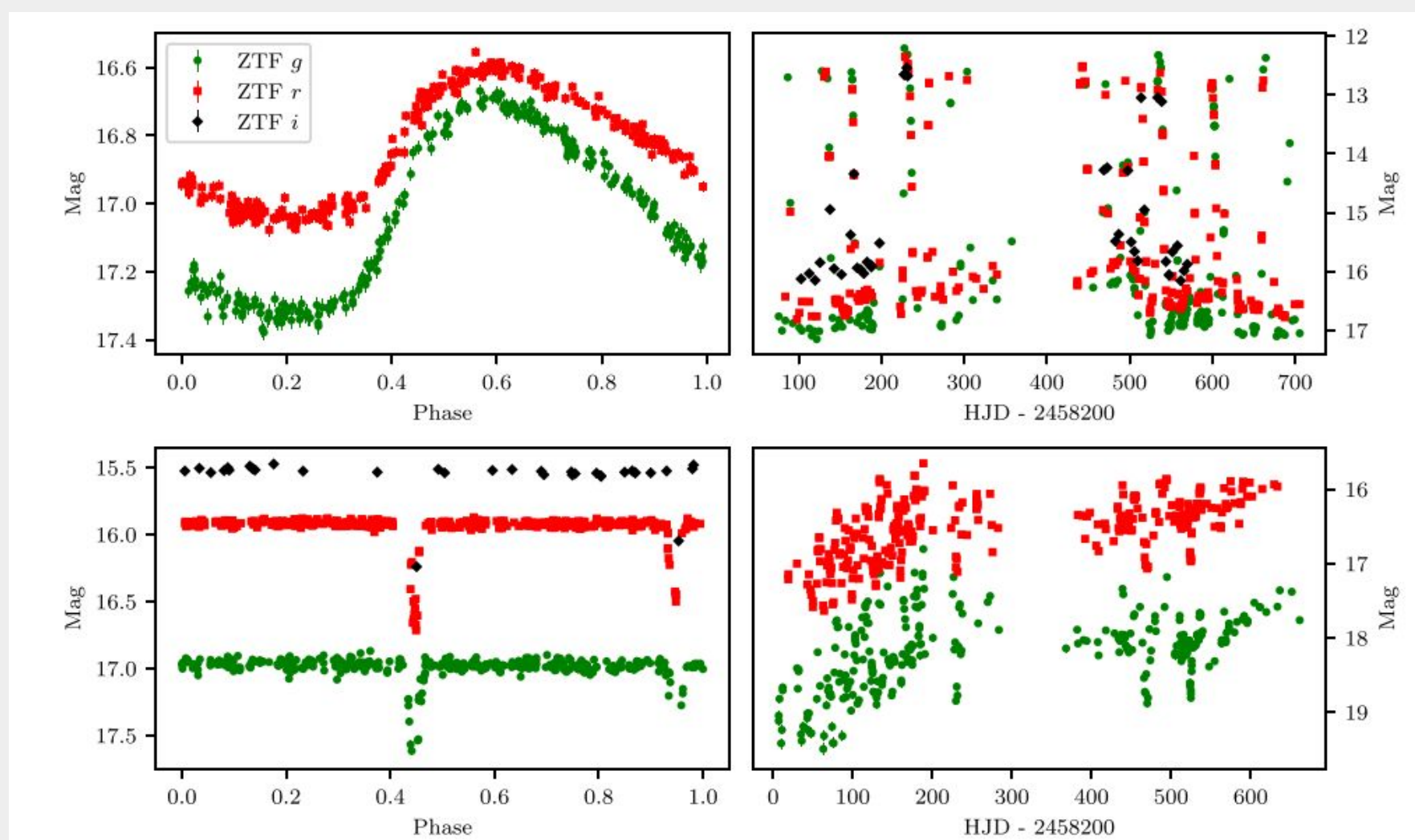
Variable Source Classification Project

Jan van Roestel, Dmitri Duev, Michael Coughlin, Ashish Mahabal, Matthew Graham, and the ZTF-collaboration Machine Learning and Galactic Science working groups

The Zwicky Transient Facility (ZTF) is imaging the entire northern sky every 2 nights. After operating for four years, lightcurves of 2 billion sources have been collected with an average of 400 epochs. To enable stellar astrophysics to be done with this data, variable sources must first be identified and classified with sufficient and well-understood purity and completeness. In addition, astrophysical anomalies can be used to study novel astrophysics and are therefore of great interest.

