# Chess Scores & Origins: Grandmasters Through Time

Ozan Güngör
Department of Information Systems and Technologies University of Bilkent 21902586
Çankaya,Ankara
ozan.gungor@ug.bilkent.edu.tr

Doğukan Hazar Alpay
*Department of Information Systems and Technologies University of Bilkent*
*22003159*
Çankaya,Ankara
hazar.alpay@ug.bilkent.edu.tr

Denizalp Turgut
*Department of Information Systems and Technologies University of Bilkent*
*22002161*
Çankaya,Ankara
denizalp.turgut@ug.bilkent.edu.tr

***Abstract*—Chess, an ancient game with a rich history spanning approximately 15 centuries, is celebrated for its profound association with intelligence. Originating in the Middle East, chess embarked on diverse journeys, eventually attaining its contemporary form in Europe. This game, a captivating fusion of power, intellect, artistry and strategic acumen, transcends its nature as an individual pastime. Remarkably, chess has evolved into a symbol of political dominance for nations [9].**

**This study endeavors to elucidate the geographical factors that underlie nations' success in the realm of chess by leveraging historical insights. It delves into the intricate interplay between geography and chess, highlighting how diverse regions and their unique contexts have contributed to the game's evolution and the rise of chess-playing nations.**

## I. Introduction

The infantry advances steadily, the elephants have already broken the defensive pact. The king tries to retreat, but enemy cavalry surrounds him from behind. It is impossible to escape. Checkmate. This is not a war, nor can it be said that it is a game. For more than fifteen centuries, chess has been used as a tool of military strategy, a romantic metaphor of human relationships, and a measure of intelligence. Although legends say that chess dates back to the 6th century in India, our earliest findings about the game date back to the 7th century. Of course, its name was not chess at that time, it was known as "Chaturanga". In Sanskrit this meant "four divisions of the army". However, as it spread to the Persian empire, it acquired its current name and terminology. After the Islamic conquest of Persia in the 7th century, chess was introduced to the Arab world. It lost the concept of a tactical simulation and achieved a rich and poetic image [6]. States used chess terms to describe their political power. The Caliphs became avid players. Historian El Mas'udi put forward the idea that chess is a reflection of people's free will, compared to games of chance. Trade on the Silk Road paved the way for the emergence of many different variants of the game. In China, chess pieces were placed at the intersections of board squares rather than inside them, as in the indigenous strategy game Go. Mongol leader Tamerlane ordered the construction of an 11x10 board that housed safe houses called castles. In Japanese Shogi, captured pieces could be used by the opposing player. However, among all these variants, chess began to take its modern form in Europe. Chess pieces had different roles, meanings and motifs. It first took the form we play today in the 15th century [8]. The relatively weak king's advisor piece became the powerful queen we call the vizier. This development changed the tempo of the game and made it more somber. As game rules became more widespread, a branch of science emerged that examined opening and end-game tactics. Chess theory was born. During the Enlightenment, gaming moved from royal courts to cafés. Chess was seen as an expression of creativity, encouraging bold moves and dramatic games. This "romantic" style reached its peak in 1851, when Adolf Anderssen made checkmate after sacrificing a queen and two rooks, and was named the "Immortal game". What dispersed all this romantic cloud atmosphere was the view that mathematics and strategic calculation would give dramatic flair. And with the rise of international competition, chess has gained geopolitical importance in recent history. The Soviet Union, which went to rivalry against the United States in every field during the Cold War, did not lag behind in a game that represents intelligence and intellectuality, such as chess. The Soviet Union devoted huge resources to developing chess talent, allowing them to dominate the championships for the rest of the century. However, if we do not count Bobby Fischer, the player who would disrupt the Russian dominance was not a citizen of another country, but a computer system called Deep Blue. Chess-playing computers have been around for decades, but Deep Blue demonstrated in 1997, when it defeated Gary Kasparov, according to many authorities, the best player of all time, that the difference between humans and computers was even greater than the difference between romantic and modern chess. Nowadays, the best players are nothing but software, products of human intelligence, that do not belong to any country, geography, or have a sub-message that needs to be conveyed through chess.

## II. Purpose of this essay

This article aims to investigate and evaluate the relationship between national chess success and geographic location. It looks into how various areas' historical and geographical backgrounds have shaped their chess accomplishments. The goal of the article is to provide light on the many elements that have influenced the growth of the game and the stature of particular countries in the chess world by examining the relationship between chess and geography. This research might advance our knowledge of the cultural and historical relevance of chess by illuminating the larger effects of location and culture on intellectual endeavors and strategic games.

