

# Introducing Recursive Linear Classification (RELIC) for Machine Learning

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## Abstract

Numerous classifiers for machine learning are powerful and effective an important path forward is decreasing the complexity and increasing the transparency of the solutions achieved. RELIC (REcursive LInear Classifier) consists of recursively applying a classifier to the training items not successfully accounted for in the previous iteration to find subsets within the training data that yield simpler classification schemes. Chooser models are iteratively added and trained on item-to-subset assignments to learn a mapping between input space and the classifier ensemble. Test examples are passed through the set of choosers to select the appropriate subset-classifier pairing to generate a classification. While applicable to any classifier, we begin by evaluating RELIC using logistic regression and linear SVM to determine whether they perform better under the recursive approach and become competitive with non-linear classifiers. Application of this approach to non-linear classifiers and potential implications for the broader science of learning are also addressed.