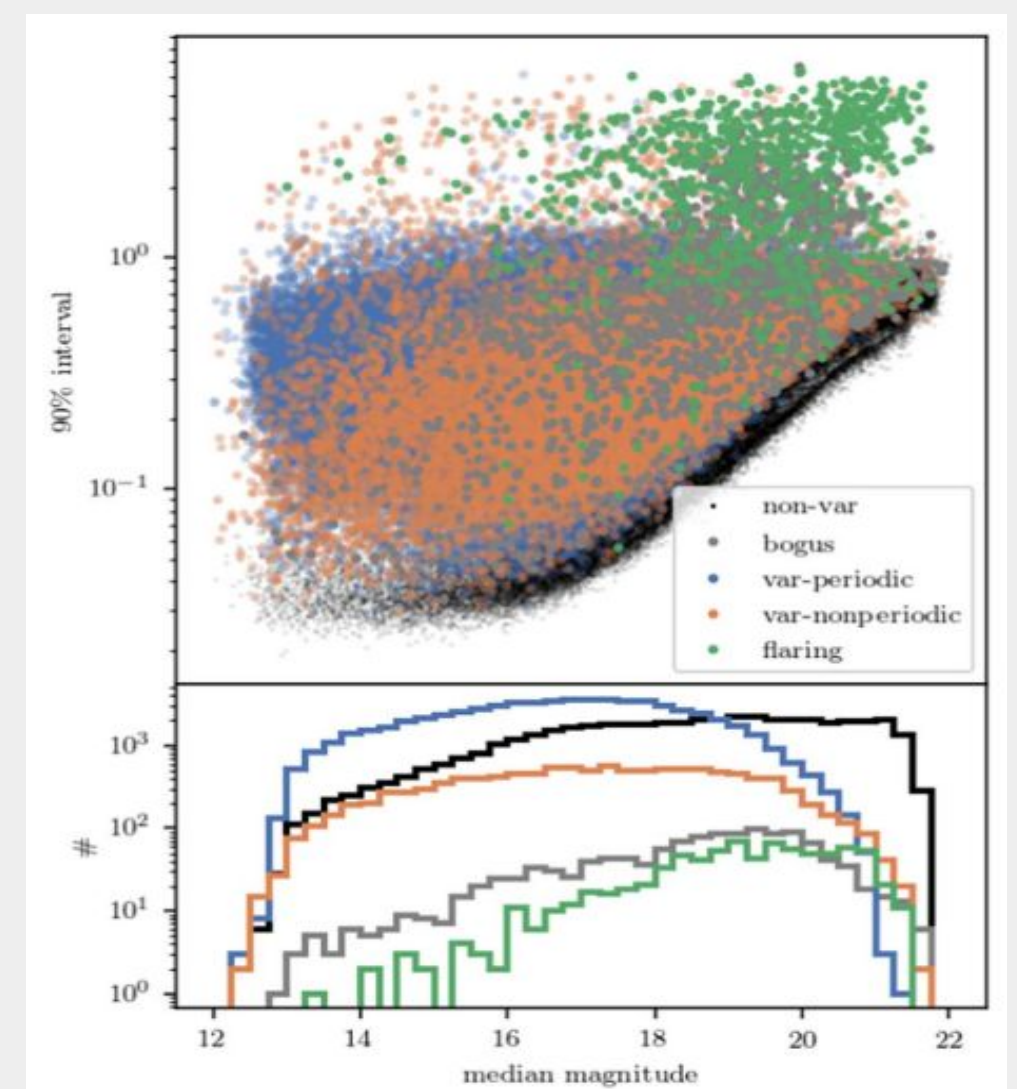
Solution: a set of “one-versus-all” set of binary classifiers that are continuously improved using active learning

