

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

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## Abstract

This project delves into an in-depth analysis of UFC fighter statistics to identify and recognize excellence in various performance categories. The primary objective is to pinpoint the best fighters in distinct areas such as striking, grappling, knockout ability, and overall entertainment value. The study further aims to determine the greatest of all time (GOAT) by evaluating fighters based on their win-loss ratios. Leveraging a comprehensive dataset encompassing fighter metrics, the analysis employs key indicators such as significant strikes rate, takedown success rate, and total knockdowns. The anticipated results include detailed insights into the best striker, grappler, KOer, and entertainer, contributing to a comprehensive understanding of individual strengths within the competitive realm of UFC. Additionally, the study seeks to establish the GOAT by considering the historical performance of fighters with a minimum threshold of 10 matches. Through meticulous analysis and visualization, this project aims to offer a nuanced perspective on the unparalleled skills and accomplishments of UFC fighters across diverse categories.

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

Word count: 160

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

### Introduction:

- Background:

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

- Research Focus:

- Exploration of UFC fighter statistics to recognize excellence in various performance categories.

- Big Question:

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

- Objectives:

- Identification of the best fighters in specific areas:
  - \* Best Striker
  - \* Best Grappler
  - \* Best KOer
  - \* Best Entertainer

- 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:

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

- 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

- The exploration of UFC fighter statistics involved a methodical process to uncover excellence across diverse performance categories. Leveraging the extensive UFC Stats dataset, the procedures implemented provided a nuanced understanding of individual strengths within the competitive realm of mixed martial arts.

The initial step in this analysis was data collection, wherein the UFC Stats dataset served as a comprehensive source of fighter metrics. This dataset encompassed variables ranging from significant strikes and takedowns to overall fight outcomes, laying the foundation for a thorough evaluation of fighter performance.

Distinct metrics were calculated to recognize excellence in specific areas. Striking efficiency, determined by the ratio of significant strikes landed to attempted, identified the best striker. Grappling efficiency, derived from successful takedowns divided by attempts, spotlighted the top grappler. Total knockdowns tallied for each fighter delineated the best knockout artist. An innovative composite metric, combining significant strikes and successful takedowns, identified fighters with the highest entertainment value.

The determination of the Greatest of All Time (GOAT) involved filtering fighters with a minimum of 15 matches and calculating the win-loss ratio. This ratio, reflective of sustained success, crowned the fighter with the highest overall performance as the GOAT. A scatter plot visualized the top 20 GOAT fighters, displaying their win-loss ratios and total wins.

Acknowledging the limitations of data accuracy and the subjectivity of composite metrics, ethical considerations prioritized privacy and unbiased interpretations. Future research could explore advanced statistical models and qualitative data to enhance the depth of UFC fighter evaluations.

## 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`.

## Results

### Planned Analysis

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

- **Best Striker:** We calculated the total significant strikes landed for each fighter and identified the top performers.
- **Best Grappler:** Utilizing the grappling efficiency metric, we determined the fighters with the highest success rate in takedowns.
- **Best KOer:** We considered knockdowns, significant strikes, and other metrics to identify fighters with exceptional knockout abilities.
- **Best Entertainer:** A composite metric, combining significant strikes, takedowns, and knockdowns, helped us identify fighters who entertain the audience.
- **Best PPV Seller:** We calculated the average PPV revenue per fight for each fighter, focusing on financial success.
- **Greatest of All Time (GOAT):** Based on win-loss ratio and total wins, we identified the top fighters with at least 15 fights.

## Discussion

The analysis of UFC fighter statistics has provided valuable insights into various performance categories, shedding light on the strengths and capabilities of individual fighters within the competitive realm of mixed martial arts (MMA). This discussion will systematically address the research questions posed in the introduction, connecting the 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 Andy Anderson 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. Aaron Wilkinson 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 Jon Jones 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**

