INFO 4602/5602
Information Visualization

Individual Project Presentation (My Dashboard Report)

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Context for Dashboard Design and Development

What

- Game IDs for tracking, Player Ratings for skill level analysis, and Performance Metrics (inaccuracies, mistakes, blunders) to identify common errors.
- Opening Strategies (ECO codes, ply count) to analyze popular and successful openings.
- Accuracy Metrics (centipawn loss) to measure move precision and alignment with optimal play.

Where

- Player Training: Helps players and coaches identify effective strategies and improvement areas.
- Content Creation: Supports educators and creators with data-driven insights on popular openings and common errors.
- Research & Analysis: Enables analysts to study patterns in player performance and strategy choices.

Context for Dashboard Design and Development

Who

This dashboard is designed for chess players, enthusiasts, coaches, data analysts, and content creators. With the rise in online chess popularity, fueled by shows like The Queen's Gambit and influencers like GothamChess, more players are joining platforms like lichess.org.

This project provides insights into player performance, strategies, and trends in online chess.

How

Data Source: The data is sourced from lichess.org, a widely-used, free-to-access online chess platform known for its open-source API.

Motivation for Dashboard

Improvement & Strategy: This dashboard helps players and coaches identify improvement areas, track skill progression, and analyze effective openings and common mistakes, providing actionable insights to enhance gameplay.

Trend Analysis & Performance Tracking: By visualizing metrics like player ratings, centipawn loss, and error types, users can explore trends that impact game outcomes, making it a valuable resource for both amateur and professional chess communities.

Key Research Questions

01

- *What are the most popular and successful opening moves among players of various skill levels?*
- Purpose: Understanding which openings are most commonly used and how they correlate with player ratings and game outcomes.

02

- *How do different player ratings impact the likelihood and types of mistakes (inaccuracies, mistakes, and blunders)?*
- Purpose: This will shed light on how skill levels relate to game accuracy and error frequency, helping players identify skill gaps.

03

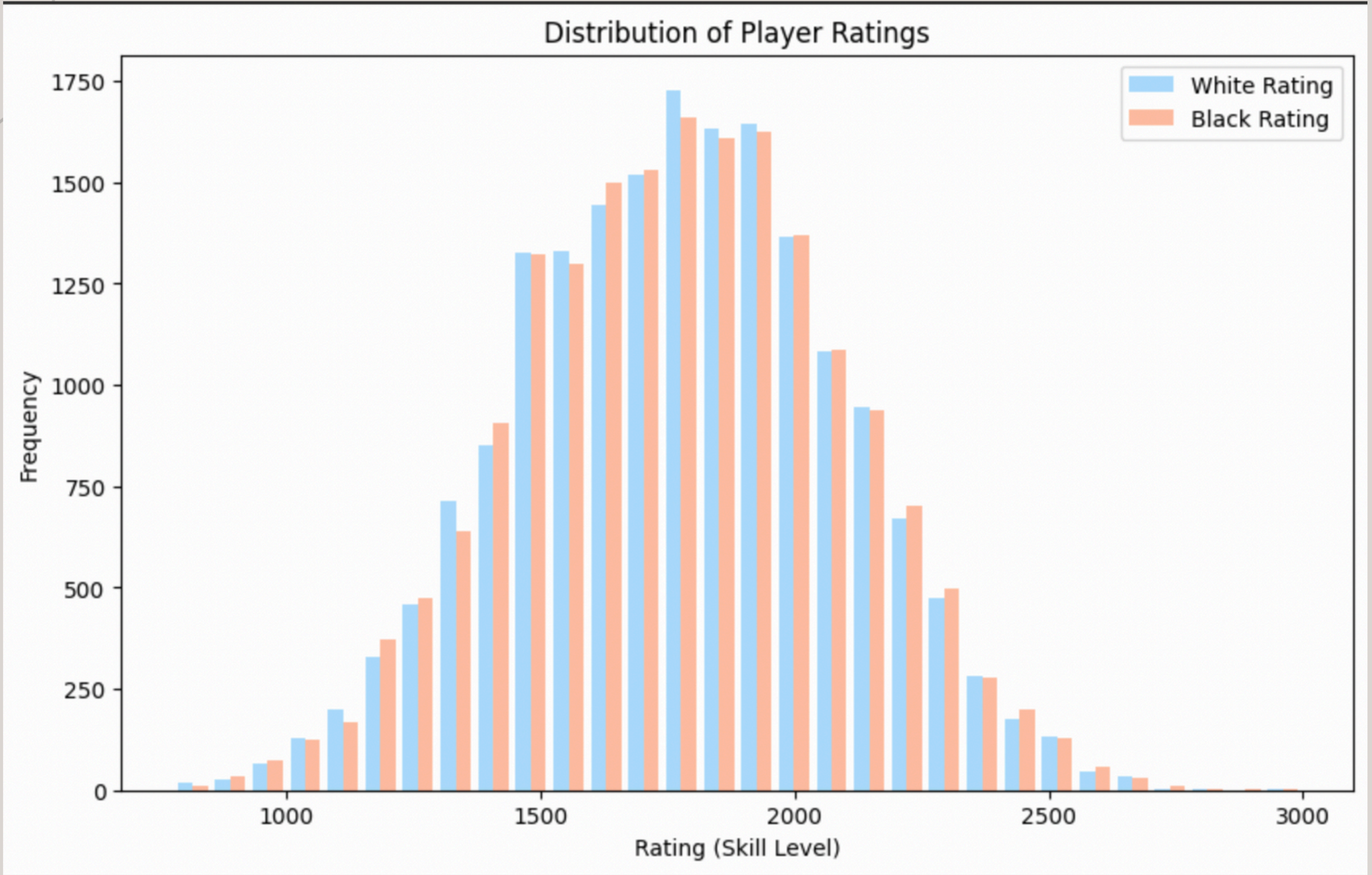
- *Is there a relationship between a player's rating and their average centipawn loss (move efficiency)?*
- Purpose: By examining this, we can see if higher-rated players consistently make more efficient moves compared to lower-rated players, providing insight into the role of precision in winning games.

