

# BAIS:3200

## Final Project Report

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### Introduction

The Ultimate Fighting Championship (UFC) is the preeminent mixed martial arts (MMA) organization with many fans and enthusiasts. The data around UFC and its participants is essential for sports analysts, fans, and sports bettors to have access to the statistics of each combatant to predict potential match outcomes and comprehend the fighters' strengths and limitations. However, much of today's data only covers the top fifteen fighters of each weight division in the organization. Due to the limited coverage of combatants, many enthusiasts will never hear of fighters outside of the top fifteen, particularly those who are not too familiar with the sport. In addition, trainers and instructors could use this information to devise strategies for their fighters. With this, fighters' knowledge of their statistics and performance can inform their training and approach for upcoming bouts. Throughout this project, we expect to democratize the access to fighters' statistics in a centralized database, with the goal of bringing more eyes to the sport of MMA and allowing UFC enthusiasts to become true fans of the sport.

### Data

This project uses data gathered from <http://www.ufcstats.com/event-details/1ccff7f0cfd85eb> and <https://www.ufc.com/rankings>. The original data from ufcstats.com contains data from events dating back to 1994 (UFC 2: No Way Out). Since our database will focus on active fighters (fighters who are currently under a UFC contract), we decided to reduce the size of the data by selecting only the last 50 events, which date back to early 2022 (which is why throughout the report we will be referring to our queries and findings as "over/during the last year"). By doing so, we are preventing from collecting a lot of data from inactive fighters that would not be of much use to achieve our goal. The data that we gathered from ufcstats.com was based off selective rankings that the fighter held as well as the different classes of the fighter, unique titles that the fighter holds, information on the fighter, and strategies within the fight involving how the fight ended, such as if it was a technical knockout, knockout, submission, or if the fight ended in some other unique manner. We have marked down the data into different categories based on recent fight results and how the match between both fighters ended. Data was also recorded on the fight itself by looking at if the fight was a main event, event name and type, and if the fight was awarded a prize or not. The data that was selected from ufc.com was based much more on the fighters themselves and went into attributes like height, weight, class, record, and division. Table 1 displays a description of the data.

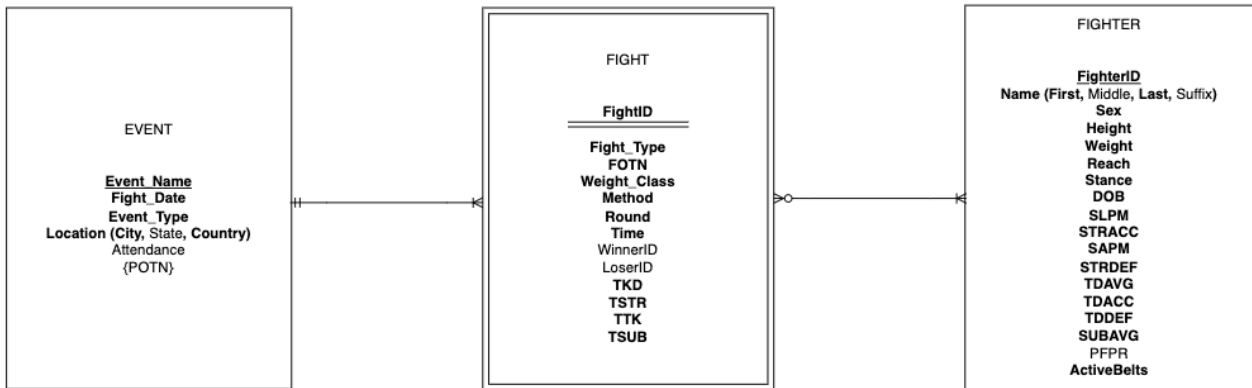
*Table 1 Data Dictionary*

Attribute	Type	Description
Event_Name	Text	Unique title for each event
Fight_Date	Text	Date of the event
Event_Type	Text	Type of event: PPV or Fight Night
Location	Text	Location of the event
Attendance	Numeric	Number of people that attended the event