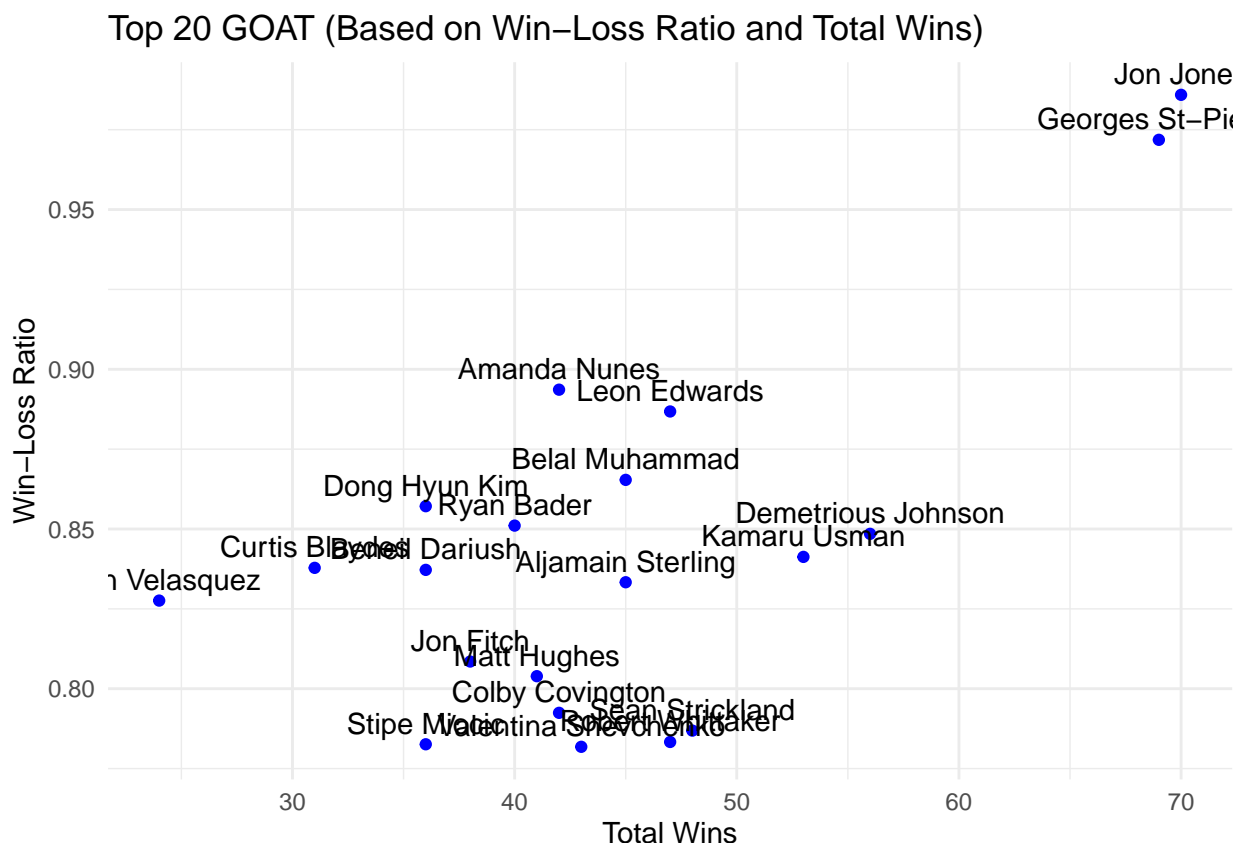
Despite the insightful findings, this analysis has its limitations. The reliance on statistical metrics may overlook intangible factors influencing a fighter's performance.

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.