Data Source and Discussion

The data for this project is sourced from online chess games on lichess.org, which were collected and expanded from an initial dataset on Kaggle. The dataset includes information on game ID, player ratings, opening codes, centipawn loss, and various error types (inaccuracies, mistakes, blunders).

These metrics were scraped and structured to allow for deeper analysis of player behaviors and strategies. This dataset serves as a rich foundation for building an interactive dashboard that visualizes trends in chess gameplay and helps answer key research questions.

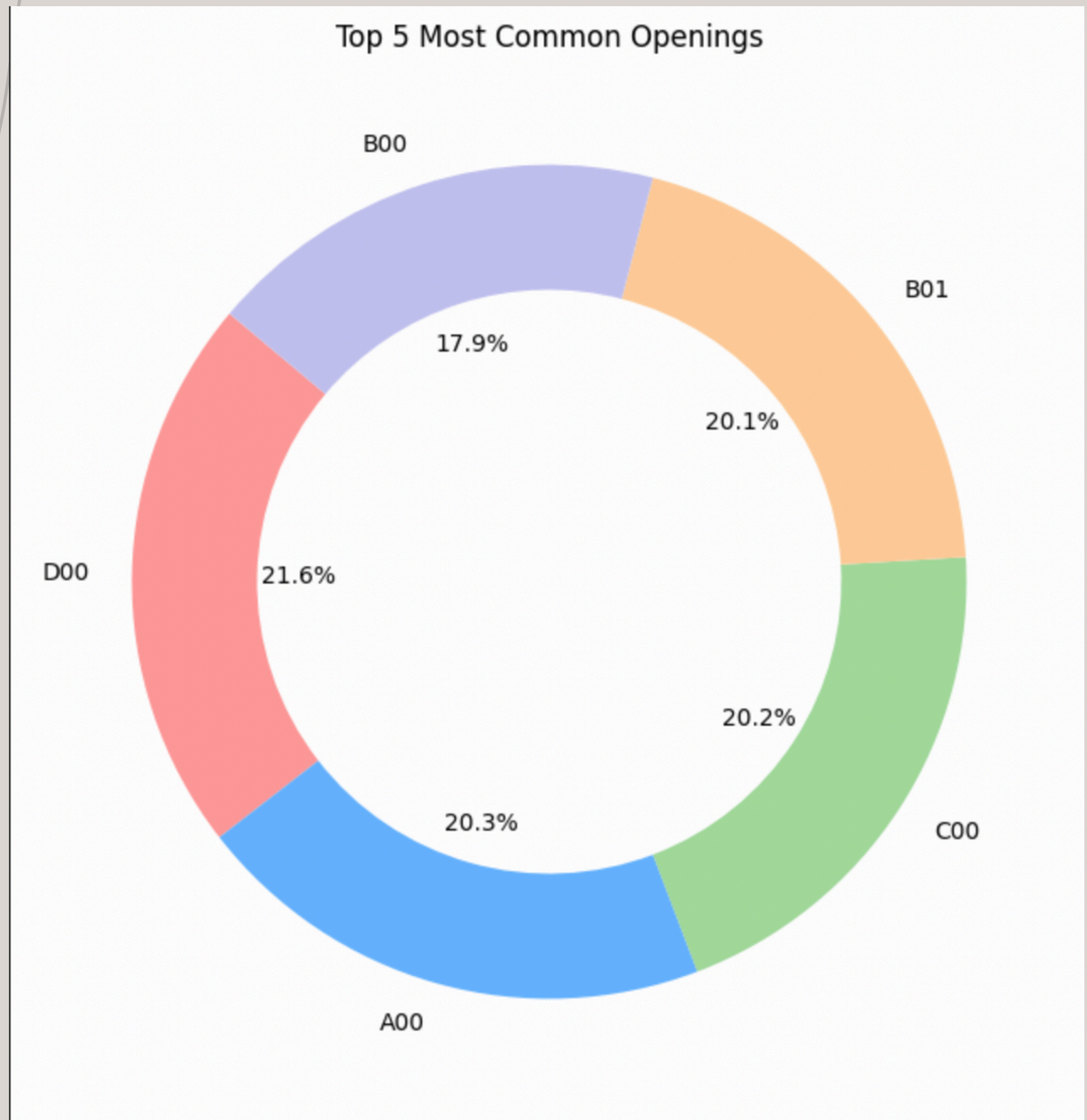
Chart 1



This histogram shows player ratings for both White and Black, with most players concentrated around the 1500-1800 range, indicating a common skill level.

The similar distributions for White and Black suggest balanced skills across both sides, with fewer players at very low or very high ratings.

Chart 2



ECO (Encyclopedia of Chess Openings) Codes in Chess:

- **ECO codes like A00 and D00 are not board coordinates; they are classification labels for different chess openings.**
- **For example, A00 covers irregular openings, while D00 includes Queen's Pawn Game setups.**
- **These codes help organize and identify chess openings for easy reference.**

Chart 3

This chart shows that as player ratings increase, average centipawn loss decreases, indicating more accurate play at higher skill levels.

Players rated above 2000 have an average loss below 50, while those below 1000 are closer to 100. The similar patterns for White and Black suggest that color does not significantly impact accuracy across skill levels.