The Data



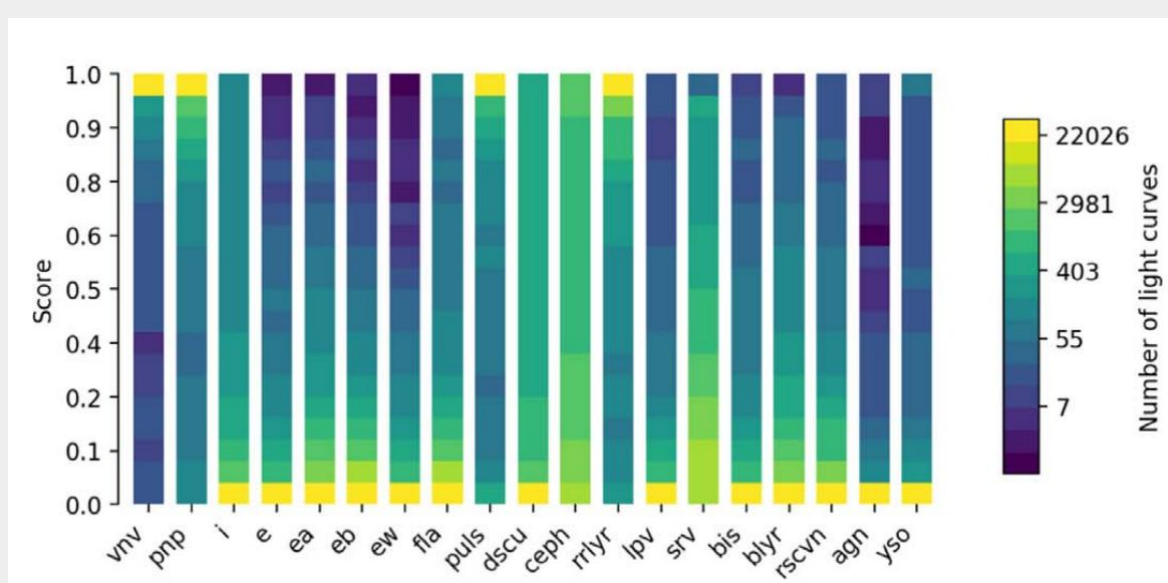
Example lightcurves from ZTF of a pulsating star, dwarf novae, eclipsing binary and young stellar object

Training sample



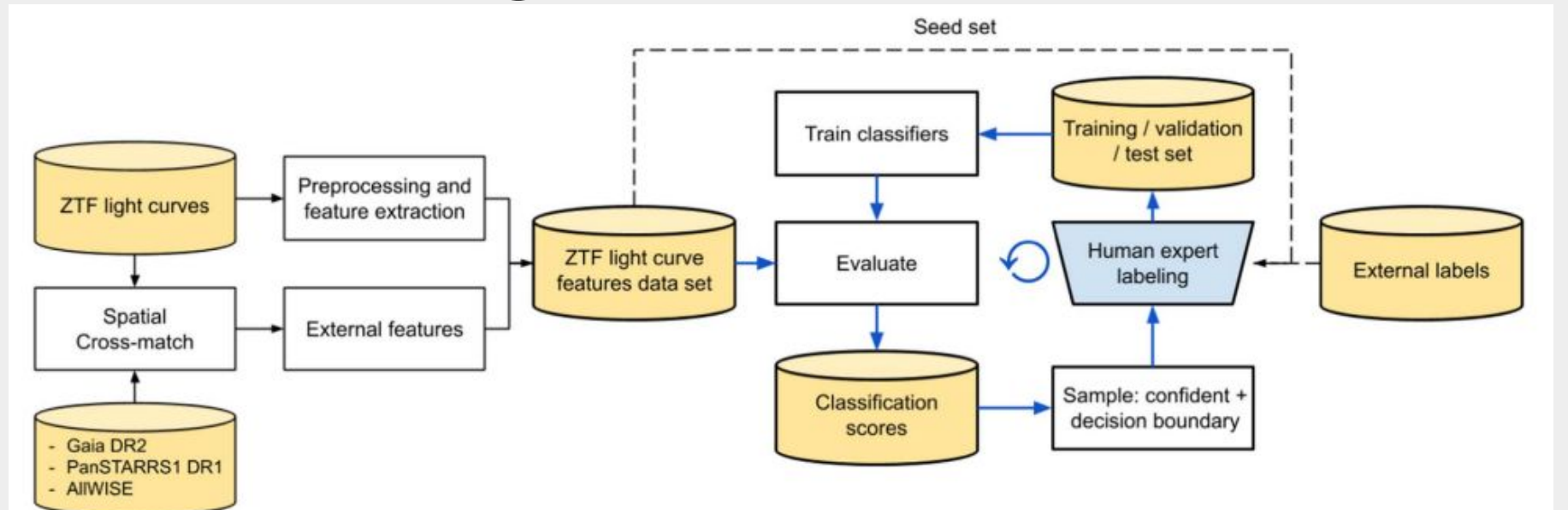
The human vetted training sample.

‘One-versus-all’ classifiers



Distribution of scores for RR-Lyrae in the holdout set

Active learning



The workflow of the project, including an active learning loop to continuously improve the classifiers



Caltech



Jan van Roestel