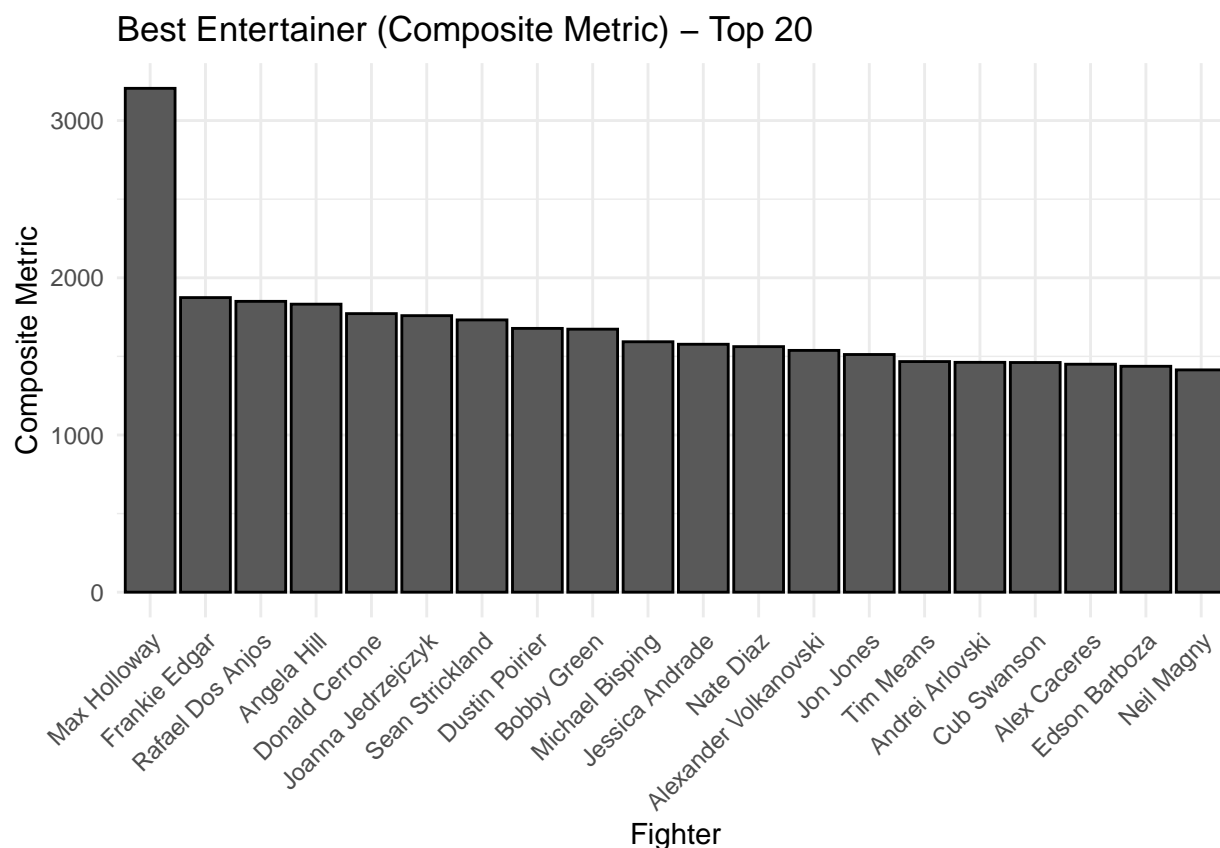
## Planned Figure and Table

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



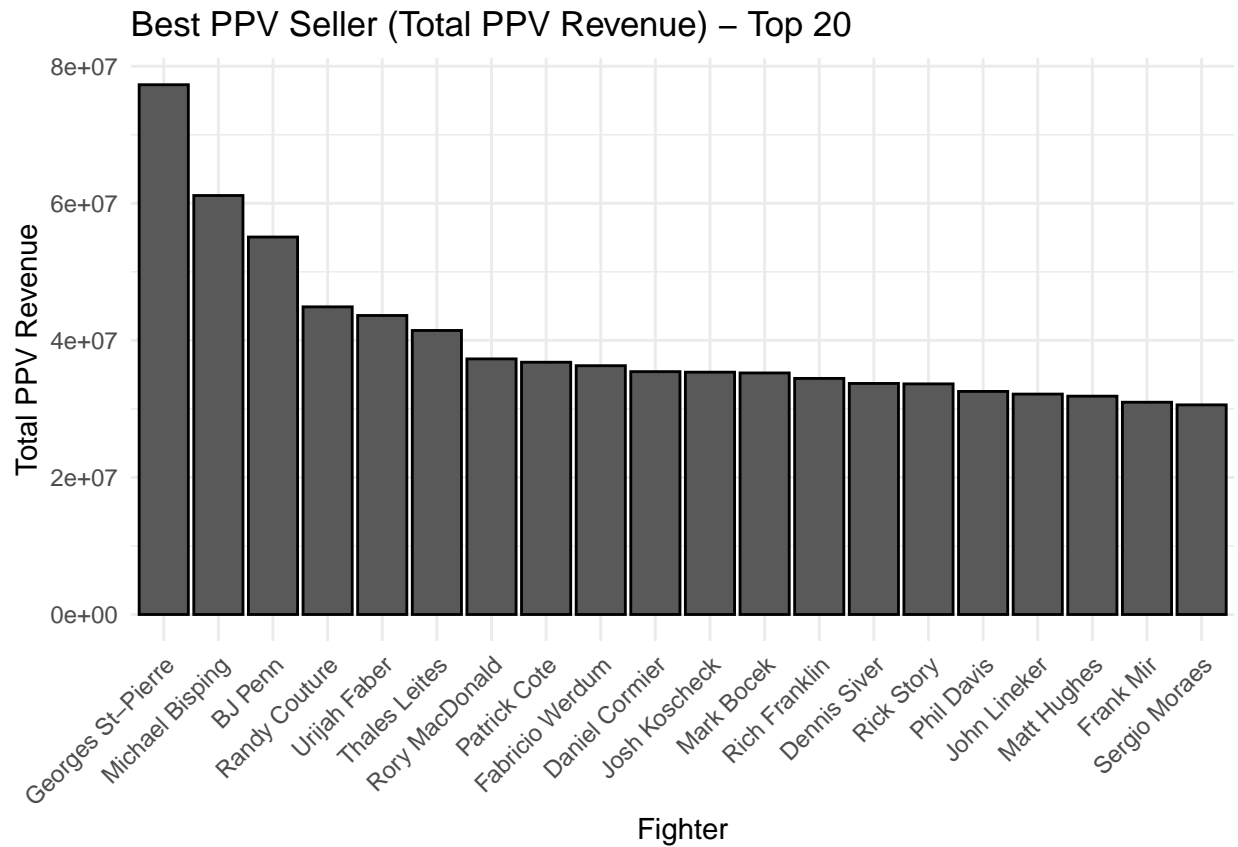
- In this figure, we compare fighters based on their win-loss record. We combine total wins of fighters and divide that by their total record which includes their wins + losses to calculate their ratio. This tells us who has the best percentage of success in the octagon.