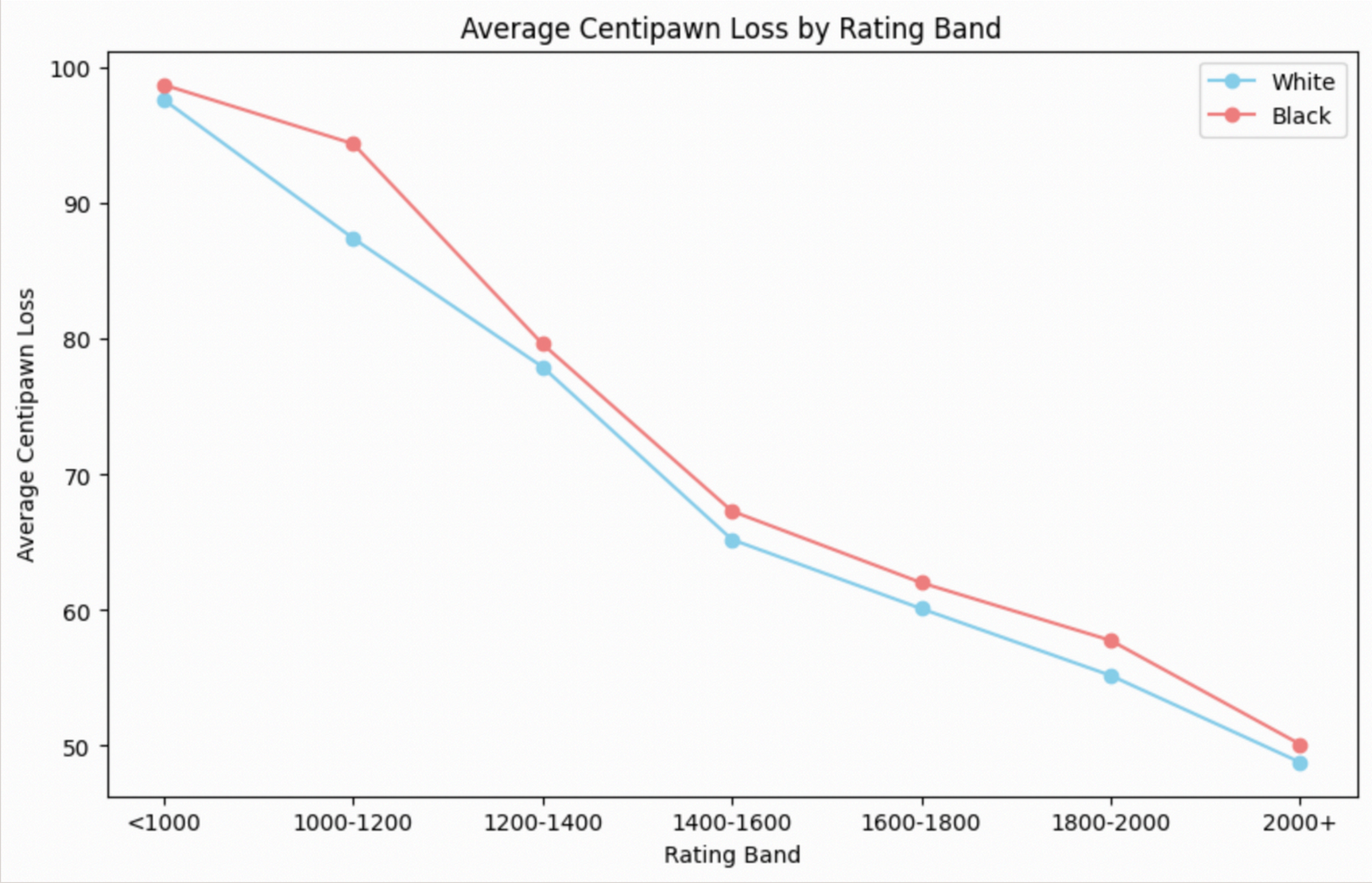