Fight_ID	Numeric	Last names of fighters participating in the fight (Jones vs. Gane)
Fight_Type	Text	Type of fight: preliminary fight, main card fights or main event
FOTN	Text	Fight of the Night Award (Y or N)
Weight_Class	Text	Weight class in which the fight is taking place
Method	Text	Method in which the fight was won (KO, SUB or DEC)
Round	Numeric	Round in which the fight ended
Time	Numeric	Time of the round in which the fight ended (seconds)
WinnerID	Text	FighterID of the winner of the fight
LoserID	Text	FighterID of the loser of the fight
TKD	Numeric	Total knockdowns per fight
TSTR	Numeric	Total strikes per fight
TTK	Numeric	Total takedowns per fight
TSUB	Numeric	Total submission attempts per 15 minutes, per fight
FighterID	Text	4-digit surrogate key created to identify fighters uniquely
Name	Text	First, Middle and Last Name of the fighter + Suffix
Sex	Text	Sex of the fighter (M or F)
Height	Numeric	Height of the fighter (inches)
Weight	Numeric	Weight of the fighter (pounds)
Reach	Numeric	Reach of the fighter (inches)
Stance	Text	Stance of the fighter (Orthodox, Southpaw, Switch)
DOB	Numeric	Date of birth of the fighter
Active Belts	Numeric	Number of titles won by the fighter
PFPR	Numeric	Ranking of the fighter
POTN	Text	FighterID of the winner of the Performance of the Night Award
SLPM	Numeric	Significant Strikes Landed per Minute
STRACC	Numeric	Significant Striking Accuracy
SAPM	Numeric	Significant Strikes Absorbed per Minute
STRDEF	Numeric	Significant Strike Defense (the % of opponents strikes that did not land)
TD AVG	Numeric	Average Takedowns Landed per 15 minutes
TDACC	Numeric	Takedown Accuracy
TDDEF	Numeric	Takedown Defense (the % of opponents TD attempts that did not land)
SUBAVG	Numeric	Average Submissions Attempted per 15 minutes

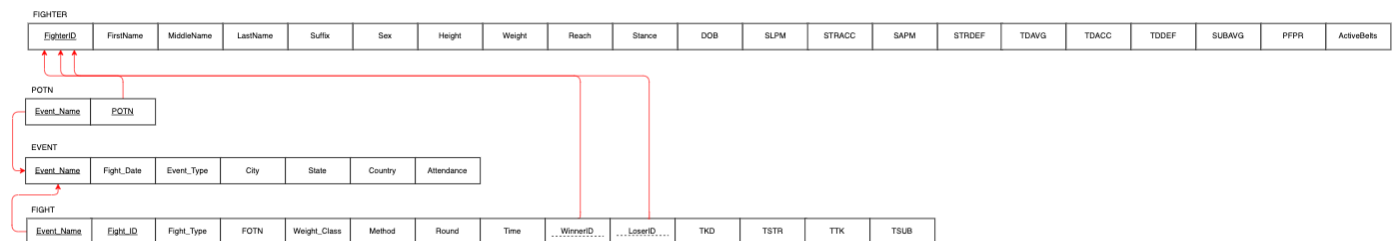
The primary entity in this database is EVENT, followed by FIGHTER. The data we are getting from ufcstats.com is organized by event, so we thought it would be a good idea to keep this set up. EVENT is identified by a unique name: if it is a PPV event, the name of the event is always “UFC”, followed by its number (UFC 285 for example). If it is not a PPV event, the name of the event is always “UFC Fight Night”, followed by the main event of the night (UFC Fight Night: Hall vs Silva). Since Fight\_ID is made up of the last names of the fighters participating in the fight, they are dependent on EVENT because the same fighters could fight again, but never in the same event. As for FIGHTER, we have created a surrogate key (FighterID) to identify each fighter uniquely. We will be keeping track of their name, their

age, their fighting stance and all physical attributes and statistics that are related to their performances. Figure 1 displays the ERD for this data.



*Fig. 1 Entity relationship diagram (ERD)*

Based on this ERD, we normalized the data to 3NF and created a relational schema with 4 tables. Figure 2 displays the graphical relational schema of the database. Since POTN was a multivalued attribute in the EVENT entity, it became its own table with Event\_Name and POTN acting as a composite primary key. Both the FIGHTER and EVENT tables act as the parent tables, since the FIGHT and POTN table store Event\_Name and FighterID as foreign keys, respectively.



*Fig. 2 Graphical relational schema*

## Database Implementation

To implement the database in APEX, we wrote CREATE TABLE commands for each table displayed in Figure 2

## EVENT

Even though EVENT was not the only parent table, we decided to create it and populate it first since it followed the logical path of our ERD: Event-Fight-Fighter.

```

CREATE TABLE "EVENT"
(
  "EVENT_NAME" VARCHAR2(100) NOT NULL ENABLE,
  "FIGHT_DATE" DATE NOT NULL ENABLE,
  "EVENT_TYPE" VARCHAR2(50) NOT NULL ENABLE,
  "CITY" VARCHAR2(50) NOT NULL ENABLE,
  "STATE" VARCHAR2(50),
  "COUNTRY" VARCHAR2(50) NOT NULL ENABLE,
  "ATTENDANCE" NUMBER(5,0),
  CONSTRAINT "EVENT_PK" PRIMARY KEY ("EVENT_NAME")
  USING INDEX ENABLE
) ;

