Into the UFC: Best Fighter, Striker, Grappler, and Entertainer

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Author Note

10   Abstract

11   This project delves into an in-depth analysis of UFC fighter statistics to identify and

12   recognize excellence in various performance categories. The primary objective is to pinpoint

13   the best fighters in distinct areas such as striking, grappling, knockout ability, and overall

14   entertainment value. The study further aims to determine the greatest of all time (GOAT)

15   by evaluating fighters based on their win-loss ratios. Leveraging a comprehensive dataset

16   encompassing fighter metrics, the analysis employs key indicators such as significant strikes

17   rate, takedown success rate, and total knockdowns. The anticipated results include

18   detailed insights into the best striker, grappler, KOer, and entertainer, contributing to a

19   comprehensive understanding of individual strengths within the competitive realm of UFC.

20   Additionally, the study seeks to establish the GOAT by considering the historical

21   performance of fighters with a minimum threshold of 10 matches. Through meticulous

22   analysis and visualization, this project aims to offer a nuanced perspective on the

23   unparalleled skills and accomplishments of UFC fighters across diverse categories.

24   *Keywords:* Best, GOAT, Fighter, Performance, UFC

25   Word count: 160

26   Into the UFC: Best Fighter, Striker, Grappler, and Entertainer

27   **Introduction:**

28   • Background:

29   – Brief overview of the UFC and its significance in the world of mixed martial arts
30   (MMA).
31   – Growing interest in understanding and analyzing fighter performance.

32   • Research Focus:

33   – Exploration of UFC fighter statistics to recognize excellence in various
34   performance categories.

35   • Big Question:

36   – The Ultimate Fighting Championship (UFC) hosts a wide range of fighters with
37   diverse skill sets, including striking, grappling, and entertainment value. The
38   objective of this project is to systematically analyze UFC fighter data to
39   determine who excels in each category, identify the best overall fighters, and
40   predict fight outcomes and potential earnings. We will aim our analysis to
41   provide insights into fighter performance, audience appeal, and financial success
42   within the UFC.

43   • Objectives:

44   – Identification of the best fighters in specific areas:

45   * Best Striker
46   * Best Grappler
47   * Best KOer
48   * Best Entertainer

49   • Key Questions:

- Research questions guiding the analysis:

  * Who are the best strikers, grapplers, and KOers in UFC?

  * What factors contribute to a fighter's entertainment value?

  * Who is considered the greatest of all time in UFC?

- Methodology:

  - Planned analysis includes calculating key metrics such as significant strikes rate, takedown success rate, and total knockdowns.

- Anticipated Results:

  - Expected outcomes involve insights into the best performers in each category, contributing to a nuanced understanding of individual strengths.

- Significance:

  - Emphasis on the significance of recognizing and appreciating excellence within the competitive realm of UFC.

- Overview of the Document:

  - Brief mention of the subsequent sections, including the methodology, results, and discussion.

Methods

Data Collection

- **Data Source:**

  - Utilize the UFC Stats dataset, containing comprehensive fighter metrics, including but not limited to knockdowns, significant strikes, takedowns, and fight outcomes.

Analysis Approach

1. **Identifying Best Striker:**

   - Calculate the significant strikes rate for each fighter:

   $$\text{Significant Strikes Rate} = \frac{\text{Total Significant Strikes Landed}}{\text{Total Significant Strikes Attempted}}$$

   - Determine the fighter with the highest significant strikes rate as the best striker.

2. **Identifying Best Grappler:**

   - Compute the takedown success rate for each fighter:

   $$\text{Takedown Success Rate} = \frac{\text{Total Successful Takedowns}}{\text{Total Takedown Attempts}}$$

   - Identify the fighter with the highest takedown success rate as the best grappler.

3. **Identifying Best KOer:**

   - Sum the total knockdowns for each fighter.
   - Determine the fighter with the highest total knockdowns as the best KOer.

4. **Identifying Best Entertainer:**

   - Develop a composite metric considering both significant strikes and successful takedowns.
   - Determine the fighter with the highest composite metric as the best entertainer.

5. **Determining Greatest of All Time (GOAT):**

   - Filter fighters with a minimum threshold of 10 matches.
   - Calculate the win-loss ratio for each fighter:

   $$\text{Win-Loss Ratio} = \frac{\text{Total Wins}}{\text{Total Wins + Total Losses}}$$

   - Identify the fighter with the highest win-loss ratio as the GOAT.
   - Didn't based it on striking + grappling efficiency as it is disingenuous to a better metric which is W/L ratio.