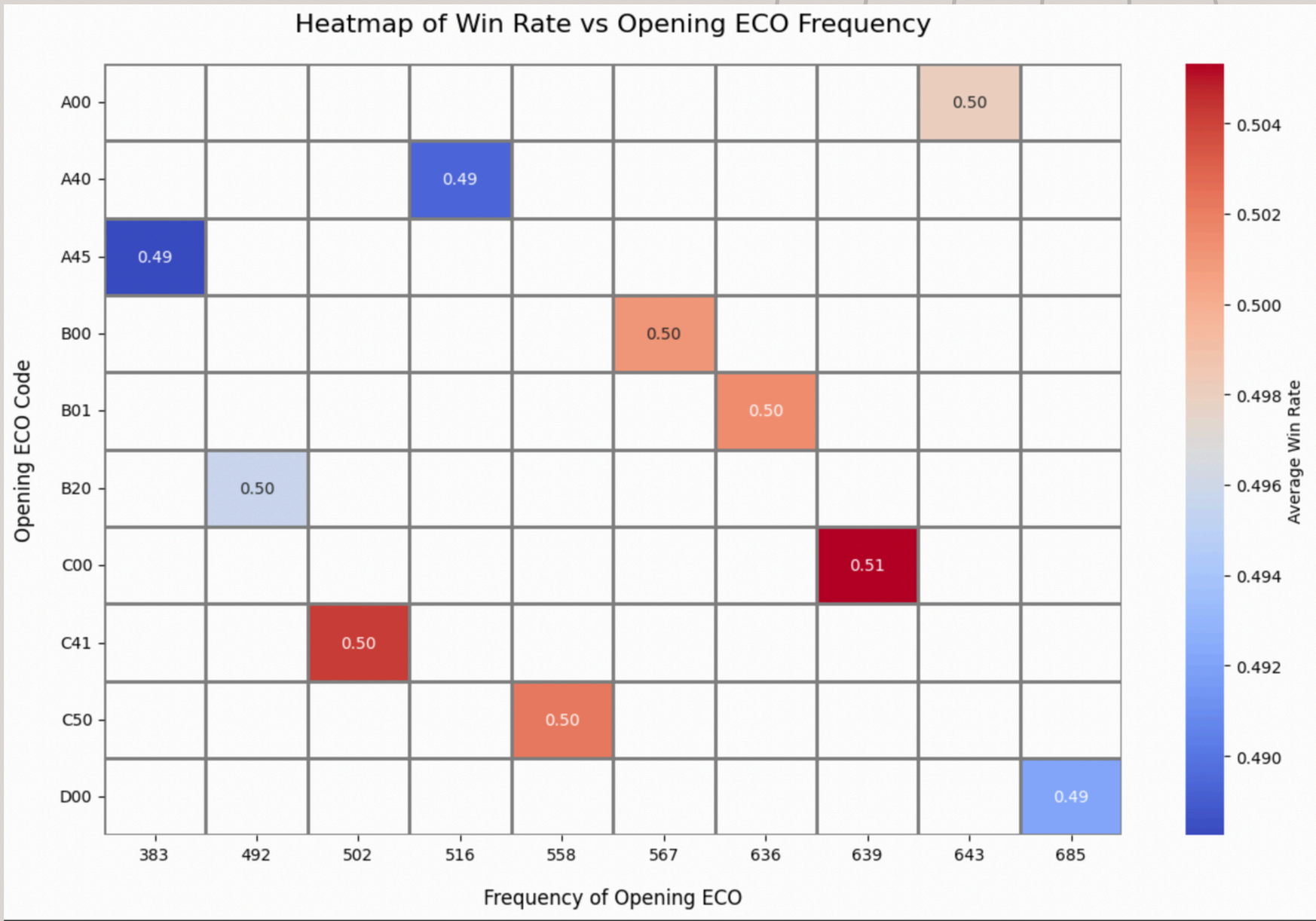


