ICON: an update

14 September 2015
EU-FP7 FET project Inductive Constraint Programming
summary of ICON project
will be published by Springer (soon)
chapters on ICON work and context from outside authors
Learning Modulo Theories
New Approaches to Constraint Acquisition
Learning Constraint Satisfaction Problems: An ILP Perspective
ModelSeeker: Building Constraint Models with Global Constraints from Positive Examples
Algorithm Selection for Combinatorial Search Problems: A Survey
Automated Parameter Tuning and Algorithm Configuration: A Review
Advanced Portfolio Techniques
Adapting Consistency in Constraint Solving
Data Mining and Constraints: An Overview
A Novel Hybrid Approach to Prototype-based Clustering
Modeling Data Mining Problems in MiningZinc
Partition-Based Clustering using Constraint Optimization
ICON Show Cases and Challenges
ICON challenge on algorithm selection

ICON challenge on Algorithm Selection

http://challenge.icon-fet.eu/
ICON challenge on algorithm selection

http://challenge.icon-fet.eu/
(Sorry, closed and done now.)
submit algorithm selection system to be trained and tested on the Aslib data
all data public, split into train/test secret
can specify subset of features, presolver
time limit of 12 hours
evaluate in terms of PAR10, misclassification penalty, number solved
normalise by single best and virtual best performance
ICON challenge on algorithm selection

8 submissions:
- ASAP_kNN
- ASAP_RF
- autofolio
- flexfolio-schedules
- sunny
- sunny-presolv
- zilla
- zillafolio
ICON challenge on algorithm selection – results

1. zilla
2. autofolio
3. zillafolio
4. ASAP_RF
5. ASAP_kNN
6. flexfolio-schedules
7. sunny-presolv
8. sunny
 ICON challenge on algorithm selection – results

▷ top-ranked systems very close
▷ combination of zilla and autofolio worse than either of them?
▷ ASAP_* not previously described in literature and very good results
# ICON challenge on algorithm selection – results

<table>
<thead>
<tr>
<th>scenario</th>
<th>ASAP_kNN</th>
<th>ASAP_RF</th>
<th>autofolio</th>
<th>flexfolio</th>
<th>sunny</th>
<th>sunny-presoly</th>
<th>zilla</th>
<th>zillafolio</th>
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</table>

ICON challenge on algorithm selection – results

No excuse not to participate!

```r
trainAS = parseASScenario(opts$train)
ldf = convertToLlama(trainAS)
testAS = parseASScenario(opts$prediction)
ldft = convertToLlama(testAS)

feats = intersect(ldf$features, ldft$features)
ldf$features = feats
ldft$features = feats

tt = trainTest(ldf)
model = regressionPairs(makeLearner("regr.randomForest"), tt)
preds = model$predictor(ldft$data[, feats])

sched = ddply(preds, c("id"), function(ss) {
  data.frame(instanceID = testAS$feature.values[ss$id[1], "instance_id"],
             runID = 1,
             solver = ss$algorithm[1],
             timeLimit = testAS$desc$algorithm_cutoff_time)
})

write.csv(sched[, c("instanceID", "runID", "solver", "timeLimit")],
          file = stdout(), quote = FALSE, row.names = FALSE)
```

This would have ranked you 4th.
▷ first evaluation did not remove presolved instances from generated training sets
▷ rerun with this fixed
▷ no major result changes
Rerun – results

1. zilla
2. zillafolio
3. autofolio with 48 hours training time
4. autofolio
5. llama-regrPairs
6. ASAP_RF
7. ASAP_kNN
8. llama-regr
9. flexfolio-schedules
10. sunny
11. sunny-presolv

ICON challenge on algorithm selection – takeaway

▷ independent comparison of different approaches
▷ some data sets are still “hard” for algorithm selection
▷ motivated increased support for Aslib format and some changes
▷ data and setup will be made available
Challenge reloaded?

- Second challenge next year?
- Would you be interested in participating?
- Your feedback welcome!