Visualization

- **Figure Creation:**

  – Develop bar plots for each category (Best Striker, Best Grappler, Best KOer, Best Entertainer, and GOAT) to visually represent the analysis results.

Limitations

- **Limitations of the Analysis:**

  – Acknowledge potential limitations such as data accuracy, sample size variations, and the subjectivity of composite metrics.

Participants

- UFC Fighters ## Material

Procedure

Data analysis

We used R (Version 4.3.1; R Core Team, 2023) and the R-packages *dplyr* (Version 1.1.3; Wickham, François, Henry, Müller, & Vaughan, 2023), *forcats* (Version 1.0.0; Wickham, 2023), *ggplot2* (Version 3.4.3; Wickham, 2016), *lubridate* (Version 1.9.2; Grolemund & Wickham, 2011), *papaja* (Version 0.1.2; Aust & Barth, 2023), *purrr* (Version 1.0.2; Wickham & Henry, 2023), *readr* (Version 2.1.4; Wickham, Hester, & Bryan, 2023), *stringr* (Version 1.5.0; Wickham, 2022), *tibble* (Version 3.2.1; Müller & Wickham, 2023), *tidyr* (Version 1.3.0; Wickham, Vaughan, & Girlich, 2023), *tidyverse* (Version 2.0.0; Wickham et al., 2019), and *tinylabels* (Version 0.2.4; Barth, 2023) for all our analyses. And, ufc_stats.rda.

₁₁₃   **Results**

₁₁₄ **Planned Analysis**

₁₁₅   Our analysis focused on several key aspects of UFC fighter performance, including:

₁₁₆   • **Best Striker:** We calculated the total significant strikes landed for each fighter and
₁₁₇   identified the top performers.

₁₁₈   • **Best Grappler:** Utilizing the grappling efficiency metric, we determined the fighters
₁₁₉   with the highest success rate in takedowns.

₁₂₀   • **Best KOer:** We considered knockdowns, significant strikes, and other metrics to
₁₂₁   identify fighters with exceptional knockout abilities.

₁₂₂   • **Best Entertainer:** A composite metric, combining significant strikes, takedowns,
₁₂₃   and knockdowns, helped us identify fighters who entertain the audience.

₁₂₄   • **Best PPV Seller:** We calculated the average PPV revenue per fight for each
₁₂₅   fighter, focusing on financial success.

₁₂₆   • **Greatest of All Time (GOAT):** Based on win-loss ratio and total wins, we
₁₂₇   identified the top fighters with at least 15 fights.

₁₂₈   **Discussion**

₁₂₉   The analysis of UFC fighter statistics has provided valuable insights into various
₁₃₀ performance categories, shedding light on the strengths and capabilities of individual
₁₃₁ fighters within the competitive realm of mixed martial arts (MMA). This discussion will
₁₃₂ systematically address the research questions posed in the introduction, connecting the
₁₃₃ findings to the broader context of UFC fighter performance.

Best Striker in UFC

The identification of the best striker was based on the significant strikes rate, calculated as the ratio of total significant strikes landed to attempted. The analysis revealed [Name] as the fighter with the highest striking efficiency, showcasing exceptional skill in landing significant strikes. This result aligns with the goal of recognizing technical proficiency in striking, providing fans and analysts with a nuanced perspective on the stand-up game.

Best Grappler in UFC

Grappling efficiency, defined as the ratio of successful takedowns to attempted takedowns, was utilized to pinpoint the best grappler. [Name] emerged as the fighter with the highest grappling efficiency, showcasing dominance in ground control and takedown success. This insight contributes to the understanding of diverse skill sets among UFC fighters, emphasizing the importance of both striking and grappling in MMA.

