Meta-learning methods for analyzing Go playing trends

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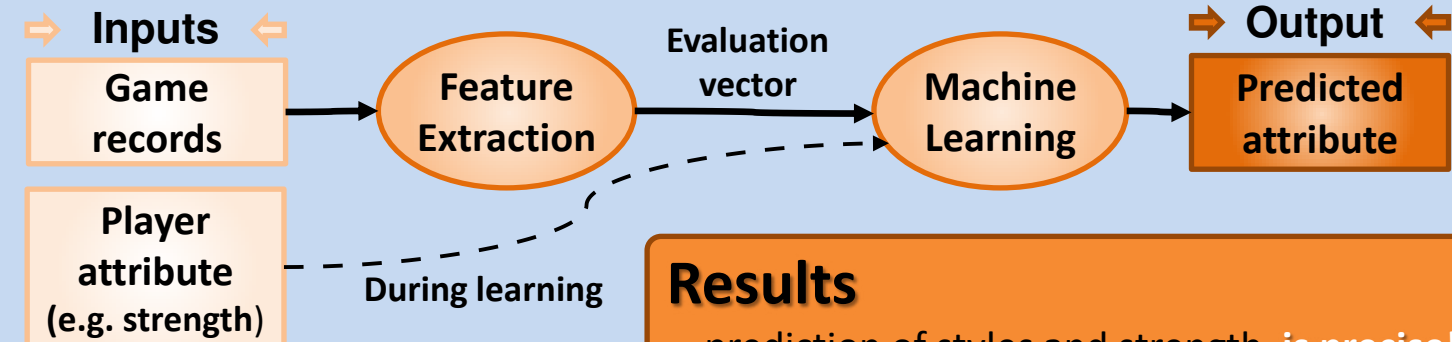**Faculty of Mathematics and Physics**

Game of Go

- ancient board game
- **black** vs. white
- simple rules, complex tactics
- ~24 million of players
- AI is a hard problem

This work

- **goal** is to predict player attributes such as strength or playing style from a sample of player's games
- we employ advanced machine learning techniques and sophisticated feature extraction

⇨ **Inputs** ⇦

Game records

Player attribute (e.g. strength)

Feature Extraction

Evaluation vector

During learning

Machine Learning

⇨ **Output** ⇦

Predicted attribute

Solution: Feature Extraction

- analysis of patterns
- histograms of events
- sente/gote, captures
- wins/losses
- etc...

local   local
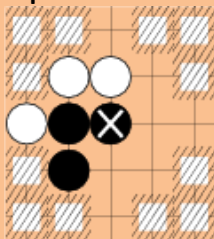
Solution: Machine Learning

- evolution of regression ensembles based on stacked generalization
- various base-learners
  - (bagged) neural networks
  - mean regression
  - Random Forrests
  - k-NN
  - PLS

Bag 20×

NN   PLS

Bag k-nn   NN
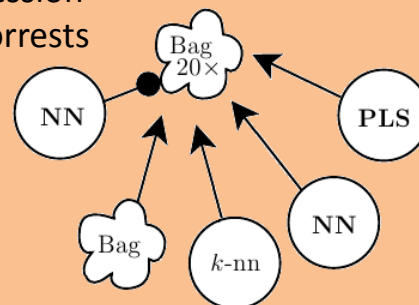
Results

- prediction of styles and strength **is precise!**

Learner	RMSE Territoriality
Mean regression	2.403
Initial hand tuned l.	1.434
The best GA learner	1.394

- can **help Go players** by:
  - pinpointing their weaknesses based on the pattern analysis
  - making personalized tips about their playing style
- **Realized as a web-application!**

http://gostyle.j2m.cz