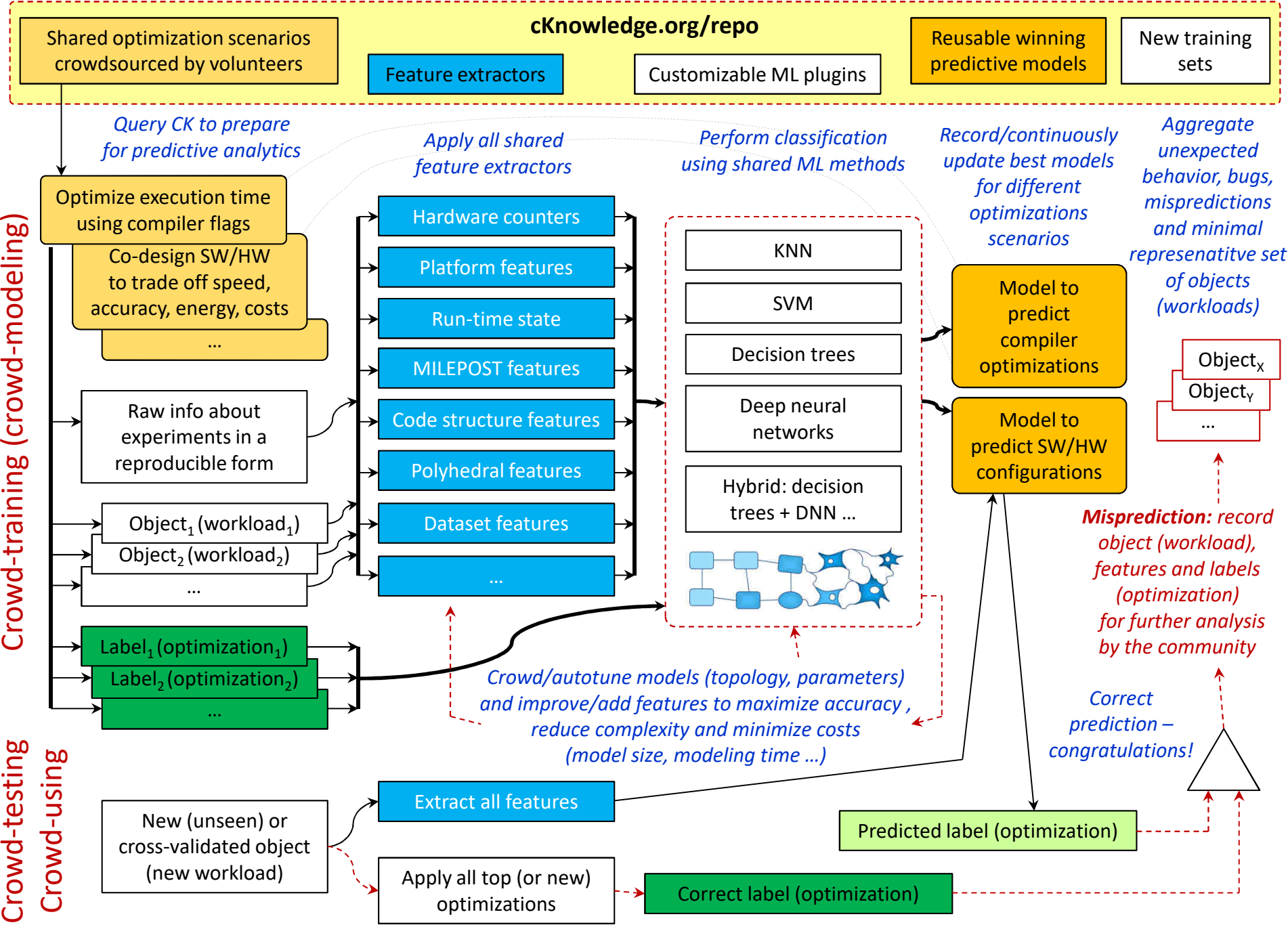
cKnowledge.org/repo
Shared optimization scenarios crowdsourced by volunteers
Feature extractors
Customizable ML plugins
Reusable winning predictive models
New training sets
Query CK to prepare for predictive analytics
Apply all shared feature extractors
Perform classification using shared ML methods
Record/continuously update best models for different optimizations scenarios
Aggregate unexpected behavior, bugs, mispredictions and minimal represenatitve set of objects (workloads)
Crowd-training (crowd-modeling)
Optimize execution time using compiler flags
Co-design SW/HW to trade off speed, accuracy, energy, costs
...
Raw info about experiments in a reproducible form
Object1 (workload1)
Object2 (workload2)
...
Label1 (optimization1)
Label2 (optimization2)
...
Hardware counters
Platform features
Run-time state
MILEPOST features
Code structure features
Polyhedral features
Dataset features
...
KNN
SVM
Decision trees
Deep neural networks
Hybrid: decision trees + DNN ...
Model to predict compiler optimizations
Model to predict SW/HW configurations
ObjectX
ObjectY
...
Misprediction: record object (workload), features and labels (optimization) for further analysis by the community
Crowd/autotune models (topology, parameters) and improve/add features to maximize accuracy , reduce complexity and minimize costs (model size, modeling time ...)
Correct prediction – congratulations!
Crowd-testing
Crowd-using
New (unseen) or cross-validated object (new workload)
Extract all features
Apply all top (or new) optimizations
Predicted label (optimization)
Correct label (optimization)