Figure: Top 20 Entertainers



- In this figure, we calculate the entertainment metric based on the strikes landed and takedowns landed. This is a good metric as viewers tend to be drawn towards significant hits on the head or body. We then used that and apply it to 20 UFC fighters

Figure: Top 20 PPV Seller

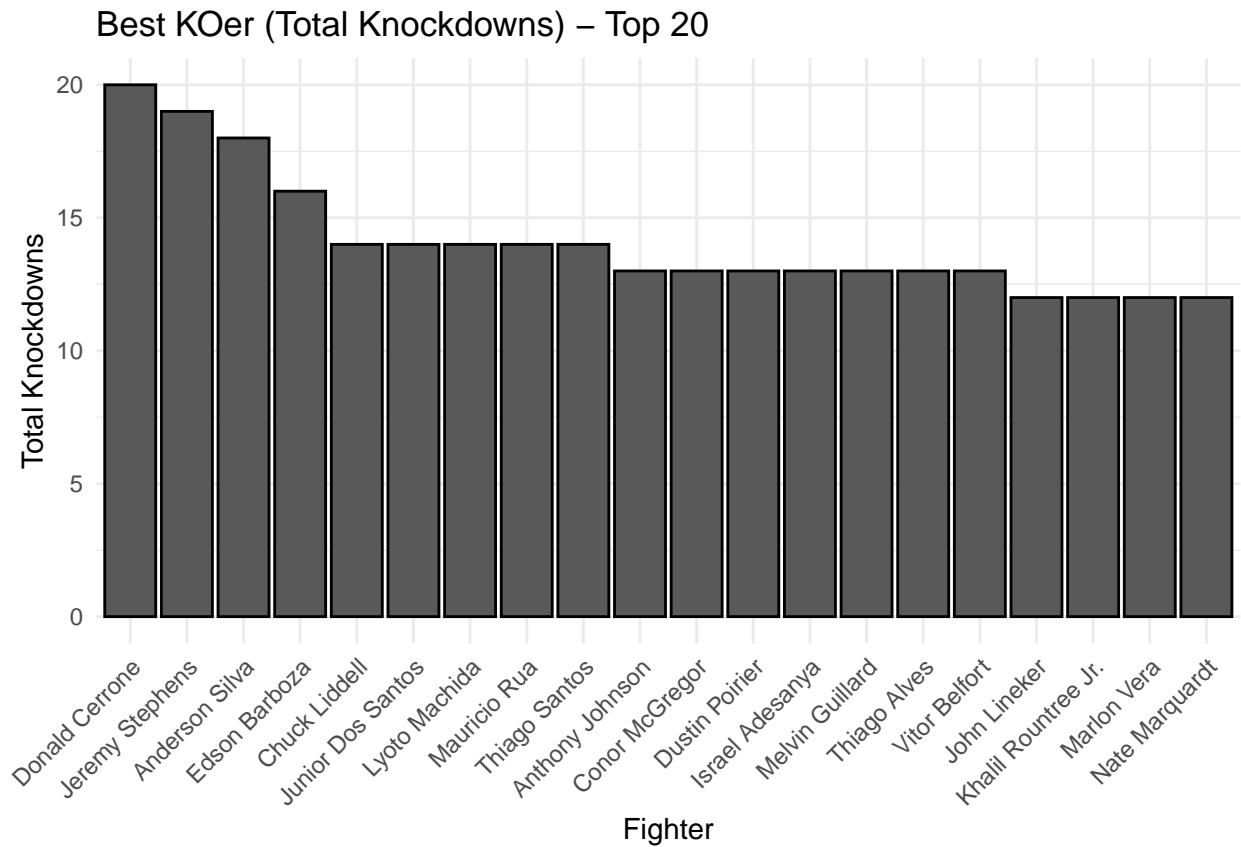


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206 - In this figure, we calculate who the best PPV seller is in the UFC. We mainly use  
