DM872

Mathematical Optimization at Work

Optimization and Machine Learning

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Machine Learning for IP

- branching rules that attempt to approximate strong branching, but run much faster
- rules to select a branching variable
- rules to decide whether a heuristic should be called
- rules to select which Gomory cuts should be added
- a rule to decide whether a decomposition algorithm should be used on a given problem/instance.
- algorithm portfolios

Questions: generalizations to arbitrary, effectiveness as the size of instances is significantly increased.

IP for Machine Learning

The examples that we see:

- linear programming used to train deep neural networks with various architectures and loss functions
- generation of misclassified instances for a given neural network
- IP to design optimal decision trees