Predicting Chess Endings

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How can we predict the ending of a chess game?

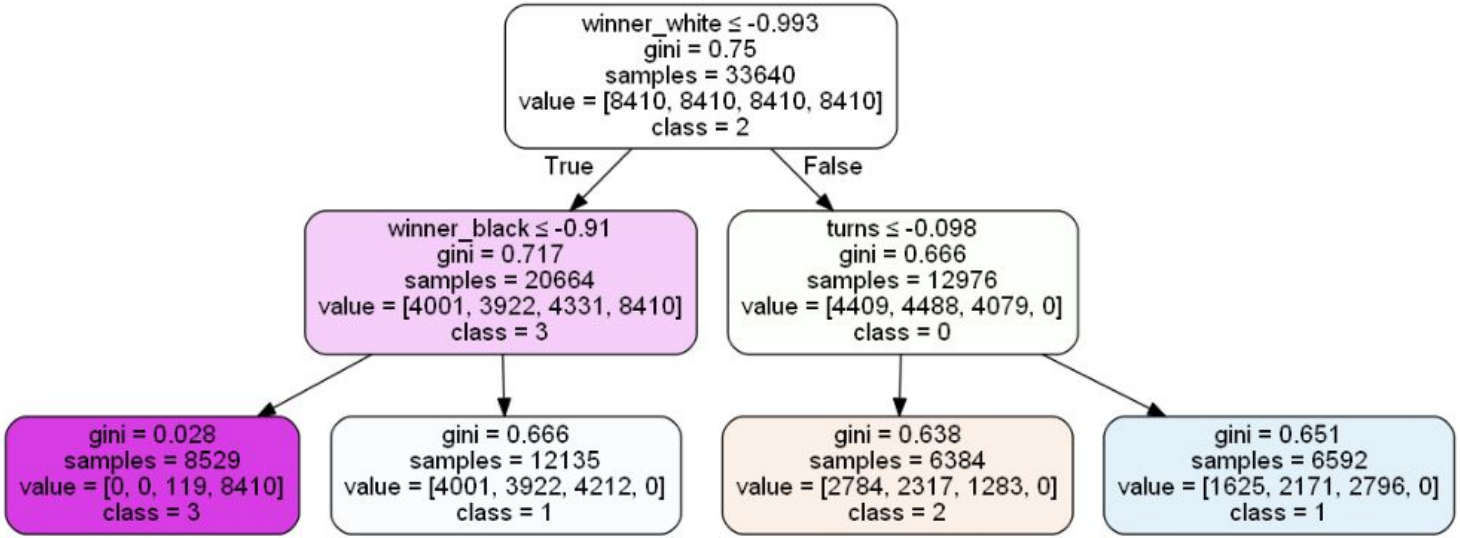
Overview

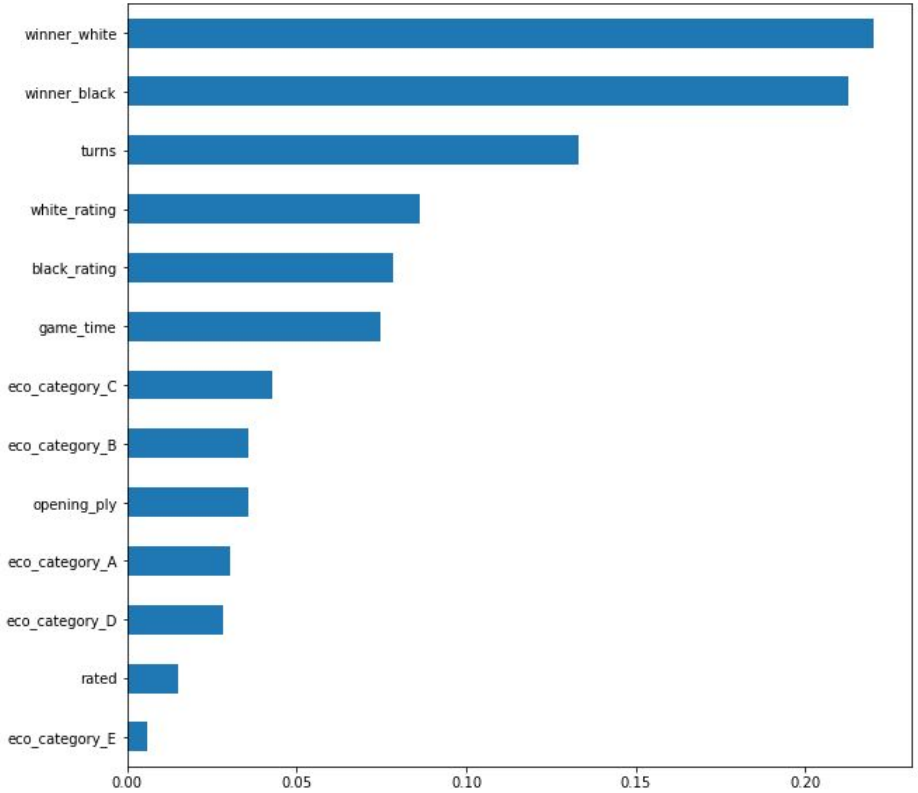
- Analyzed 20,000 games from LiChess.org, from low-ranked (~800) to high-ranked (2700+)
- Used classification modeling techniques to predict whether games ended in checkmate, resignation, stalemate, or timeout
- Considered factors such as player ratings, turn counts, and game openings

Methodology

- Created a Decision Tree algorithm that determined classification thresholds for each factor
- Reran the algorithm several times to create a “forest”

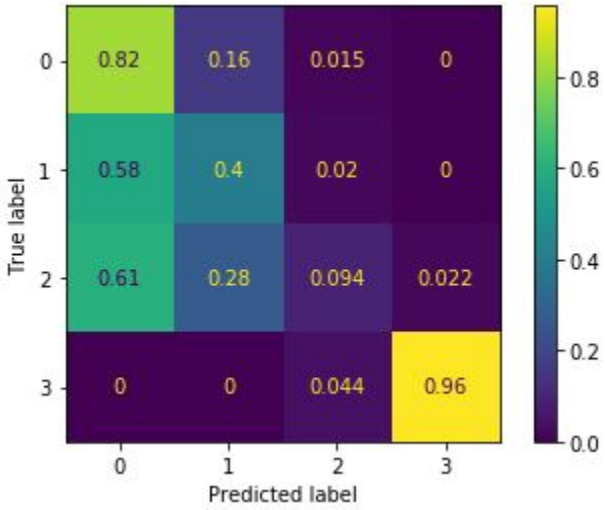
Decision Tree Example





Feature Importance: The most important factor in determining how the game ended was the color that was played by the winner

Overall Model Accuracy



Conclusions

- Player color and turn count accounted for nearly 60% of prediction weight
- Prediction is ~63% accurate, compared to 25% accuracy for random guessing

Further Research

- Analyze impact of further granulation in such factors as openings, etc.
- Narrow scope to include only high-level games to investigate the existence/structure of a top-down metagame
- Widen scope to include mid- and end-game conditions to further predict game structure

Thank you!

Source: https://www.kaggle.com/datasnaek/chess/data