Figure 1. Chess Champions Through the World [1]

## III. Mapping Grandmasters Across Globe

The countries highlighted in red on the map denote the home countries of individuals who are currently ranked among the top 100 chess players by the World Chess Federation (FIDE). Although the players with the highest population among the top 100 players from the countries shown in red vary, in general, there are certain countries that have taken this lobby under control. Russia is one of the first countries that come to mind when it comes to chess. Russians are seen as the best in this game, both because of their proximity to the geography where chess was born compared to the countries in the West and because they dominated the chess world during the Cold War. In addition, India, known as the birthplace of chess according to legends, China, which soon became acquainted with chess, including its various variants, as it was located on the Silk Road, and America, the hometown of Bobby Fischer, who stood alone against the Soviets during the Cold War, is the most widespread and successful game of chess. They are among the top countries where they are played by people. Countries such as Ukraine, Azerbaijan and Armenia, which were part of the Soviet Union before its dissolution, are also among the countries with assertive names in chess. In addition, countries such as Germany and France have fewer players on their best lists than Eastern European countries. Although there is no definitive reason or single reason for this, it can be said that the influence of religious elements such as the banning of the game by the church in France is visible.

Unfortunately, since chess is a game that has been played among high-economic nobles since its invention, it has not gained popularity in a region such as Africa, where economic crisis, hunger, technology and imports are more limited.

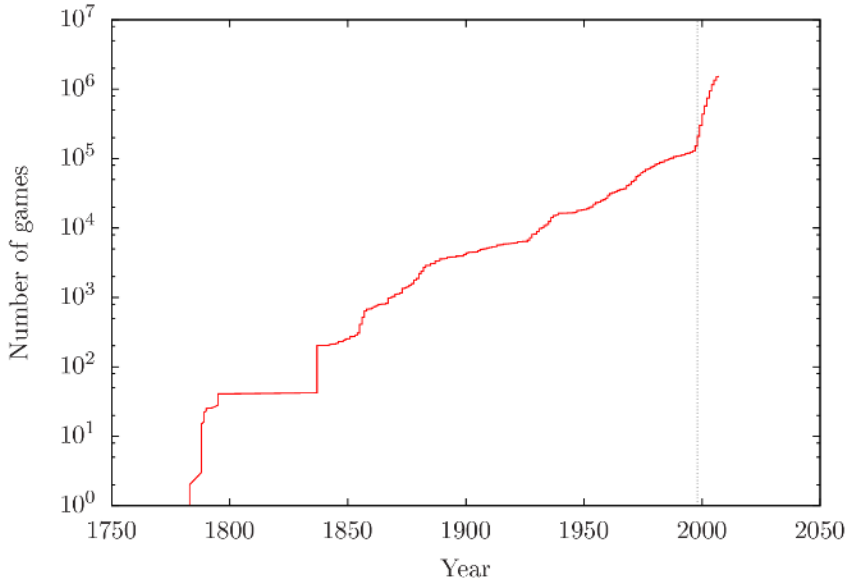



Figure 2. Chess Matches in Centuries [4]

## IV. Best Players Of All Time

According to the chart above, it can be easily estimated that chess skill has increased over time. As long as some exceptions are ignored, the elo of chess players increases as the year increases. Technological developments and a strong tradition in the chess world served as the main driving forces behind the creation of chess notation. Although the exact historical beginnings are unknown, it is generally accepted that chess players started keeping track of their moves in the 18th century. Players tried to study their games, see any mistakes or strategies they might have missed, and make sure they had a clear and unquestionable record of the result. In the midst of this historical progression, Paul Morphy stands out as an extraordinary figure, a tremendous player ahead of his time. Not only did he exhibit amazing skill on the chessboard, but he also left behind a wealth of games for players in later generations, thus his contributions go beyond the ordinary. Because of his exceptional legacy, which offered priceless resources for research and analysis, his successors had greater chances than their contemporaries to advance and innovate.

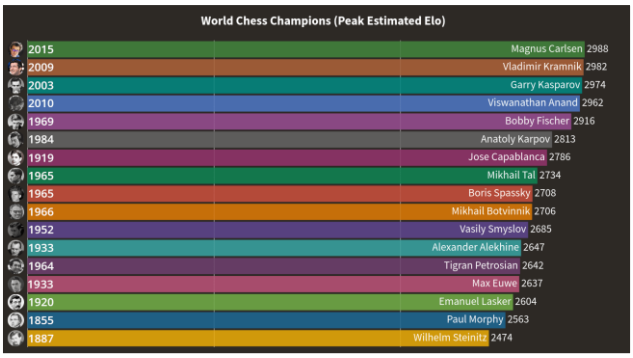



Figure 3. Highest Elo Players Around the World [2]