```

### FIGHTER

As the other parent table, FIGHTER was created and populated second:

```

CREATE TABLE "FIGHTER"
(
  "FIGHTERID" CHAR(4) NOT NULL ENABLE,
  "FIRSTNAME" VARCHAR2(20) NOT NULL ENABLE,
  "MIDDLENAME" VARCHAR2(20),
  "LASTNAME" VARCHAR2(40) NOT NULL ENABLE,
  "SUFFIX" CHAR(3),
  "SEX" CHAR(1),
  "HEIGHT" NUMBER(2,0) NOT NULL ENABLE,
  "WEIGHT" NUMBER(3,0) NOT NULL ENABLE,
  "REACH" NUMBER(2,0) NOT NULL ENABLE,
  "STANCE" VARCHAR2(8) NOT NULL ENABLE,
  "DOB" DATE NOT NULL ENABLE,
  "SLPM" NUMBER NOT NULL ENABLE,
  "STRACC" NUMBER NOT NULL ENABLE,
  "SAPM" NUMBER NOT NULL ENABLE,
  "STRDEF" NUMBER NOT NULL ENABLE,

```

```

"TD AVG" NUMBER NOT NULL ENABLE,
"TDACC" NUMBER NOT NULL ENABLE,
"TDDEF" NUMBER NOT NULL ENABLE,
"SUBAVG" NUMBER NOT NULL ENABLE,
"PFPR" NUMBER,
"ACTIVEBELTS" NUMBER NOT NULL ENABLE,
CONSTRAINT "FIGHTER_PK" PRIMARY KEY ("FIGHTERID")
    USING INDEX ENABLE
) ;

```

## FIGHT

```

CREATE TABLE "FIGHT"
(
    "EVENT_NAME" VARCHAR2(50) NOT NULL ENABLE,
    "FIGHT_ID" VARCHAR2(50) NOT NULL ENABLE,
    "FIGHT_TYPE" VARCHAR2(12) NOT NULL ENABLE,
    "FOTN" CHAR(1) NOT NULL ENABLE,
    "WEIGHT_CLASS" VARCHAR2(50) NOT NULL ENABLE,
    "METHOD" VARCHAR2(50) NOT NULL ENABLE,
    "ROUND" NUMBER(1,0) NOT NULL ENABLE,
    "TIME" NUMBER(3,0) NOT NULL ENABLE,
    "WINNERID" CHAR(4),
    "LOSERID" CHAR(4),
    "TKD" NUMBER(1,0) NOT NULL ENABLE,
    "TSTR" NUMBER(3,0) NOT NULL ENABLE,
    "TTK" NUMBER(2,0) NOT NULL ENABLE,
    "TSUB" NUMBER(1,0) NOT NULL ENABLE,
    CONSTRAINT "FIGHT_PK" PRIMARY KEY ("EVENT_NAME", "FIGHT_ID")
        USING INDEX ENABLE
) ;

ALTER TABLE "FIGHT" ADD CONSTRAINT "FIGHT_FK1" FOREIGN KEY ("WINNERID")

```

```
REFERENCES "FIGHTER" ("FIGHTERID") ENABLE;  
ALTER TABLE "FIGHT" ADD CONSTRAINT "FIGHT_FK2" FOREIGN KEY ("LOSERID")  
REFERENCES "FIGHTER" ("FIGHTERID") ENABLE;
```

## POTN

```
CREATE TABLE "POTN"  
(  "EVENT_NAME" VARCHAR2(50) NOT NULL ENABLE,  
"PERF_OF_THE_NIGHT" CHAR(4) NOT NULL ENABLE,  
CONSTRAINT "POTN" PRIMARY KEY ("EVENT_NAME", "PERF_OF_THE_NIGHT")  
USING INDEX  ENABLE  
  ) ;  
  
ALTER TABLE "POTN" ADD CONSTRAINT "POTN_FK1" FOREIGN KEY ("EVENT_NAME")  
REFERENCES "EVENT" ("EVENT_NAME") ENABLE;  
ALTER TABLE "POTN" ADD CONSTRAINT "POTN_FK2" FOREIGN KEY ("PERF_OF_THE_NIGHT")  
REFERENCES "FIGHTER" ("FIGHTERID") ENABLE;
```

## **Analysis**

Using the data and statistics provided by UFC and other analytical sources, 4 research questions were formulated with the objective of exploring different aspects of each fighter's performance as well as the goal to provide the user with enough valuable information to become more invested in the sport.