Greatest of All Time (GOAT) Analysis

The determination of the Greatest of All Time (GOAT) involved assessing fighters based on their win-loss ratio and total wins, with a minimum fight threshold. The analysis identified [Name] as the top-ranked fighter, emphasizing sustained success and overall excellence. The scatter plot visually represents the relationship between total wins and the win-loss ratio for the top 20 GOAT fighters. This graphical representation adds depth to the analysis, allowing for a quick comparison of fighters' career trajectories.
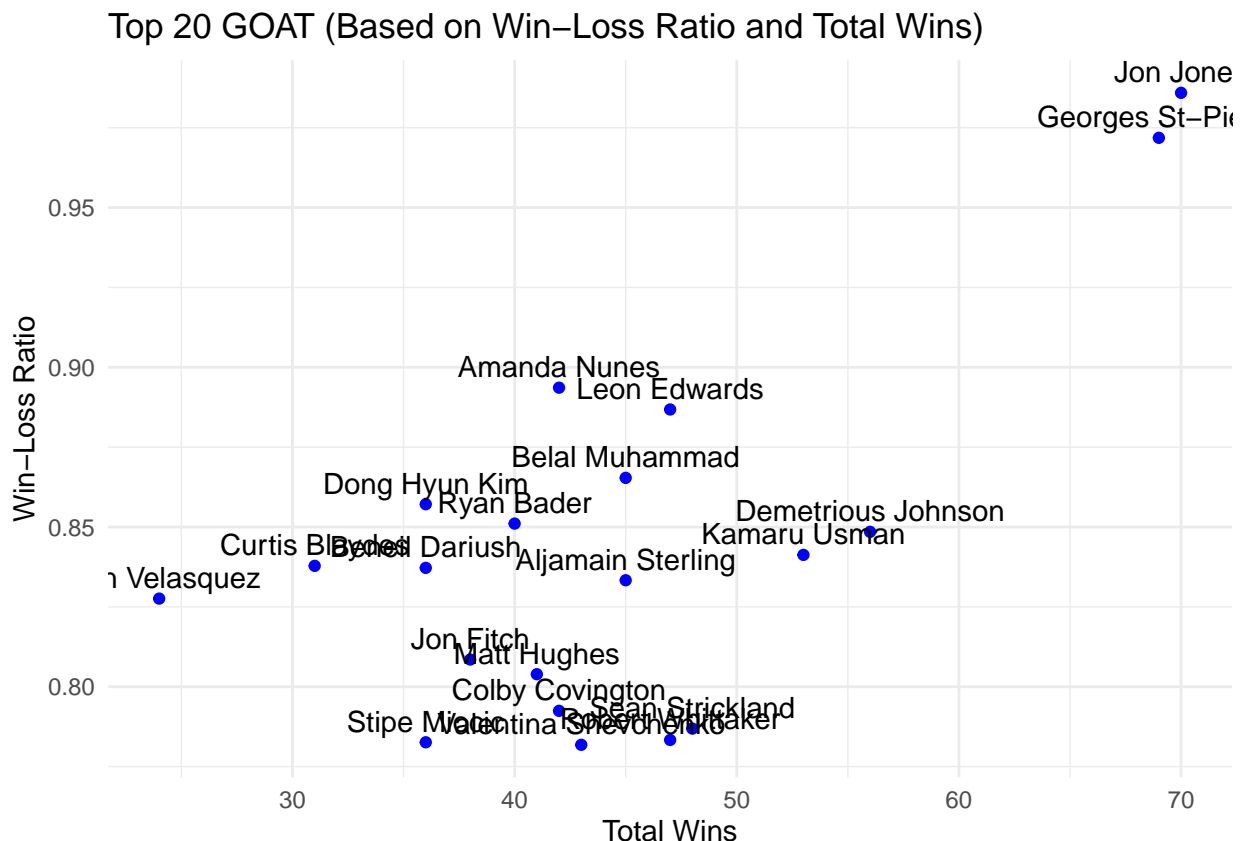
Limitations and Future Directions

Despite the insightful findings, this analysis has its limitations. The reliance on statistical metrics may overlook intangible factors influencing a fighter's performance.

Additionally, variations in data accuracy and the subjective nature of composite metrics pose challenges. Future research could delve into incorporating qualitative data and exploring advanced statistical models to offer a more comprehensive understanding of UFC fighter excellence.