Moreover, this transition was significantly influenced by the way that chess eras developed. Bold and inventive play was valued in the romantic movement of the 19th century, which laid the foundation for Paul Morphy's chess epoch. With the help of several well-known individuals, Morphy was able to establish himself as a leader in the international chess community. Nevertheless, the significant influence of theoretical and analytical approaches to the game ultimately overshadowed this romantic chess movement. The biggest reason for this is, of course, technology and the legacy left behind. Although the exact date is unknown, it is estimated that moves in chess games were noted by both players starting from the 18th century. The reason for this was that people wanted to review this game , as well as the fact that there might be an overlooked bug in the game. Paul Morphy, as a player beyond his time, is such a good player that he is an exception even in the inference of the above data. And by bequeathing his games to every player on the list after him, he left them resources to work with. In other words, other players in the table have more opportunities to work and develop than Morphy. Another important factor is the difference in chess era. Paul Morphy remained in the romantic movement of 19th century chess and is one of the two most important influencers as the world leader. However, the romantic chess movement was buried in the dusty pages of history with the influence of mathematics on chess and was replaced by theoretical chess. In addition, while some players stayed in their seats for decades like Garry Kasparov, players such as Bobby Fischer and Paul Morphy rose in a short time and said goodbye to chess in a short time [5].

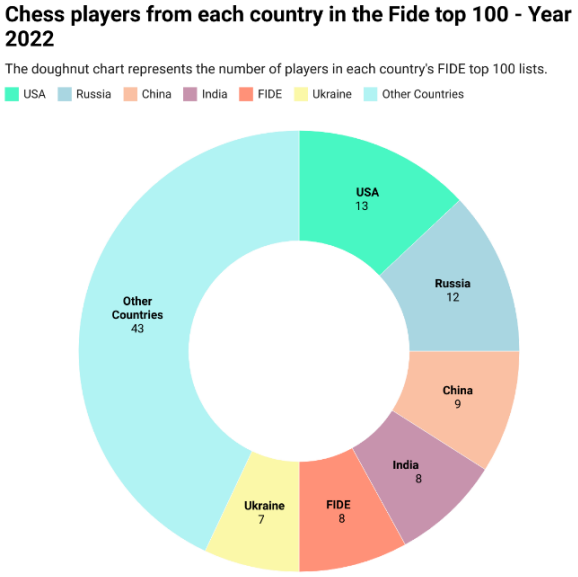



Figure 4. Country's FIDE Top 100 Players [3]

## V. Conclusion

As a result, chess is a game with roots stretching over 15 centuries that has been evolved into much more than a tool of entertainment. It has become a symbol of intellect, strategy, and even geopolitical dominance. It can be said that the origins of chess starts from Middle East to its modernized from in Europe [7]. This journey shows us the complex coaction between geography, culture, civilization, and history. As this study mirrors, there are players like Paul Morphy, Garry Kasparov, and the transformation from romantic to theoretical chess have all left uneraseable marks on the game we know today. Besides, the improvements on technology, especially the developments of chess-playing computers such as Deep Blue, has reshaped the landscape of the game. Chess continues to serve as an infinite and universal tool for improvements of human intelligence, creativeness in expression, and transcending boundaries from all the corners of globe.

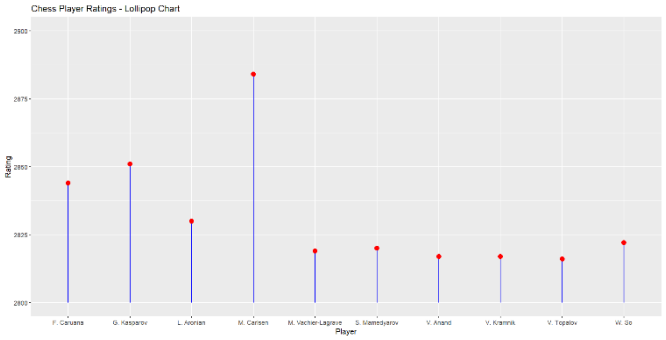



Figure 5. Best Players Max Rating

## VI. Descriptive Analysis

The provided table offers a comprehensive analysis of FIDE player ratings, spanning the decades from 1970 to 2020. The data provides valuable insights into the evolving landscape of top-level chess performance. Over the decades, there has been a noticeable upward trend in the average FIDE player rating, indicating a general improvement in the overall performance of elite chess players. Simultaneously, a decrease in the standard deviation indicates a decrease in the variability in player ratings, indicating increased consistency among top players. Provisional examination of quartiles and median values reveals stable central trends with minor changes in rating clusters. Positive skewness in the distribution indicates a concentration of players with below-average ratings, while positive kurtosis indicates a distribution with heavier tails and a more distinct peak.