### **Question 1: Weight Classes and Fighters**

*Are there any specific weight classes that are more entertaining than others? Which ones have the most accomplished fighters over the last year?* Since there were so many ways to address this question, we decided to split it into 3 parts to display a better application of our answer.

For the first part of our answer, we wrote a simple query that counts the number of KOs/TKOs in each Weight Class in the database, and it returns the top 5 divisions with most KOs/TKOs, organized by count. We excluded 'Catchweight' because this is not a real weight class, instead, it is a specific weight agreed by fighters for special occasions (For example, Vettori vs. Costa was scheduled to be a middleweight bout but since Costa failed to make weight, they agreed to fight at 200 pounds in a catchweight bout).

```
SELECT WEIGHT_CLASS, COUNT(*) AS KOs
```

```

FROM FIGHT
WHERE METHOD LIKE '%KO/TKO%'
      AND WEIGHT_CLASS NOT LIKE 'Catch%'
GROUP BY WEIGHT_CLASS
ORDER BY KOs DESC
FETCH FIRST 5 ROWS ONLY;

```

The results of this query are shown below. Out of all of the weight classes in the UFC, the middleweight division was the one with the most KOs/TKOs over the last year. This simple query was also displayed as a bar chart in the APEX web application (Figure 201). We decided to include the bar chart to emphasize the number of KOs/TKOs that the middleweight division has over the rest of the weight classes.

WEIGHT_CLASS	KOS
Middleweight	28
Lightweight	24
Welterweight	23
Light Heavyweight	22
Bantamweight	20

*Fig. 3 Weight Classes with most KOs/TKOs*

For the second part of our answer, we wanted to focus on the second component of the question formulated: *Which (weight classes) have the most accomplished fighters over the last year?* There were a couple of ways to do this, but since our database contained data regarding awards for both performances and fights of the night, we thought it would be a great idea to come up with a query that returned the names of fighters that have won both awards, along with the weight class where they belong. With that in mind, we wrote a compound query that includes a join operation to retrieve fighter information (ID and full name) and calculate their weight class with case statements.

```

SELECT
  F.FIGHTERID,
  F.FIRSTNAME || ' ' || F.MIDDLENAME || ' ' || F.LASTNAME AS FULL_NAME,
  CASE
    WHEN F.SEX = 'F' AND F.WEIGHT = 135 THEN 'Women's Bantamweight'
    WHEN F.SEX = 'M' AND F.WEIGHT = 135 THEN 'Bantamweight'
    WHEN F.WEIGHT = 145 THEN 'Featherweight'

```

```

        WHEN F.WEIGHT = 155 THEN 'Lightweight'
        WHEN F.WEIGHT = 170 THEN 'Welterweight'
        WHEN F.WEIGHT = 185 THEN 'Middleweight'
        WHEN F.WEIGHT = 205 THEN 'Light Heavyweight'
        WHEN F.WEIGHT > 220 THEN 'Heavyweight'

    END AS WEIGHTCLASS
FROM FIGHTER F
INNER JOIN (
    SELECT WINNERID AS FIGHTERID
    FROM FIGHT
    WHERE FOTN = 'Y'
    UNION
    SELECT LOSERID AS FIGHTERID
    FROM FIGHT
    WHERE FOTN = 'Y'
    INTERSECT
    SELECT PERF_OF_THE_NIGHT
    FROM POTN
) FN ON F.FIGHTERID = FN.FIGHTERID;

```

The results of this query are shown below (Figure 4). Based on all the data collected, there are 19 fighters that have won both a Performance of the Night Award and a Fight of the Night award over the last year. Along with their IDs and full names, their weight class can be seen in the right column. Something worth pointing out is that by answering the stated question in this manner, we are also informing the user of the fighters that have had most success over the last year, which should contribute to our end goal of helping enthusiast learn more about the sport.



FIGHTERID	FULL_NAME	WEIGHTCLASS
1274	Drew Dober	Lightweight
1314	Tai Tuivasa	Heavyweight
1356	Michael Chandler	Lightweight
1004	Rob Font	Bantamweight
1006	Kevin Holland	Welterweight
1007	Santiago Ponzinibbio	Welterweight
1011	Chris Curtis	Middleweight
1025	Marlon Vera	Bantamweight
1028	Nate Landwehr	Featherweight
1033	Chidi Njokuani	Middleweight
More than 10 rows available. Increase rows selector to view more rows.		