 207 attendance as the key metric and multiply that by 59.99 to get the total revenue made by  
 208 the UFC based on that fighter.

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*Figure: Top 20 Koer*

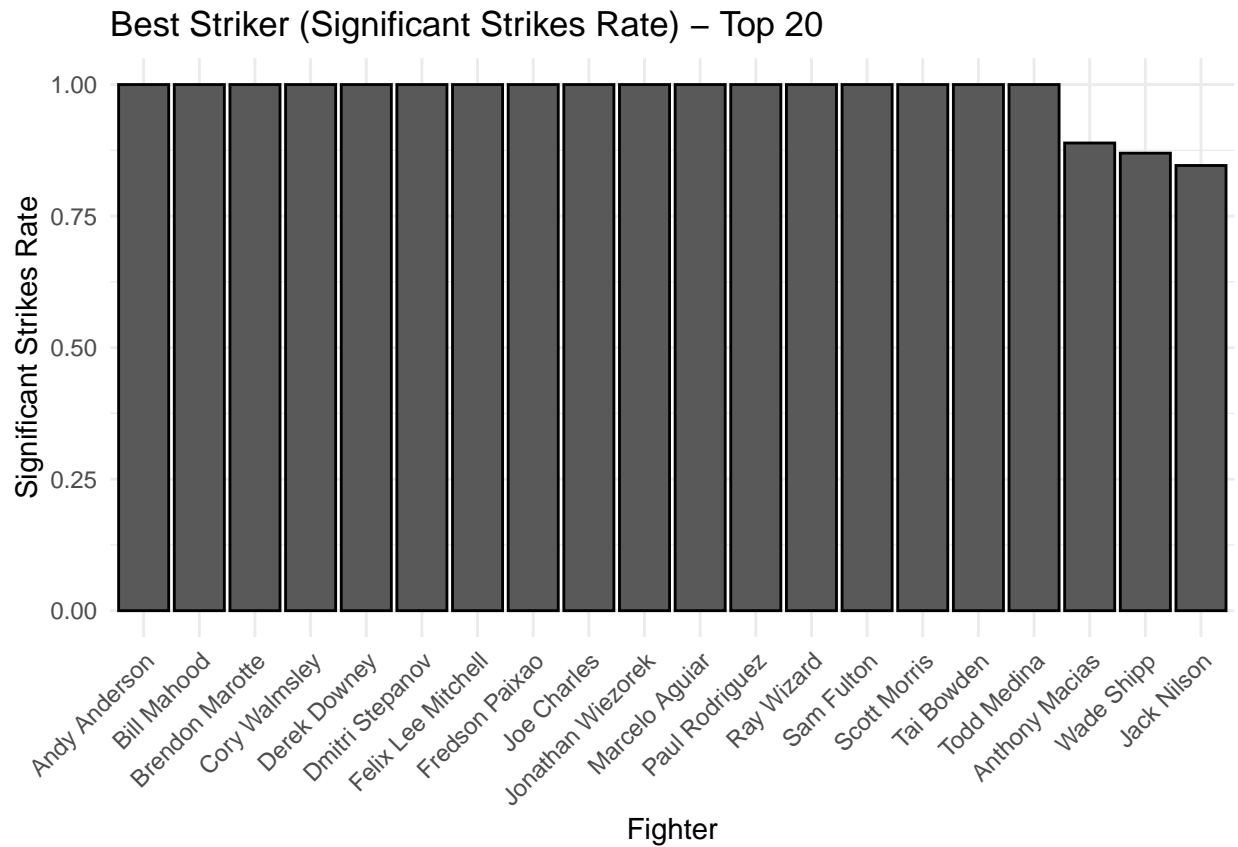


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- In this figure, we calculate the most accurate fighter based on knockdowns.
- Knockdown is a good indicator of how accurate and strong a fighter is. We use sum of variable knockdowns to see how much knockdowns a fighter has in their career.