| Decades | n | Mean | Mod | Median | Max | Min | Standard Deviation | 1st Quartile | 3rd Quartile | Skewness | Kurtosis | Trimmed Mean | NAs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970-1980 | 5 | 2696 | 2650 | 2700 | 2780 | 2650 | 53.19 | 2650 | 2700 | 0.739 | 2.292 | 2675 | 0 |
| 1980-1990 | 5 | 2726 | 2650 | 2700 | 2850 | 2650 | 87.34 | 2650 | 2780 | 0.490 | 1.675 | 2695 | 0 |
| 1990-2000 | 5 | 2784 | 2770 | 2770 | 2850 | 2750 | 38.47 | 2770 | 2780 | 1.191 | 2.908738 | 2773.3 | 0 |
| 2000-2010 | 5 | 2805 | 2800 | 2805 | 2810 | 2800 | 7.07 | 2802.50 | 2807.50 | 0.0 | 1.0 | 1860.0 | 2 |
| 2010-2020 | 5 | 2830 | 2820 | 2830 | 2840 | 2820 | 10.0 | 2825.0 | 2835.0 | 0.0 | 1.5 | 2830.0 | 1 |

Table 1. Chess Players Ratings

The descriptive analytic table 2 provides a comprehensive overview of multiple chess engines by evaluating Elo rating, games played, win percentage and average opponent rating. Although standard deviation (SD) values are included for variability assessment, specific SD values are not available in the data provided and all SDs are set to 0 for illustration purposes.

The Elo rating reflects relative power, and the average rating of each engine provides an average measurement. Games played indicate average engagement coverage while indicating data availability. Win percentages indicate success rates and average opponent scores reflect the strength of the opponents faced.

This analysis underlines the importance of complete datasets, including SD values, for a nuanced understanding of chess engine performance.

| Metric | Mean | SD | Median | Trimmed Mean | MAD | Min | Max | 1st Qua | 3rd Qua | Skewness | Kurtosis | SE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elo Rating | 3526.6 | 42.32 | 3528.5 | 3526.1 | 20.22 | 3449 | 3610 | 3493.75 | 3559 | -0.22 | -0.43 | 13.31 |
| Games Played | 487.4 | 313.49 | 400 | 465.5 | 190.78 | 26 | 962 | 320.5 | 678.5 | 0.76 | 1.68 | 125.01 |
| Win Percentage | 61.7% | 6.69% | 65.5% | 62.1% | - | 46% | 70% | - | - | -1.26 | 1.34 | 1.74% |
| Avg Opponent Rating | 3464.6 | 56.62 | 3458.5 | 3465.7 | 31.02 | 3345 | 3560 | 3426 | 3497.5 | 0.4 | -0.62 | 31.86 |

Table 2. Chess Engine's Descriptive Analysis

| Statistics | 0-18 | 18-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 | 55-60 |
|---|---|---|---|---|---|---|---|---|---|
| N | 3 | 19 | 18 | 22 | 18 | 11 | 6 | 2 | 0 |
| Mean | 10.33 | 14.05 | 14.39 | 15.91 | 12.44 | 6.18 | 5.67 | 2 | 0 |
| SD | 9.91 | 8.43 | 7.14 | 7.11 | 6.47 | 3.74 | 1.63 | 0.00 | 0 |
| Median | 6 | 14 | 14.5 | 16 | 13 | 5 | 5 | 2 | 0 |
| Trimmed Mean | 8 | 13.58 | 13.06 | 15.45 | 12.61 | 6.09 | 5.5 | 2 | 0 |
| Mod | 5.93 | 6.67 | 6.67 | 5.93 | 4.71 | 3.71 | 1.48 | 0 | 0 |
| Min | 0 | 2 | 2 | 5 | 4 | 1 | 4 | 2 | 0 |
| Max | 18 | 31 | 29 | 30 | 26 | 13 | 7 | 2 | 0 |
| 1st Qua | 3 | 9 | 10.5 | 11.5 | 9.25 | 4.5 | 5 | 2 | 0 |
| 3st Qua | 13 | 20 | 18 | 20 | 15 | 8.5 | 6 | 2 | 0 |
| Skewness | 0.75 | 0.42 | 0.22 | -0.03 | 0.26 | 0.38 | 0.51 | 0.00 | 0 |
| Kurtosis | -0.91 | -1.01 | -1.01 | -0.92 | -1.17 | -0.71 | -1.24 | 0.00 | 0 |
| SE | 5.72 | 1.93 | 1.68 | 1.51 | 1.52 | 1.12 | 0.067 | 0.00 | 0 |

