Chess Opening Classifier

Based on Middle Game Position

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Ever heard that chess games are becoming increasingly memorized?

Chess is all about memorization and it's boring

: Oldest ⌄   ‹ 1 2 3 4 ... › Last

Memory: The Key To Chess?

Examining the connections between chess and memory research

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Magnus Carlsen remembers more chess games than you do. This is not surprising. What may be surprising, though, is the sheer extent of Carlsen's recall. He remembers the moves and circumstances not only of his own games, but other players' as well, going back decades. Is this then the secret of Magnus' greatness: a vast internal library of chess games? Or is it the other way around: can he remember so much because he understands chess so well?

formatallan 🇺🇸   May 9, 2019   ↑ 7 ↓   #1

That's right. Chess is all about memorizing moves and counter moves. There are no openings, or endgames, or tactics. There are a finite amount of moves and the best players are the ones who memorize thousands of counters in their heads. Odds are if you are playing a good player and you make a move, if that player is good he knows the perfect move to make to counter because he has every single possible move memorized in his or her head. That is why I suck so much at chess and will never be good at it. My memory is quite poor and I am unable to memorize thousands of moves. That's why 360 is probably a better game overall, but regular chess blows. The best players in the world all have eidetic memories. There is very little skill in chess, only memorization. That is why chess is boring and stupid. Discuss.

So what's getting memorized

- Players don't memorize full games; they memorize **opening patterns** that cover the most common early structures.
- These patterns work like **templates**, giving plans and typical responses rather than exact sequences.
- By move 10–12, games almost always leave known territory and require **general principles** instead of rote memory.

Why an Opening Classifier

- You have limited memory/resources to memorize a game of chess
- Chess players solve chess puzzles to better their skills and while solving these problems
- Given a middle game, a tool that helps you identify what opening it came from would be extremely helpful to think of incorporating similar puzzles or coming across similar scenarios when selectively memorizing/practicing opening lines
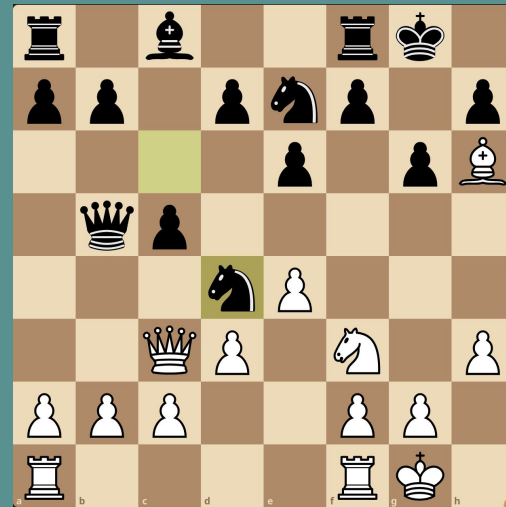
https://lichess.org/training/Sicilian_Defense_Old_Sicilian

DEMO

- https://www.365chess.com/analysis_board.php

The Logic behind

- Features used:
    - Embedded an entire chessboard with 768 features (12 * 8 * 8)
    - Material points for white
    - Material points for black
- Test/train split created by randomly choosing 80% of games from each opening family into train and 20% in test to have good representation
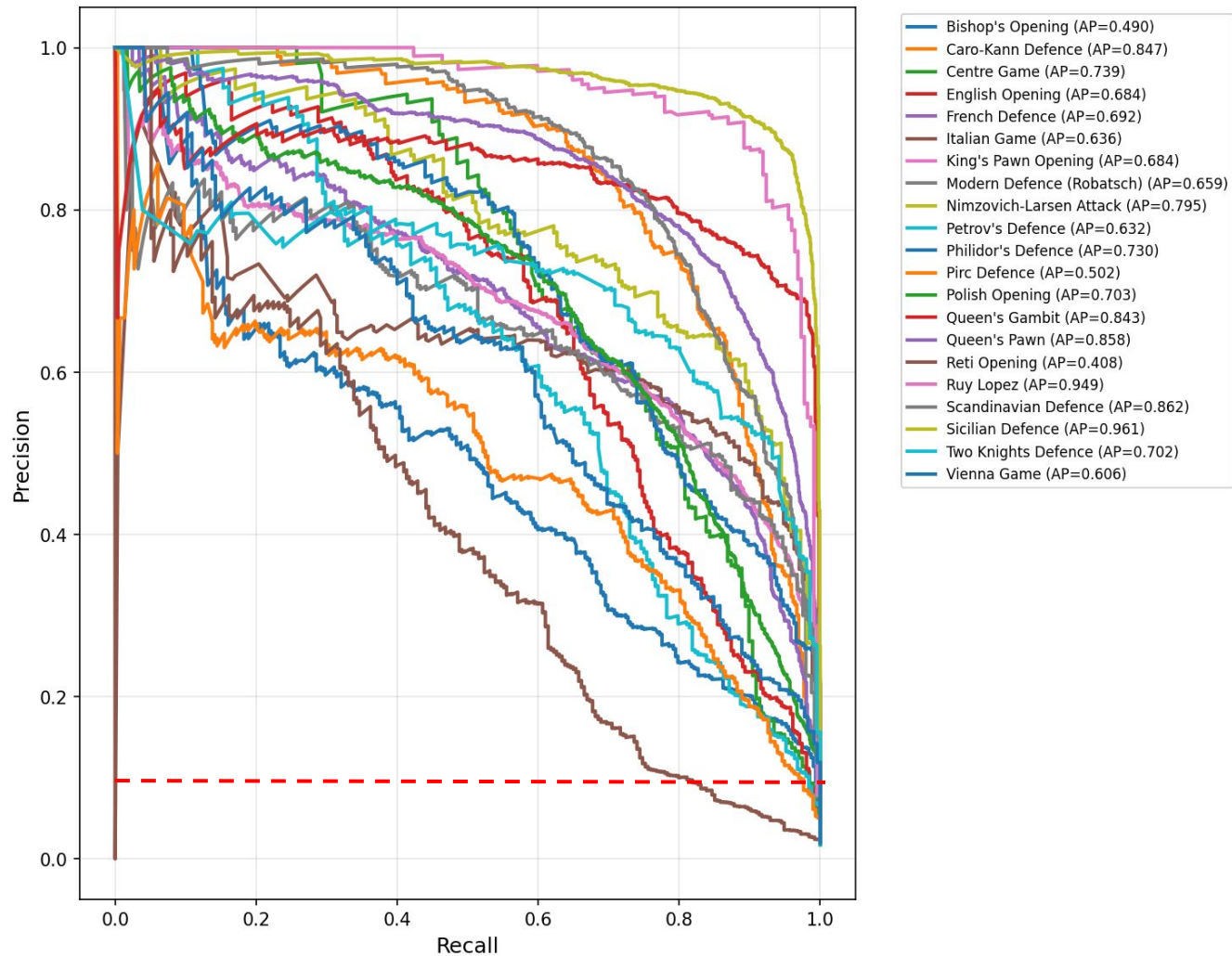- Used precision, Recall, F1 Score for evaluation