Chart 4

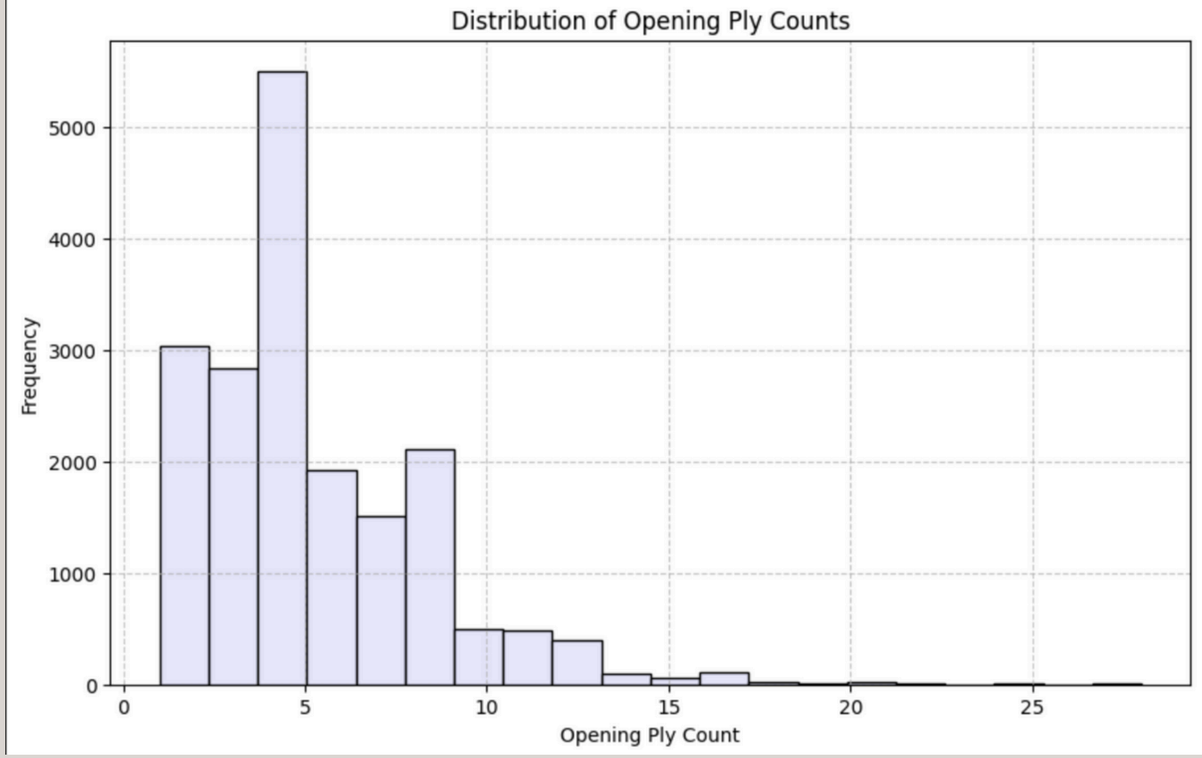
This heatmap shows the average win rate for top chess openings (ECO codes) at different frequencies. Red shades indicate higher win rates, while blue shades indicate lower ones.