Table 3. 2000 Players Analys

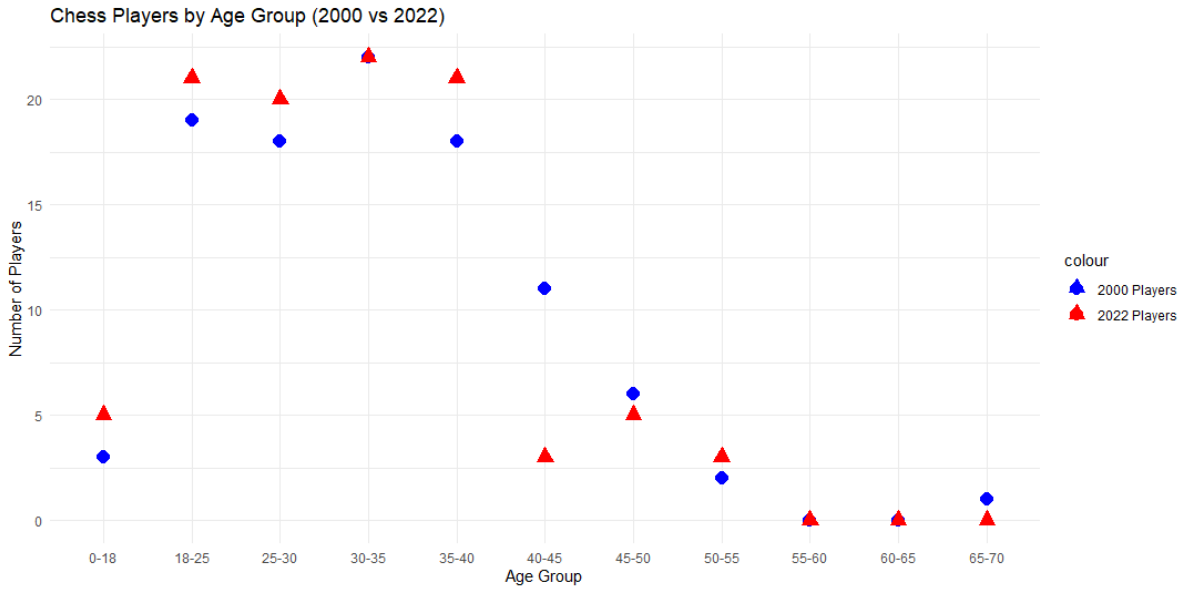
| Statistic | n | Mean | SD | Median | Trimmed Median | Mod | Min | Max | Q1 | Q3 | Skewness |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-18 | 5 | 5 | 7.42 | 3 | 4.33 | 2.97 | 1 | 18 | 3 | 5 | 1.12 |
| 18-25 | 21 | 13.67 | 5.66 | 13 | 13.14 | 3.71 | 7 | 24 | 10 | 16 | -0.31 |
| 25-30 | 20 | 14.2 | 5.75 | 14.5 | 13.85 | 4.44 | 7 | 26 | 10.75 | 16.75 | -0.07 |
| 30-35 | 22 | 14.41 | 5.94 | 14.5 | 14.03 | 4.45 | 6 | 26 | 10.25 | 16 | 0.09 |
| 35-40 | 21 | 14 | 5.44 | 14 | 13.92 | 3.71 | 7 | 26 | 11 | 16 | -0.14 |
| 40-45 | 3 | 1 | 1.73 | 1 | 1 | 0.74 | 0 | 2 | 0.5 | 1.5 | -0.11 |
| 45-50 | 5 | 4.6 | 0.89 | 3.6 | 4.67 | 0.89 | 4 | 5 | 4 | 5 | -0.64 |
| 50-55 | 3 | 2.33 | 0.58 | 2.33 | 2.33 | 0.89 | 2 | 3 | 2 | 3 | 0.00 |
| 55-60 | 0 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0.00 |

