Part -a:- Paper session, title, authors, and affiliations.

- Paper session: Research Track Full Papers
- Title: Learning Models of Individual Behavior in Chess
- Authors: Reid McIlroy-Young, Russell Wang, Siddhartha Sen, Jon Kleinberg, Ashton Anderson

Part -b :- What problem is addressed? Why is the problem important and challenging?

- We all would have played online chess or even playing now with a AI bot. Which is only capable of doing some ideal moves which follows the basic rules that are restricted moves or actions.
- But the problem here is it only follows the set of instructions which are pretty common moves done which are aggreated moves. In this research, the aim is to predict the individualize chess moves for a player.
- The challenge of anticipating human actions, as opposed to anticipating ideal actions, has gotten a lot of attention in the quest to create AI systems that are focused on humans.
- This solution is the updated version of the previous one named maia which is a neural chess engine model which will follow some set of rules to predict the next moves knowing only their skill levels
- The challenge here is to predict the moves of a individual player who has their own style of play rather than the following the steps. I.e tricks, new moves something like that.

Part -c:- A high-level, brief description of the proposed solution (no need to include the details)?

- The value that each specific person may receive from interacting with these systems is potentially constrained by the existing work's emphasis on capturing human activity in an aggregate sense.
- Selected players from the blitz(one of the popular chess games) who having more than 20000+ games
- Final methodology is to use the training set, use transfer learning to convert a maia model into a individualized model
- IN accuracy comparison, individualized model outperformed all maia models achieving 4-5 % higher accuracy per player

Model Accuracy Comparison
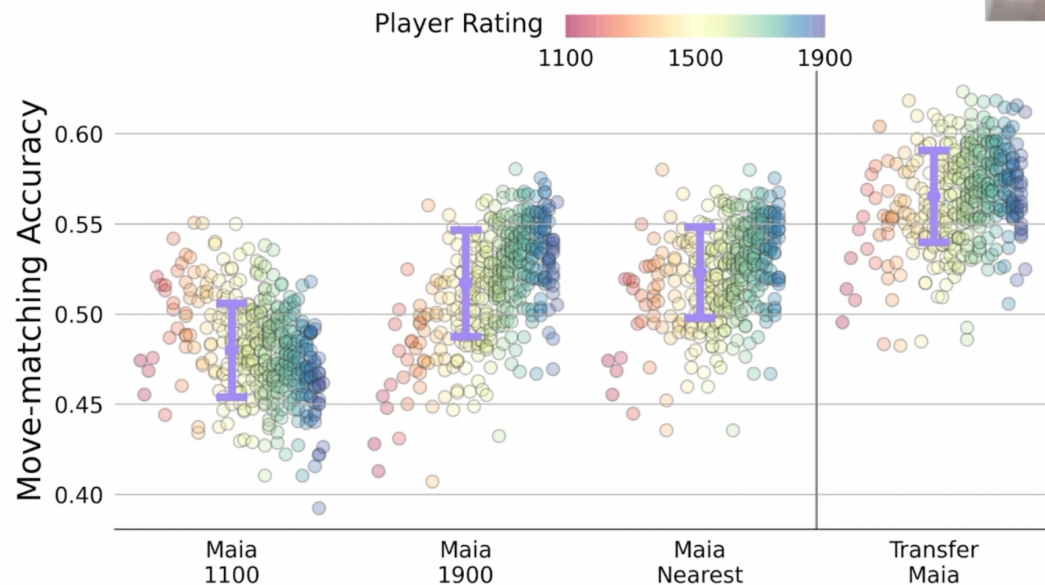
The final results and conclusions will be found in the part d.

Part -d:- How is the proposed solution evaluated?(data sets, metrics, etc.)

Data set information :