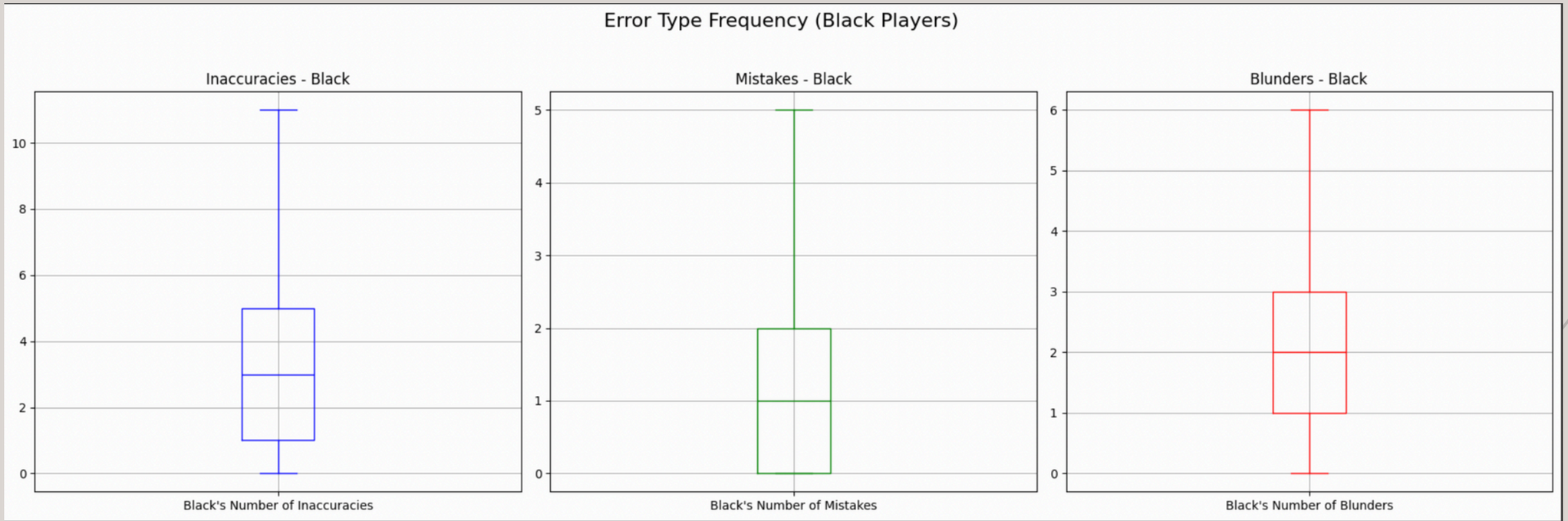
Openings like C41 and C00 show slightly higher win rates (up to 51%) at certain frequencies, while others like A45 perform lower.

This visualization provides insights into which openings and frequencies are more effective, helping players refine their strategies.



A few extra charts





Answers to Research Questions and Recommendations

01

Popular and Successful Openings:

- Answer: The dataset reveals that certain openings, such as the Queen's Gambit and Sicilian Defense, are more common and tend to yield higher success rates among mid-to-high-rated players.
- Recommendation: Players, especially those with lower ratings, should study these openings to improve their gameplay consistency.

02

Impact of Player Ratings on Mistakes:

- Answer: Higher-rated players tend to make fewer severe mistakes (blunders) and inaccuracies, with their errors concentrated on smaller inaccuracies rather than drastic blunders.
- Recommendation: Beginners should focus on minimizing blunders by training with tactics puzzles and practicing endgame scenarios, where mistakes can be especially costly.

03

Relationship Between Ratings and Centipawn Loss:

- Answer: A strong inverse relationship is observed between rating and centipawn loss—higher-rated players generally maintain better control over their positions with lower centipawn losses.
- Recommendation: To improve precision, players can review games with engines like Stockfish to identify areas where they lose material advantage and practice refining their move accuracy.

Answers to Research Questions and Recommendations

- Error Patterns: Black players make more inaccuracies than blunders, suggesting a focus on reducing minor errors.
- Opening Depth: Most games follow opening theory for only 4-5 moves, showing early divergence from standard lines.
- Training Focus: Reducing inaccuracies and studying deeper openings could help players improve their gameplay.
- Strategic Insights: These insights guide players and coaches in optimizing strategies for common mistakes and opening knowledge.

Links

To the dashboard: Link
To the dataset: Link

Thank You