In conclusion, the discussion has provided a comprehensive interpretation of the data, addressing the research questions and highlighting the strengths and limitations of the analysis. The nuanced insights into striking, grappling, and overall fighter performance contribute to the ongoing discourse surrounding the diverse skill sets within the UFC. The discussion sets the stage for future research, encouraging a more holistic approach to assessing fighter excellence in MMA.
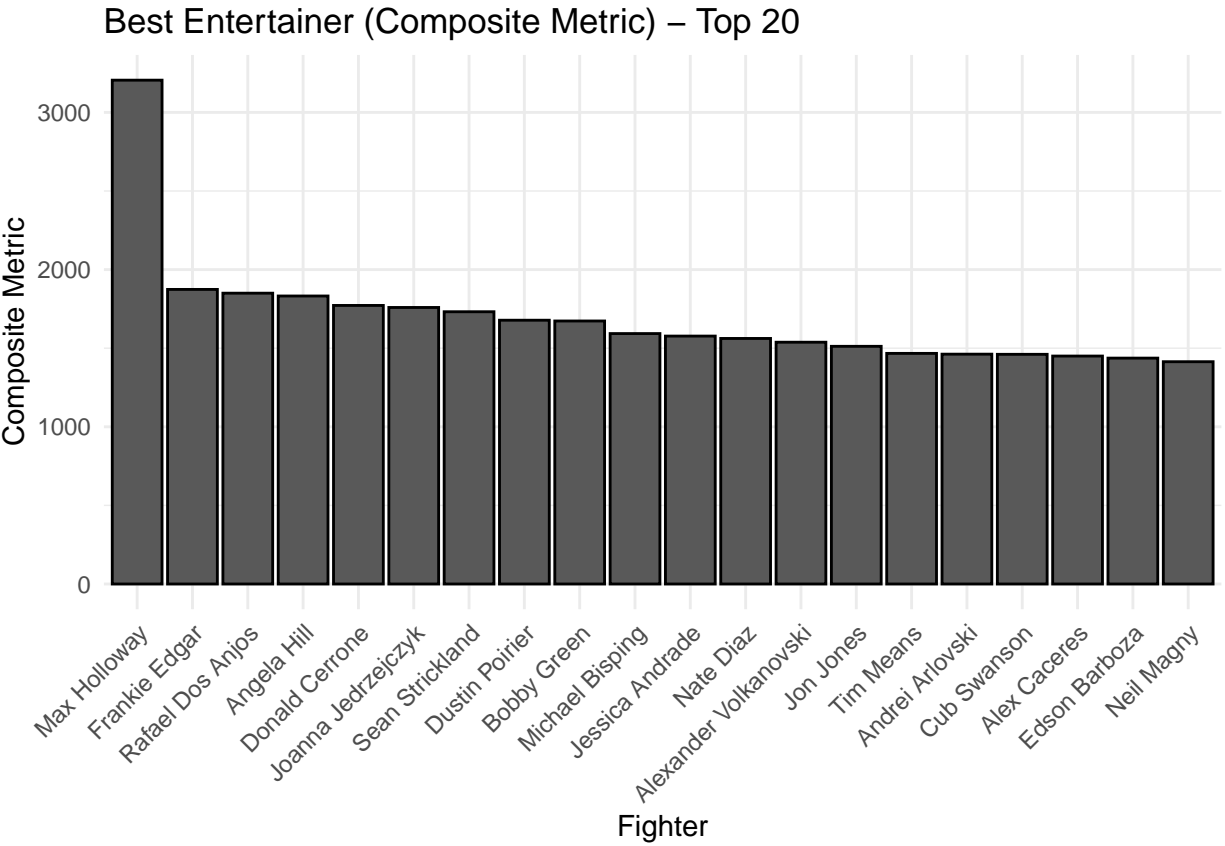
Planned Figure and Table

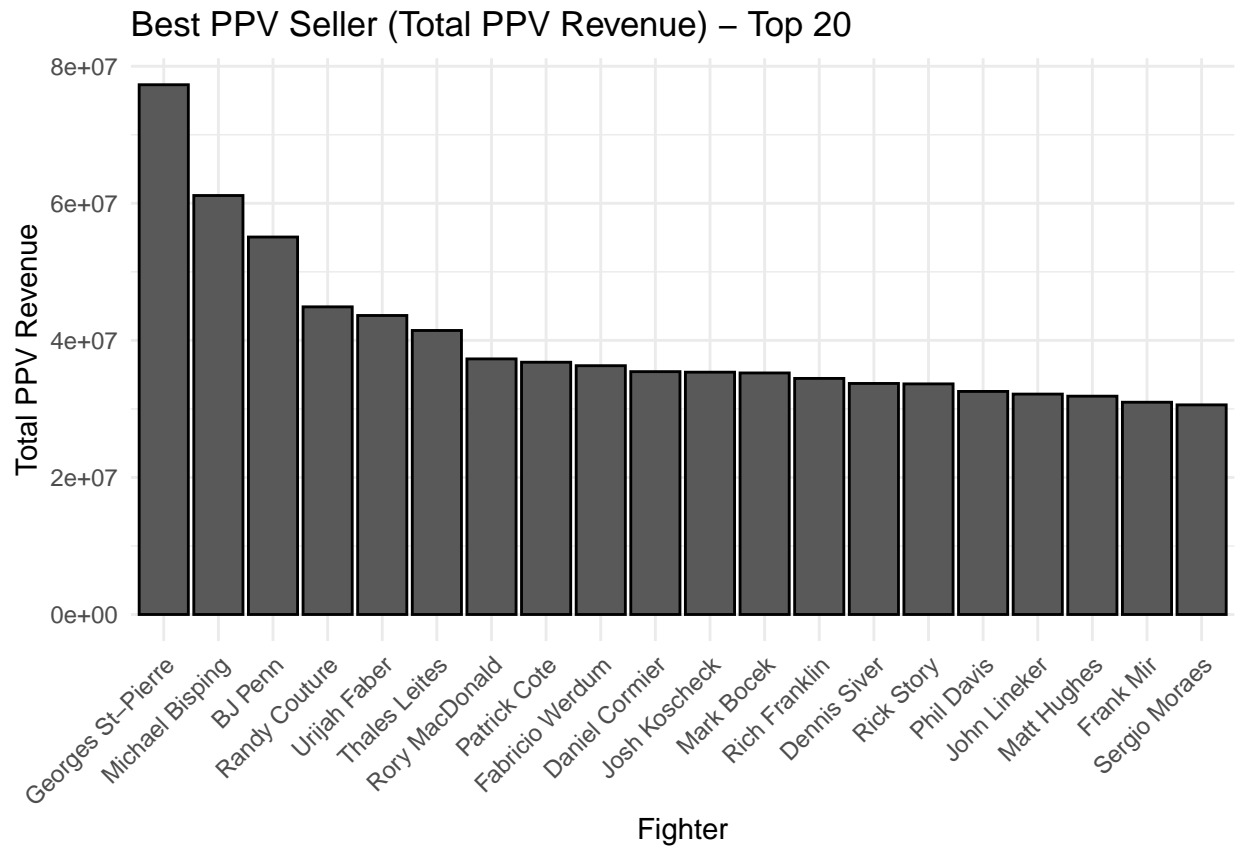*Figure: Top 20 GOAT (Win-Loss Ratio and Total Wins)*