*Fig.4 Fighters that have won both FOTN and POTN awards (19 rows total-only showing 10)*

Nonetheless, by just displaying this table in our APEX application, we thought that the user would not get a feel of the distribution by weight class, so we decided to make some slight modifications to our query in order to display it as a bar chart (Figure 21). We deselected the fighter information (ID and Full Name), and we added a GROUP BY statement at the end of our query, which would allow it to return the number of fighters that have won both FOTN and POTN awards per weight class:

GROUP BY

CASE

WHEN F.SEX = 'F' AND F.WEIGHT = 135 THEN 'Women''s Bantamweight'

WHEN F.SEX = 'M' AND F.WEIGHT = 135 THEN 'Bantamweight'

WHEN F.WEIGHT = 145 THEN 'Featherweight'

WHEN F.WEIGHT = 155 THEN 'Lightweight'

WHEN F.WEIGHT = 170 THEN 'Welterweight'

WHEN F.WEIGHT = 185 THEN 'Middleweight'

WHEN F.WEIGHT = 205 THEN 'Light Heavyweight'

WHEN F.WEIGHT > 220 THEN 'Heavyweight'

END;

With this slight modification, the results of the query are displayed below. This new output allowed us to present a bar chart in our APEX application (figure 21), which shows that the Welterweight and Lightweight divisions are the weight classes with the most fighters (4) that have won both a FOTN and POTN award over the last year. This query works effectively since it explicitly points out the weight classes that *have the most accomplished fighters over the last year*, based on awards.

WEIGHTCLASS	FIGHTERS
Bantamweight	2
Welterweight	4
Lightweight	4
Featherweight	3
Light Heavyweight	1
Heavyweight	1
Middleweight	3
Women's Bantamweight	1

*Fig.5 Number of fighters that have won both FOTN and POTN awards per weight class*

Finally, for the third part of our answer, we decided to use the pound-for-pound rankings data collected during the scraping process. "The pound-for-pound rankings offer a way to level the playing field, creating a platform for comparison that transcends weight classes. In essence, the UFC pound-for-pound rankings are a tribute to skill, technique, strength, and versatility, rather than physical stature alone" (<https://thebodylockmma.com/ufc/pound-for-pound-rankings/>). We thought this would be a great idea since the rankings are updated often, therefore offering an insight into who CURRENTLY are the best fighters in the world. With this in mind, we composed a separate CASE query for male and female fighters that return the names of the fighters in the pound-for-pound rankings as showed here: <https://www.ufc.com/rankings>, plus the weight class in which they compete:

### MEN'S DIVISION

SELECT

F.FIRSTNAME || ' ' || F.MIDDLENAME || ' ' || F.LASTNAME AS FULL\_NAME,

CASE

WHEN F.WEIGHT = 125 THEN 'Flyweight'

WHEN F.WEIGHT = 135 THEN 'Bantamweight'

WHEN F.WEIGHT = 145 THEN 'Featherweight'

WHEN F.WEIGHT = 155 THEN 'Lightweight'

WHEN F.WEIGHT = 170 THEN 'Welterweight'

WHEN F.WEIGHT = 185 THEN 'Middleweight'

WHEN F.WEIGHT = 205 THEN 'Light Heavyweight'

WHEN F.WEIGHT > 220 THEN 'Heavyweight'

END AS WEIGHTCLASS,

F.PFPR

FROM FIGHTER F

```
WHERE F.SEX = 'M' AND F.PFPR IS NOT NULL  
ORDER BY F.PFPR ASC
```

### WOMEN'S DIVISION

```
SELECT  
    F.FIRSTNAME || ' ' || F.MIDDLENAME || ' ' || F.LASTNAME AS FULL_NAME,  
    CASE  
        WHEN F.WEIGHT = 115 THEN 'Strawweight'  
        WHEN F.WEIGHT = 125 THEN 'Flyweight'  
        WHEN F.WEIGHT = 135 THEN 'Bantamweight'  
  
    END AS WEIGHTCLASS,  
    F.PFPR  
FROM FIGHTER F  
WHERE F.SEX = 'F' AND F.PFPR IS NOT NULL  
ORDER BY F.PFPR ASC;
```

The results of these queries are shown below:

FULL_NAME	WEIGHTCLASS	PFP
Jon Jones	Heavyweight	1
Alexander Volkanovski	Featherweight	2
Islam Makhachev	Lightweight	3
Leon Edwards	Welterweight	4
Israel Adesanya	Middleweight	5
Aljamain Sterling	Bantamweight	6
Kamaru Usman	Welterweight	7
Charles Oliveira	Lightweight	8
Brandon Moreno	Flyweight	9
Alex Pereira	Middleweight	9
Jiri Prochazka	Light Heavyweight	11
Dustin Poirier	Lightweight	12
Max Holloway	Featherweight	13
Jamahal Hill	Light Heavyweight	14
Robert Whittaker	Middleweight	15