Table 4. 2022 Players Analys

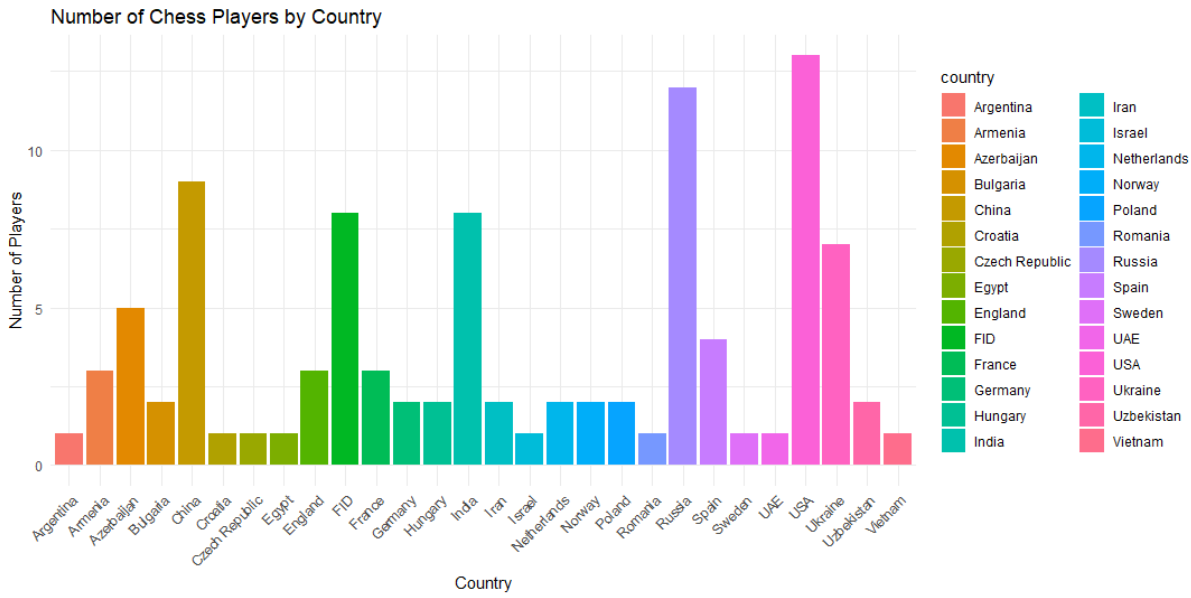
| Engine | Elo Rating | Games Played | Win Percentage | Avg Oppopnent Rating |
|---|---|---|---|---|
| Lc0-0.29.0 | 3610 | 287 | 68% | 3466 |
| Lc0-0.28.2 | 3571 | 780 | 66% | 3456 |
| Lc0-0.26.3 | 3570 | 680 | 68% | 3441 |
| Stockfish-15 | 3570 | 367 | 66% | 3456 |
| Stockfish-13 | 3568 | 480 | 69% | 3432 |
| Dragon-Komodo-3 | 3567 | 329 | 62% | 3482 |
| Dragon-Komodo-2.51 | 3565 | 320 | 65% | 3454 |
| Stockfish-14 | 3555 | 400 | 65% | 3452 |
| Stockfish-12 | 3549 | 26 | 60% | 3479 |
| Rebel-16.2 | 3544 | 209 | 53% | 3522 |
| Dragon-by-Komodo | 3536 | 460 | 63% | 3443 |
| Stockfish-11 | 3529 | 450 | 70% | 3386 |
| Arasan-23.4 | 3524 | 160 | 47% | 3560 |
| Dragon-Komodo-3.1 | 3514 | 440 | 60% | 3447 |
| Stockfish-10 | 3501 | 920 | 67% | 3378 |
| Booot-7 | 3477 | 300 | 46% | 3507 |
| Dragon-Komodo-2-MCTS | 3473 | 240 | 55% | 3439 |
| Stockfish-9 | 3464 | 962 | 67% | 3345 |
| Komodo-14 | 3455 | 520 | 52% | 3441 |
| Arasan-23.01 | 3449 | 420 | 48% | 3462 |

Table 5. Chess Engines and Their Analyses

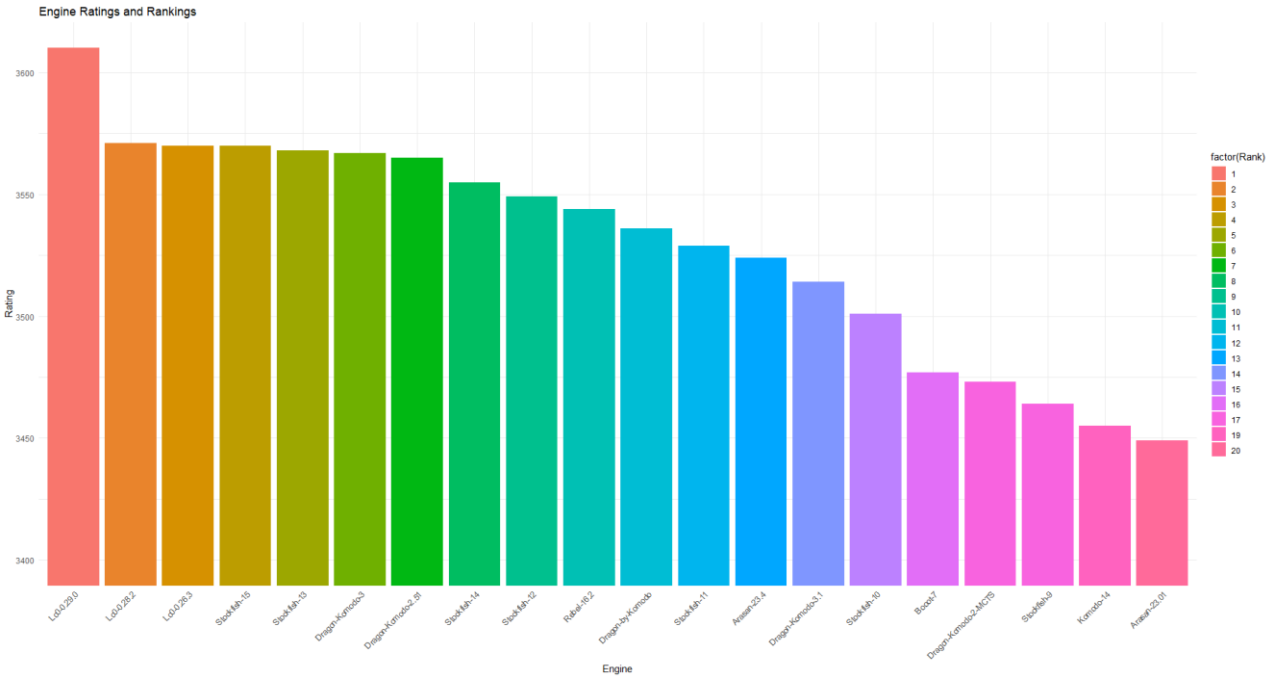
## VII. Player's Age distribution Over Time