Results

Overall Precision: 0.7207

Overall Recall: 0.7136

Accuracy: 0.7136

Class	Precision	Recall	F1-Score
Bishop's Opening	0.6065	0.3013	0.4026
Caro-Kann Defence	0.8123	0.7084	0.7568
Centre Game	0.8609	0.5000	0.6326
English Opening	0.8073	0.5016	0.6188
French Defence	0.6498	0.6016	0.6247
Italian Game	0.5770	0.7630	0.6571
King's Pawn Opening	0.5630	0.7692	0.6502
Modern Defence (Robatsch)	0.6429	0.5878	0.6141
Nimzovich-Larsen Attack	0.7157	0.6498	0.6812
Petrov's Defence	0.7770	0.4355	0.5581
Philidor's Defence	0.6545	0.6687	0.6616
Pirc Defence	0.6212	0.4141	0.4970
Polish Opening	0.7497	0.6170	0.6769
Queen's Gambit	0.7871	0.8007	0.7938
Queen's Pawn	0.7349	0.8525	0.7894
Reti Opening	0.7294	0.2441	0.3658
Ruy Lopez	0.8818	0.8739	0.8778
Scandinavian Defence	0.7600	0.7972	0.7782
Sicilian Defence	0.8252	0.9707	0.8921
Two Knights Defence	0.7396	0.6068	0.6667
Vienna Game	0.7981	0.3689	0.5046

Precision-Recall Curve

- Bishop's Opening (AP=0.490)
- Caro-Kann Defence (AP=0.847)
- Centre Game (AP=0.739)
- English Opening (AP=0.684)
- French Defence (AP=0.692)
- Italian Game (AP=0.636)
- King's Pawn Opening (AP=0.684)
- Modern Defence (Robatsch) (AP=0.659)
- Nimzovich-Larsen Attack (AP=0.795)
- Petrov's Defence (AP=0.632)
- Philidor's Defence (AP=0.730)
- Pirc Defence (AP=0.502)
- Polish Opening (AP=0.703)
- Queen's Gambit (AP=0.843)
- Queen's Pawn (AP=0.858)
- Reti Opening (AP=0.408)
- Ruy Lopez (AP=0.949)
- Scandinavian Defence (AP=0.862)
- Sicilian Defence (AP=0.961)
- Two Knights Defence (AP=0.702)
- Vienna Game (AP=0.606)

Class	Precision	Recall	F1-Score	Dataset Occurrences
Bishop's Opening	0.6065	0.3013	0.4026	1673
Centre Game	0.8609	0.5000	0.6326	1025
English Opening	0.8073	0.5016	0.6188	1605
Petrov's Defence	0.7770	0.4355	0.5581	1310
Pirc Defence	0.6212	0.4141	0.4970	1557
Reti Opening	0.7294	0.2441	0.3658	1340
Vienna Game	0.7981	0.3689	0.5046	1181

All games here either have a low appearance count in our dataset or aren't that distinct in piece placement.

Ex) English and Reti both follow a more general strategy of occupying the center of the board with the same pawns -> similar middlegame board

Class	Precision	Recall	F1-Score
Caro-Kann Defence	0.8123	0.7084	0.7568
French Defence	0.6498	0.6016	0.6247
Italian Game	0.5770	0.7630	0.6571
King's Pawn Opening	0.5630	0.7692	0.6502
Modern Defence (Robatsch)	0.6429	0.5878	0.6141
Nimzovich-Larsen Attack	0.7157	0.6498	0.6812
Philidor's Defence	0.6545	0.6687	0.6616
Polish Opening	0.7497	0.6170	0.6769
Queen's Gambit	0.7871	0.8007	0.7938
Queen's Pawn	0.7349	0.8525	0.7894
Ruy Lopez	0.8818	0.8739	0.8778
Scandinavian Defence	0.7600	0.7972	0.7782
Sicilian Defence	0.8252	0.9707	0.8921
Two Knights Defence	0.7396	0.6068	0.6667

All of these opening families have the highest frequency of occurrence in the dataset

Ruy Lopez and Two Knights have very distinct piece placement

Thank You