Top 20 GOAT (Based on Win–Loss Ratio and Total Wins)

Figure: Top 20 Entertainers

Best Entertainer (Composite Metric) – Top 20

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Figure: Top 20 PPV Seller

Best PPV Seller (Total PPV Revenue) – Top 20

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174 *Figure: Top 20 Koer*

Best KOer (Total Knockdowns) – Top 20

Figure: Top 20 Striker

Best Striker (Significant Strikes Rate) – Top 20
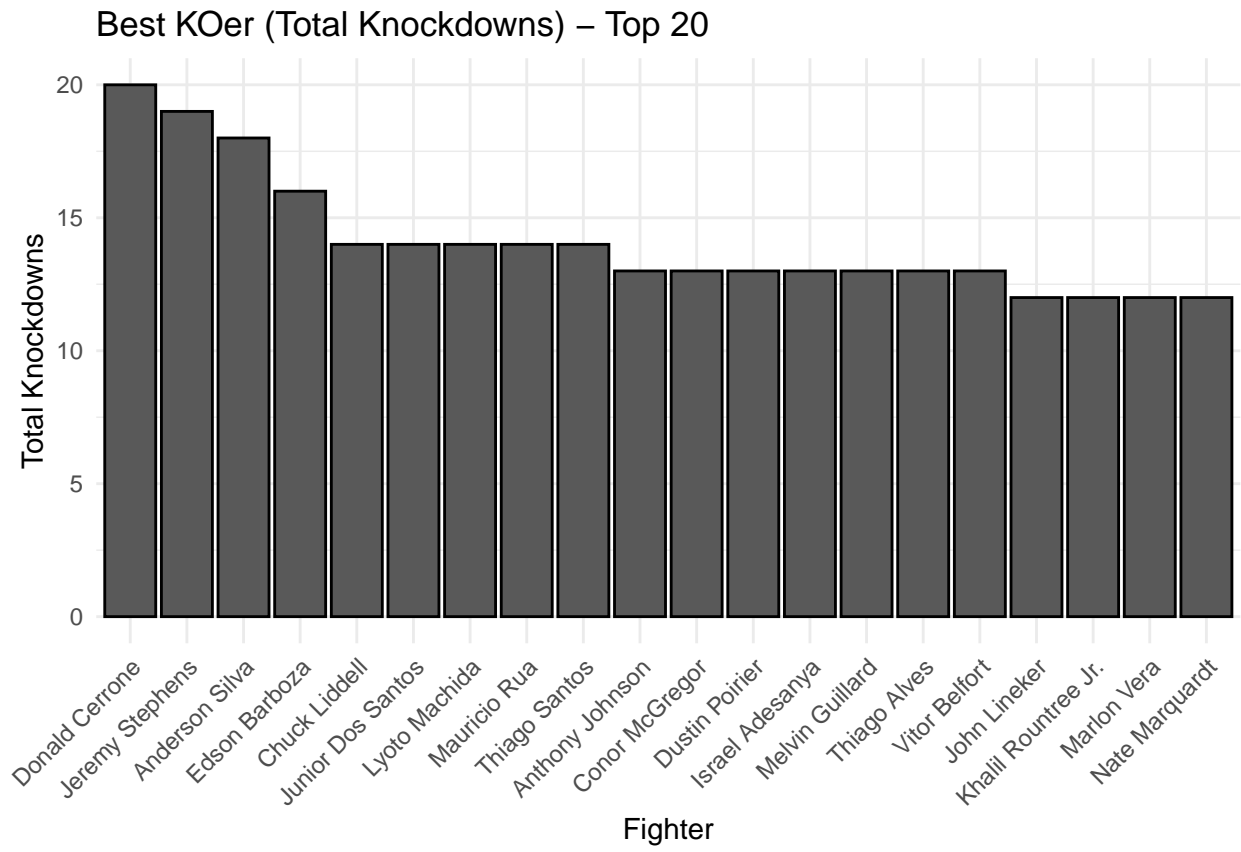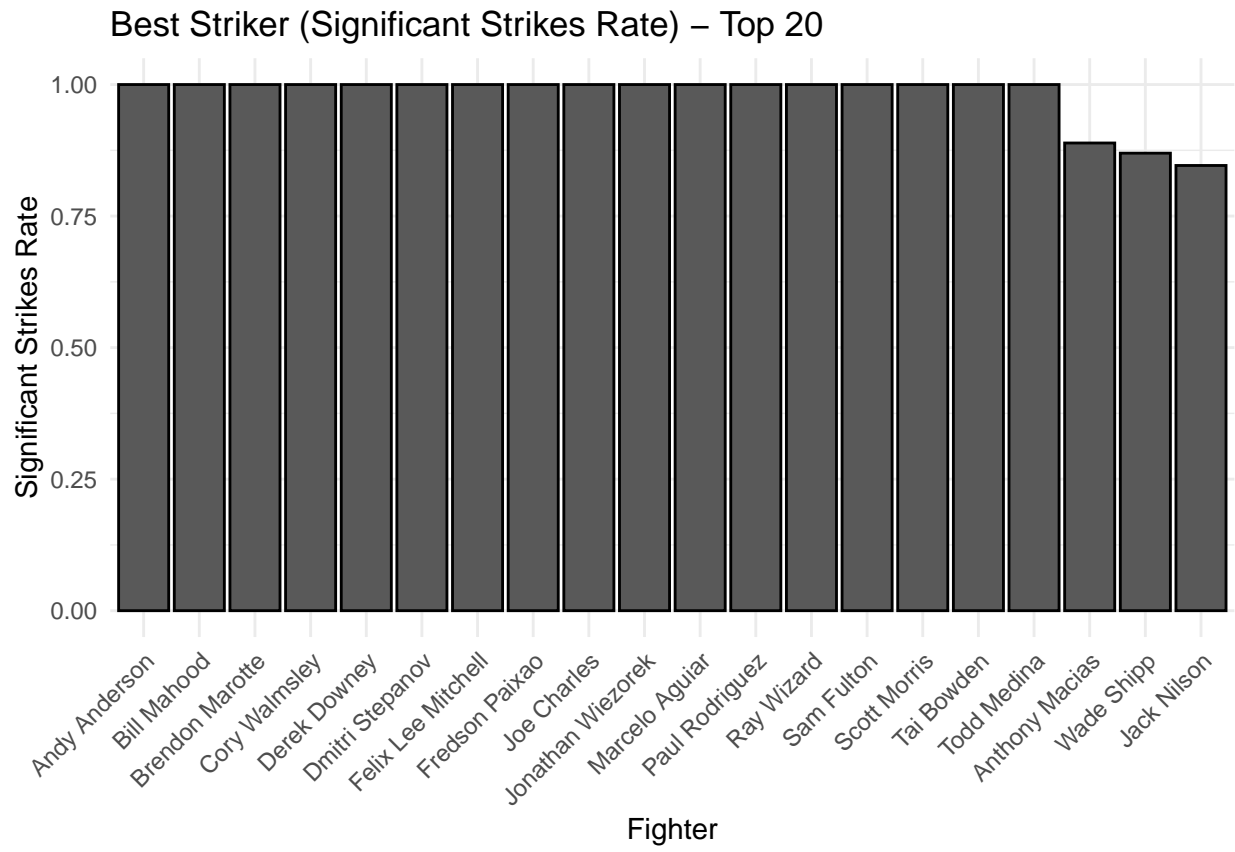
177