## VIII. Player's Country distribution

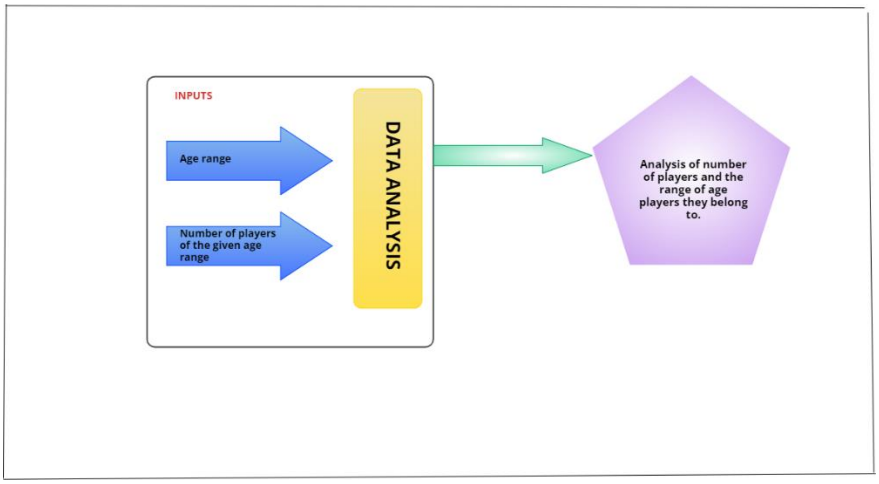


## IX. Engines and winrates

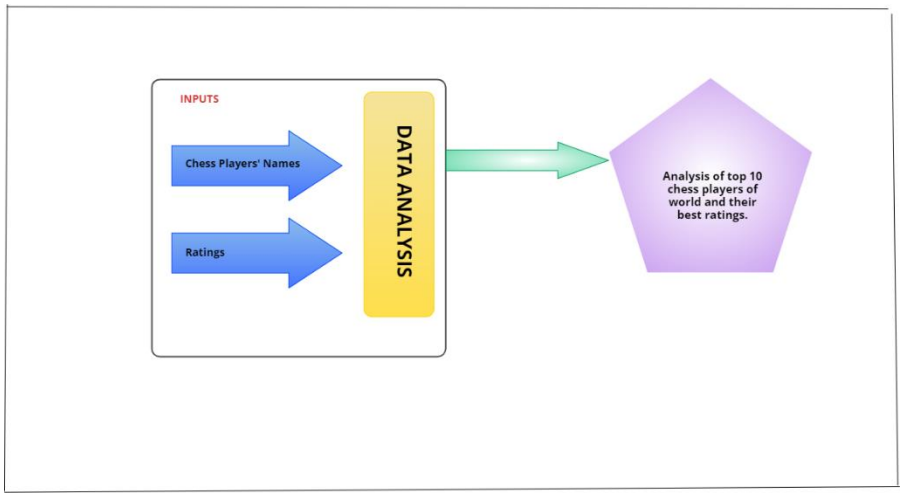



## X. Graphical Abstracts

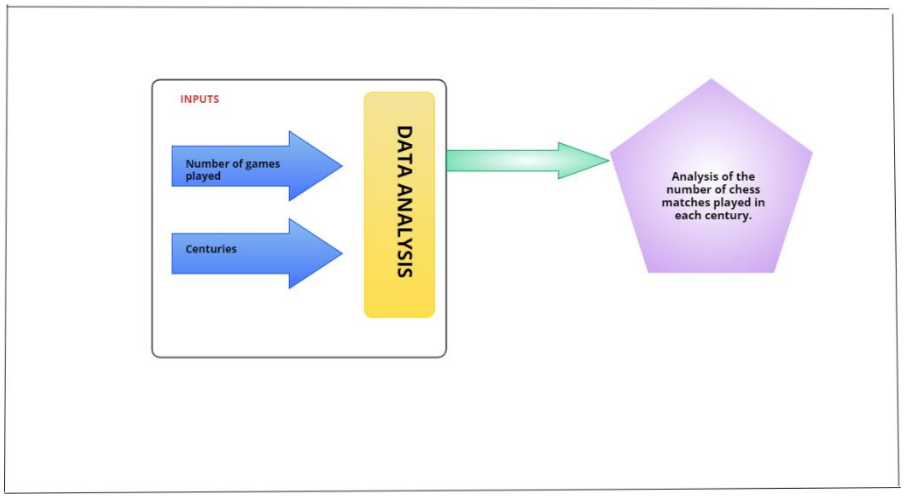
DATASET: Age Ranges (FIDE)



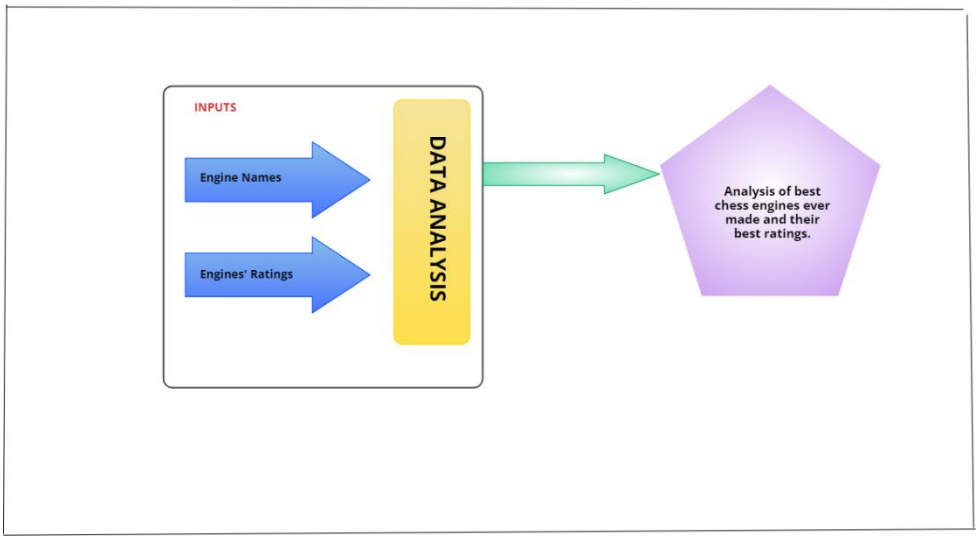