*Fig.6 Men's PFP rankings with weight class displayed*

FULL_NAME	WEIGHTCLASS	PFP
Amanda Nunes	Bantamweight	1
Alexa Grasso	Flyweight	2
Valentina Shevchenko	Flyweight	3
Zhang Weili	Strawweight	4
Rose Namajunas	Strawweight	5
Juliana Pena	Bantamweight	6
Carla Esparza	Strawweight	7
Jessica Andrade	Strawweight	8
Erin Blanchfield	Flyweight	9
Amanda Lemos	Strawweight	10
Manon Fiorot	Flyweight	11
Taila Santos	Flyweight	12
Raquel Pennington	Bantamweight	13
Marina Rodriguez	Strawweight	14
Holly Holm	Bantamweight	15

*Fig.7 Women's PFP rankings with weight class displayed*

Similar to the second part of our answer, we thought that by just displaying the tables in our APEX application we would not be explicitly answering the question or letting the user know *what weight classes have the most accomplished fighters*. This is why we decided to modify our queries like in the

second part of our answer, by deselecting the fighter information (Name and Ranking) and including a GROUP BY statement at the end of both queries. This allowed the query to break down the pound-for-pound rankings for both men and women and return the number of ranked fighters that each weight class has:

#### MEN'S QUERY

```
SELECT
CASE
    WHEN F.WEIGHT = 125 THEN 'Flyweight'
    WHEN F.WEIGHT = 135 THEN 'Bantamweight'
    WHEN F.WEIGHT = 145 THEN 'Featherweight'
    WHEN F.WEIGHT = 155 THEN 'Lightweight'
    WHEN F.WEIGHT = 170 THEN 'Welterweight'
    WHEN F.WEIGHT = 185 THEN 'Middleweight'
    WHEN F.WEIGHT = 205 THEN 'Light Heavyweight'
    WHEN F.WEIGHT > 220 THEN 'Heavyweight'
END AS WEIGHTCLASS,
COUNT(*) AS COUNT
FROM FIGHTER F
WHERE F.SEX = 'M' AND F.PFPR IS NOT NULL
GROUP BY CASE
    WHEN F.WEIGHT = 125 THEN 'Flyweight'
    WHEN F.WEIGHT = 135 THEN 'Bantamweight'
    WHEN F.WEIGHT = 145 THEN 'Featherweight'
    WHEN F.WEIGHT = 155 THEN 'Lightweight'
    WHEN F.WEIGHT = 170 THEN 'Welterweight'
    WHEN F.WEIGHT = 185 THEN 'Middleweight'
    WHEN F.WEIGHT = 205 THEN 'Light Heavyweight'
    WHEN F.WEIGHT > 220 THEN 'Heavyweight'
END
ORDER BY COUNT DESC;
```

### WOMEN'S QUERY

```
SELECT
  CASE
    WHEN F.WEIGHT = 115 THEN 'Strawweight'
    WHEN F.WEIGHT = 125 THEN 'Flyweight'
    WHEN F.WEIGHT = 135 THEN 'Bantamweight'
  END AS WEIGHTCLASS,
  COUNT(*) AS COUNT
FROM FIGHTER F
WHERE F.SEX = 'F' AND F.PFPR IS NOT NULL
GROUP BY CASE
  WHEN F.WEIGHT = 115 THEN 'Strawweight'
  WHEN F.WEIGHT = 125 THEN 'Flyweight'
  WHEN F.WEIGHT = 135 THEN 'Bantamweight'
END
ORDER BY COUNT DESC;
```

With these modifications, the queries produced the results shown below (Figure 8 and 9), where the Lightweight and Middleweight divisions are the weight classes that have the largest share of male pound-for-pound ranked fighters, while the Strawweight division is the leading weight class in the women's category.

WEIGHTCLASS	COUNT
Lightweight	3
Middleweight	3
Featherweight	2
Light Heavyweight	2
Welterweight	2
Flyweight	1
Heavyweight	1
Bantamweight	1

*Fig.8 Men's PFP rankings broken down by weight class*

WEIGHTCLASS	COUNT
Strawweight	6
Flyweight	5
Bantamweight	4

*Fig.9 Women's PFP rankings broken down by weight class*

These new queries allowed us to display a pie chart for both rankings in our APEX application (figure 22 and 23). This kind of data visualization makes it easier for the user to identify that in the men's category, the Lightweight and Middleweight division are the weight classes with most ranked fighters, while the Strawweight division is the leader in the women's category.

All in all, this 3-part answer allows the user to identify what weight classes are the most entertaining based on number of KOs/TKOs, and what weight classes have the most accomplished fighters based on awards received over the last year and the current pound-for-pound rankings.