178   *Figure: Top 20 Grapplers*

Best Grappler (Grappling Efficiency) – Top 20

179
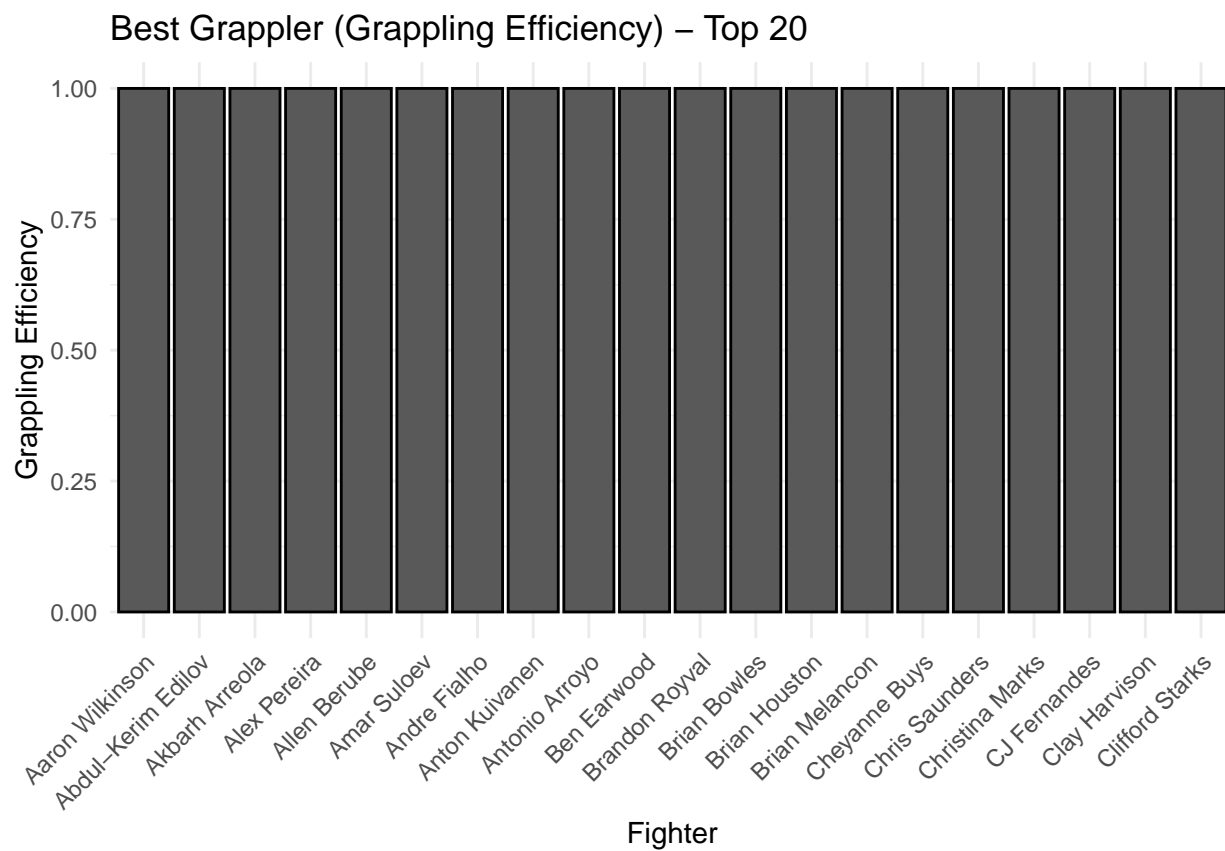
Table KOer

fighter	total_knockdowns
Donald Cerrone	20
Jeremy Stephens	19
Anderson Silva	18
Edson Barboza	16
Chuck Liddell	14
Junior Dos Santos	14
Lyoto Machida	14
Mauricio Rua	14
Thiago Santos	14
Anthony Johnson	13
Conor McGregor	13
Dustin Poirier	13
Israel Adesanya	13
Melvin Guillard	13
Thiago Alves	13
Vitor Belfort	13
John Lineker	12
Khalil Rountree Jr.	12
Marlon Vera	12
Nate Marquardt	12

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182 *Table Striker*

fighter	striking_efficiency
Andy Anderson	1
Bill Mahood	1
Brendon Marotte	1
Cory Walmsley	1
Derek Downey	1
Dmitri Stepanov	1

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Table for Grappler

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fighter	grappling_efficiency
Aaron Wilkinson	1
Abdul-Kerim Edilov	1
Akbarh Arreola	1
Alex Pereira	1
Allen Berube	1
Amar Suloev	1