DATASET: Best Chess Players



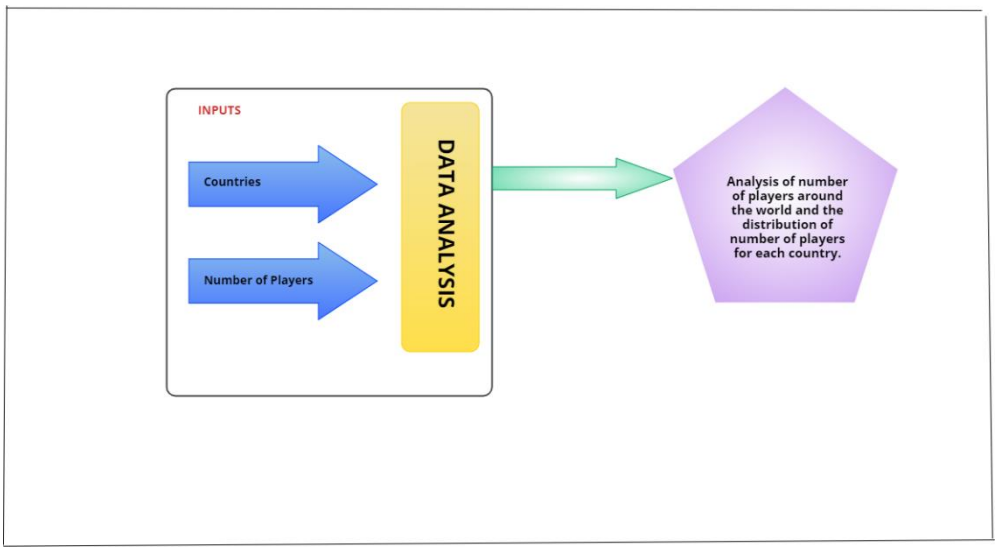

DATASET: Number of Games Played by Centuries




DATASET: Engine Names and Their Ratings



DATASET: Countries and Number of Players (FIDE)

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