## **Question 2: Reach and Performance**

*What is the relationship between a UFC fighter's reach and their performance? Does having longer arms pose a significant advantage in MMA?* To address this question, we came up with a couple of join queries where we calculated a fighters reach to height ratio.

The first query was specifically designed to be “misleading”. This query calculates the reach to height ratio by dividing a fighter's reach by their height, and then it has a join operation to return the fighter's information regarding their wins. Finally, the query returns the top 50 fighters with most wins, and their reach to height ratio:

```
SELECT
    FIGHTERID, FIRSTNAME||' '||MIDDLENAME||' '||LASTNAME||' '||SUFFIX AS FULL_NAME,
    ROUND(REACH / HEIGHT, 2) AS REACH2HEIGHT,
    COUNT(WINNERID) AS WINS
FROM
    FIGHTER
    INNER JOIN FIGHT W ON FIGHTERID = WINNERID
GROUP BY
    FIGHTERID, FIRSTNAME, MIDDLENAME, LASTNAME, SUFFIX, HEIGHT, REACH
ORDER BY
    COUNT(WINNERID) DESC
FETCH FIRST 50 ROWS ONLY;
```

The first 10 results for this query are shown below:

FIGHTERID	FULL_NAME	REACH2HEIGHT	WINS
1060	Muhammad Mokaev	1.04	4
1082	Mario Bautista	1	4
1080	Jonathan Martinez	1.03	4
1196	Serghei Spivac	1.04	3
1170	Islam Makhachev	1	3
1256	Javid Basharat	1	3
1112	Dricus DuPlessis	1.04	3
1326	Jonathan Pearce	.99	3
1174	Jack Della Maddalena	1.03	3
1160	Mayra Bueno Silva	1	3

More than 10 rows available. Increase rows selector to view more rows.

*Fig.10 Top 50 fighters with the most wins over the last year, and their Reach to Height ratio*

As seen in figure 10, this query retrieves the top 50 fighters with the most wins along their reach to height ratio by joining the FIGHTER and FIGHT tables on the WINNERID and FIGHTERID columns, respectively. However, the issue with this query is that since the fighters who have the most wins have a positive ratio, one might jump to the conclusion that there is a strong relationship between reach and performance. These types of stats are often seen in the media, but is it entirely, correct? To answer this question properly, we decided to modify the code in a way that it could group all the reach to height ratios of fighters with 2 or more fights and return them along their win percentage. This would let us display a scatterplot in our APEX application and allow the user to see for themselves if there really exists a relationship between these two variables.

```

SELECT
    T.REACH2HEIGHT,
    AVG(T.WIN_PERCENTAGE) AS AVG_WIN_PERCENTAGE
FROM (
    SELECT
        ROUND(REACH / HEIGHT, 2) AS REACH2HEIGHT,
        COUNT(CASE WHEN WINNERID = FIGHTERID THEN 1 END) * 100 / COUNT(*) AS
WIN_PERCENTAGE,
        COUNT(*) AS FIGHT_COUNT
    FROM
        FIGHTER
        INNER JOIN FIGHT ON FIGHTERID IN (WINNERID, LOSERID)

```



```

GROUP BY
    ROUND(REACH / HEIGHT, 2), FIGHTERID
) T
WHERE
    T.FIGHT_COUNT >= 2
GROUP BY
    T.REACH2HEIGHT
ORDER BY
    T.REACH2HEIGHT ASC;

```

The SQL shown above is not drastically different from the one presented beforehand, but this one allowed us to display a scatterplot in our APEX application as shown in Figure 25. Only fighters with two or more fights were considered in order to have a decent sample size. The results of this query show that there is not a strong relationship between a fighter's reach and their win percentage, at least not in the last year of fights in the UFC. As seen in figure 11, there is not an upwards or downwards pattern in the values. This is easier to visualize in the scatterplot shown in Figure 25. These results align with a school of thought in MMA where reach and height are only seen as physical advantages, yet they don't make anyone the better fighter: <https://wayofmartialarts.com/do-height-and-reach-matter-in-mma-ufc/>. Unlike boxing, MMA has a lot of ground technique, so fighters with a shorter reach will usually know how to compensate with wrestling or Jiu Jitsu for their physical disadvantage.