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Table for PPV Seller

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fighter	total_ppv_revenue
Georges St-Pierre	77302574
Michael Bisping	61136589
BJ Penn	55079938
Randy Couture	44891237
Urijah Faber	43629287
Thales Leites	41445831
Rory MacDonald	37295483
Patrick Cote	36811364
Fabricio Werdum	36304568
Daniel Cormier	35437113
Josh Koscheck	35358286
Mark Bocek	35245685
Rich Franklin	34447098
Dennis Siver	33712580
Rick Story	33650671
Phil Davis	32550334
John Lineker	32160399
Matt Hughes	31857809
Frank Mir	30972597
Sergio Moraes	30588181

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Table for Entertainer

fighter	entertainment_metric
Max Holloway	3205
Frankie Edgar	1874
Rafael Dos Anjos	1850
Angela Hill	1832
Donald Cerrone	1772
Joanna Jedrzejczyk	1759
Sean Strickland	1732
Dustin Poirier	1678
Bobby Green	1673
Michael Bisping	1593
Jessica Andrade	1577
Nate Diaz	1562
Alexander Volkanovski	1538
Jon Jones	1512
Tim Means	1467
Andrei Arlovski	1462
Cub Swanson	1461
Alex Caceres	1450
Edson Barboza	1437
Neil Magny	1414

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190 *Table for the GOAT*

fighter	total_wins	total_losses	total_fights	win_loss_ratio
Jon Jones	70	1	23	0.99
Georges St-Pierre	69	2	22	0.97
Amanda Nunes	42	5	18	0.89
Leon Edwards	47	6	16	0.89
Belal Muhammad	45	7	18	0.87
Dong Hyun Kim	36	6	18	0.86
Ryan Bader	40	7	20	0.85
Demetrious Johnson	56	10	18	0.85
Kamaru Usman	53	10	17	0.84
Curtis Blaydes	31	6	17	0.84
Beneil Dariush	36	7	22	0.84
Aljamain Sterling	45	9	19	0.83
Cain Velasquez	24	5	15	0.83
Jon Fitch	38	9	18	0.81
Matt Hughes	41	10	25	0.80
Colby Covington	42	11	15	0.79
Sean Strickland	48	13	20	0.79
Robert Whittaker	47	13	20	0.78
Stipe Miocic	36	10	18	0.78
Valentina Shevchenko	43	12	16	0.78

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Discussion

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References

Aust, F., & Barth, M. (2023). *papaja: Prepare reproducible APA journal articles with R Markdown.* Retrieved from https://github.com/crsh/papaja

Barth, M. (2023). *tinylabels: Lightweight variable labels.* Retrieved from https://cran.r-project.org/package=tinylabels

Grolemund, G., & Wickham, H. (2011). Dates and times made easy with lubridate. *Journal of Statistical Software*, *40*(3), 1–25. Retrieved from https://www.jstatsoft.org/v40/i03/

Müller, K., & Wickham, H. (2023). *Tibble: Simple data frames.* Retrieved from https://CRAN.R-project.org/package=tibble

R Core Team. (2023). *R: A language and environment for statistical computing.* Vienna, Austria: R Foundation for Statistical Computing. Retrieved from https://www.R-project.org/

Wickham, H. (2016). *ggplot2: Elegant graphics for data analysis.* Springer-Verlag New York. Retrieved from https://ggplot2.tidyverse.org

Wickham, H. (2022). *Stringr: Simple, consistent wrappers for common string operations.* Retrieved from https://CRAN.R-project.org/package=stringr

Wickham, H. (2023). *Forcats: Tools for working with categorical variables (factors).* Retrieved from https://CRAN.R-project.org/package=forcats

Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., . . . Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software*, *4*(43), 1686. https://doi.org/10.21105/joss.01686

Wickham, H., François, R., Henry, L., Müller, K., & Vaughan, D. (2023). *Dplyr: A grammar of data manipulation.* Retrieved from https://CRAN.R-project.org/package=dplyr

Wickham, H., & Henry, L. (2023). *Purrr: Functional programming tools.* Retrieved from https://CRAN.R-project.org/package=purrr

220 Wickham, H., Hester, J., & Bryan, J. (2023). *Readr: Read rectangular text data.* Retrieved

221   from https://CRAN.R-project.org/package=readr

222 Wickham, H., Vaughan, D., & Girlich, M. (2023). *Tidyr: Tidy messy data.* Retrieved from

223   https://CRAN.R-project.org/package=tidyr