1. Over 20000 rated games in blitz(3-7minutes) time frame.
2. Low variance of rating over time.
3. Rating over 1000 and 2000(medium skilled).
4. For each player divide their game into
   a. 80% training
   b. 10% validate
   c. 10% test
5. From this, they have come up with IQR to find the high skill and low skill for the current approach. What is the difference of accuracy a individual player can achieve.
6. Final solution sample of 400 players
7. Final Results from above results and procedure
   a. Examining 400 players using 100 sets each has the following results
      i. 98.4% top 1 accuracy
      ii. 98.5 % 1st 5 moves removed
      iii. 55% 1st 10 moves removed
8. Transfer models perform very well on positions they have seen before, but still outperform maia model in novel positions - for move matching accuracy
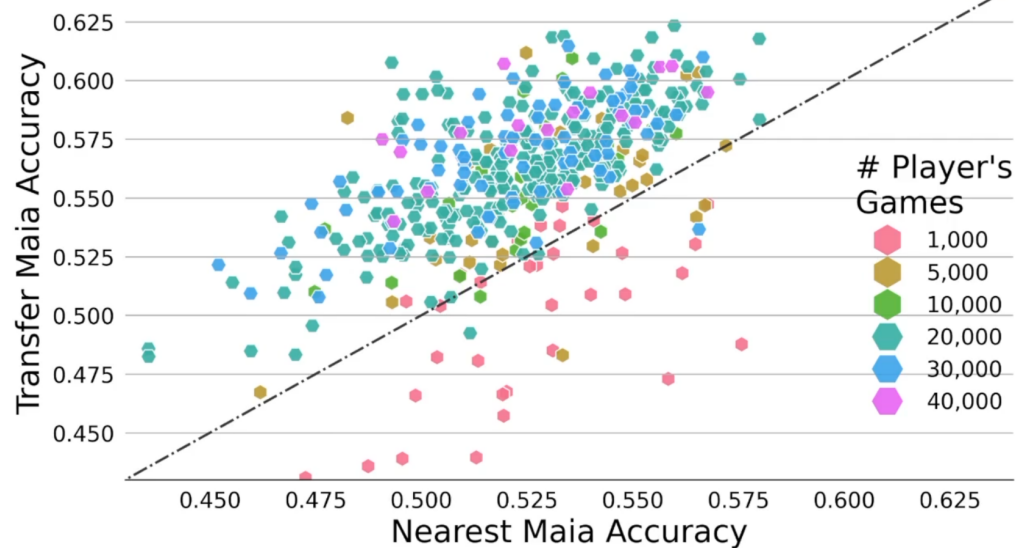
Previous Positions
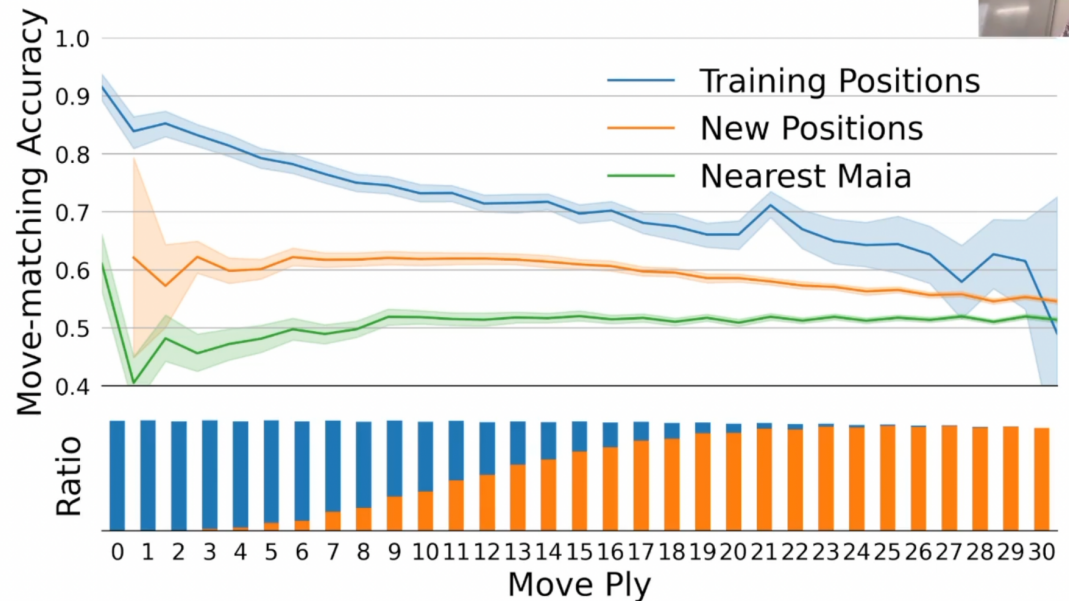
9.

10. Sample size effects play a major role in the data mining, which can alter the final predictions in the accuracy or move-in probabilities. Please find the below for the sample size effects and its accuracy effects

Sample Size Effects

11.