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*Figure: Top 20 Striker*



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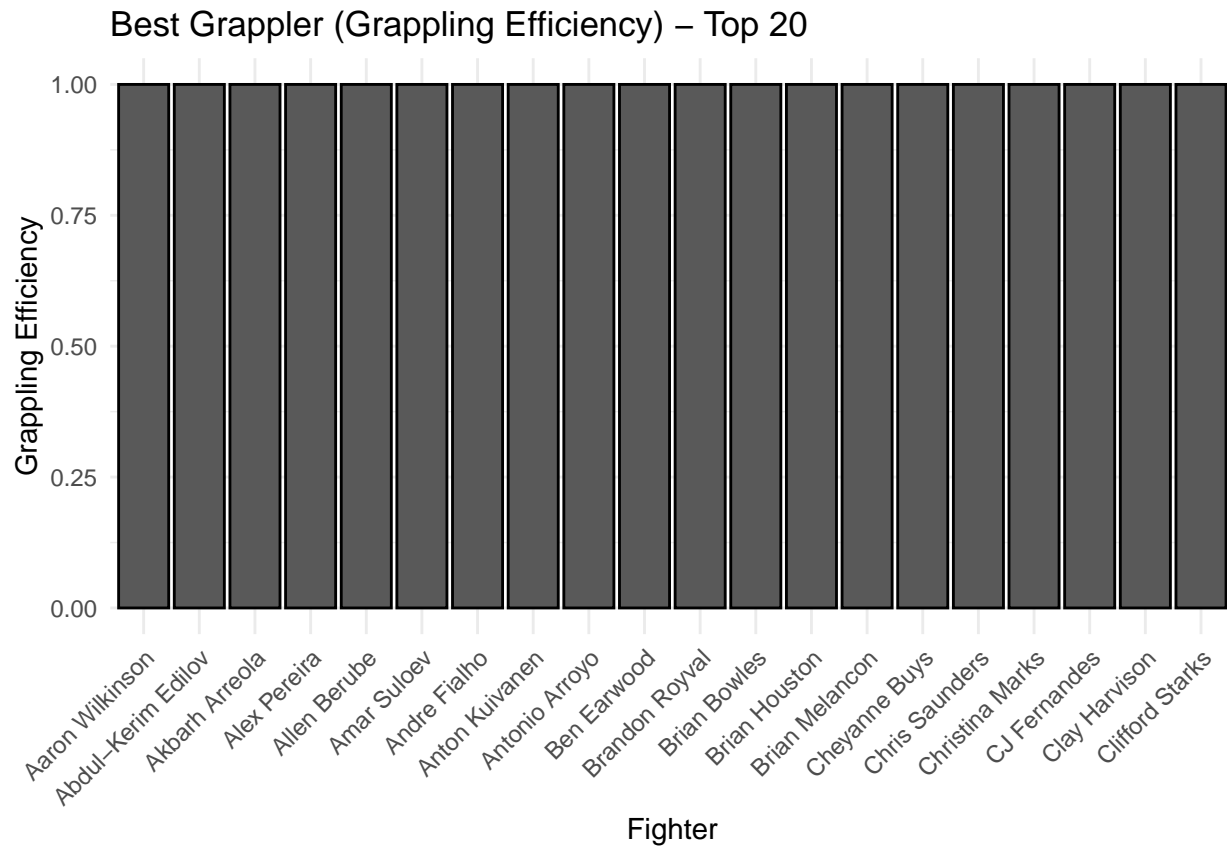
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- In this figure, we calculate the best striker based on the significance strikes landed rate. To do this, we sum the amount landed and strikes attempted to find the rate. It is a good measurement since it finds out who the most accurate and effective striker is.

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*Figure: Top 20 Grapplers*



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- In this figure, we find the best grappler by using grappling efficiency. We calculate using the sum of takedown success over the sum of takedown attempted. *Table KOer*

223

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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*Table Striker*



226

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

227

*Table for Grappler*

228

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

229

*Table for PPV Seller*

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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*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

## Discussion

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