Learning Personalized Models of Human Behavior in Chess- 2021

A naive reader (and I am such) may conclude the following:

The main goal? To craft an AI that doesn't just play chess; **it plays chess like you;** with all your quirky moves and questionable decisions. How?

- The model needs to understand human actions, not just optimal win conditions
- The model needs to match styles and behaviors.

Procedure:

They took AlphaZero and said,

> *Let's make it even smarter by making it mimic individual players.*

Given a large dataset by a single player, fine tune a model to predict the players specific moves.

Dataset (20, 000+ games)

- Games from Lichess.org
- Selected players with:
- Over 20,000 rated games in blitz with an elo between 1000-2000
- Final evaluation sample of 400 players

Method:

For each player divide their games:

- 80% training
- 10% validation
- 10% test

Using the training set, leverage transfer learning to convert a *Maia* model into an individualized model.

Accuracy Comparison

Individualized models perform relatively similar to Maia predictions.

- Maia predicts lower skilled(1100) players better
- Individualized models predicts medium and high (1500-1900) skilled models better by 4-5%
- Transfer models perform very well on positions they have seen before, and outperform Maia models on novel positions.

If you give them positions that were in the training set, they will get a 99% similarity. (Obviously)
They aim the model by taking an engine like stockfish and asking,

> *If I make this move, and it's a good move...(Similar accuracy to Maia)*
> *if I make this move, and it's a bad move.....(Better accuracy)*

Transfer models can reproduce mistakes (somewhat) better than Maia*

Sample size causes a caveat:

If you take a player with less than 10,000 games the model does not perform as reported. Will tend to overfit at this small of a sample size & will underperform.

Personalization:

What choices do we expect a player to make?

- blunders
- errors
- optimal moves

Based on these move categories, individualized models perform:

- VERY accurate predicting blunders
- More accurate than Maia on errors
- Somewhat better than Maia on optimal moves