REACH2HEIGHT	AVG_WIN_PERCENTAGE
.92	66.67
.95	83.33
.96	33.33
.97	47.78
.98	48.96
.99	58.33
1	57.12
1.01	54.52
1.02	66.67
1.03	52.74
1.04	55.42
1.05	49.11
1.06	39.39
1.07	44.12
1.08	58.52
1.09	55.56
1.12	50

*Fig.11 Win Percentage of Fighters | Grouped by their R2H ratio*

### Question 3: Age and Performance

*What is the relationship between a fighter's age and their performance in the UFC? Do older competitors perform better, or do younger competitors have a more physical advantage?* For this question, we wrote a join query that uses the FLOOR function to calculate the fighter's age.

```

SELECT
    FLOOR((SYSDATE - DOB)/365.25) AS AGE,
    ROUND(COUNT(CASE WHEN WINNERID = FIGHTERID THEN 1 END) *100 / COUNT(*),2)
    || '%' AS WIN_PERCENTAGE
FROM
    FIGHTER
    INNER JOIN FIGHT ON FIGHTERID IN (WINNERID, LOSERID)
GROUP BY
    FLOOR((SYSDATE - DOB)/365.25)
HAVING
    COUNT(*) > 2

```

```
ORDER BY  
  
AGE ASC;
```

This SQL query calculates the age and win percentage of fighters who have participated in more than two fights. It does that by joining the 'FIGHTER' table and 'FIGHT' table, then it filters the results for fighters with more than two fights (we decided that this was a good enough threshold to eliminate outliers), and then grouping them by age. The age is calculated using the floor function to get the nearest whole number of years between the current date and the fighter's date of birth. The win percentage is then calculated by counting the number of wins for a fighter and dividing it by the total number of fights, then formatting the result as a percentage. The last part is that the query sorts the results in ascending order of age. The first 10 age groups are displayed in Figure 12.

AGE	WIN_PERCENTAGE
22	87.5%
23	53.33%
24	91.67%
25	65.38%
26	42.86%
27	56.41%
28	57.95%
29	62.38%
30	49.24%
31	53.97%
More than 10 rows available. Increase rows selector to view more rows.	

*Fig 12. Age Groups (for fighters with at least 3 fights) & their Win %*

These results are also displayed as a bar chart in our APEX application (Figure 26). As we can see both in the table and the chart, although the relationship is not strictly linear, the data values generally indicate that younger fighters tend to have higher win percentages. This observation aligns with the understanding that MMA performance relies heavily on strength and endurance, which often declines with age. Some outliers remained despite the three-fight threshold, particularly in the 43 and 44 age groups, likely due to smaller sample sizes. However, the overall trend suggests that a fighter's performance tends to decline as they age.

#### Question 4: Types of Fights and Events

*What type of events are the most entertaining to watch? Which kind of fights have the most action?* To answer this question, we decided to come up with 2 CASE queries.

The first query focuses on the first component of the question: *What type of events are the most entertaining to watch?* Similar to our first question, we determined that entertainment could be measured

by the most exciting type of finishes: Knockouts and Submissions. This is why the first query calculates the average percentages of KOs/TKOs and submission finishes in UFC events. The query retrieves data from the "FIGHT" table and then groups the results by fight type, which is determined using a case statement that checks if the fight belongs to "Fight Night" event type or a "PPV" event type.

```
SELECT
    CASE WHEN UPPER(EVENT_NAME) LIKE '%FIGHT NIGHT%' THEN 'Fight Night' ELSE
    'PPV' END AS EVENT_TYPE,
    ROUND(AVG(CASE WHEN METHOD LIKE '%KO/TKO%' THEN 100 ELSE 0 END), 2) ||
    '%' AS AVG_KO_TKO_PERCENTAGE,
    ROUND(AVG(CASE WHEN METHOD LIKE '%SUB%' THEN 100 ELSE 0 END), 2) AS ||
    '%' AVG_SUBMISSION_PERCENTAGE
FROM
    FIGHT
GROUP BY
    CASE WHEN UPPER(EVENT_NAME) LIKE '%FIGHT NIGHT%' THEN 'Fight Night' ELSE
    'PPV' END
```

The results for this query (Figure 13) show that over the last year of UFC events, the UFC Fight Night events have had a larger percentage of finishes by KOs/TKOs and submissions. This is a strange statistic to comprehend for someone that is not too familiar with the sport, and this is because usually, the most recognized and higher ranked fighters participate in PPV events. To clarify, this description is not trying to imply causation, however, it is known in the MMA world that the top fighters are more focused on defense and damage limitation, while the fighters that are trying to get to the top have a more aggressive style of fighting. So, although UFC Fight Nights may not feature the most famous fighters, this aggressiveness and/or motivation to get to the top could potentially be one of the reasons why they have a higher rate of KOs/TKOs and submission finishes, making them exciting for fans.

EVENT_TYPE	AVG_KO_TKO_PERCENTAGE	AVG_SUBMISSION_PERCENTAGE
PPV	28.51%	19.91%
Fight Night	33.76%	21.48%

Fig 13. Event Type with Avg KO/TKO and Submission Finishes

Our second SQL query focuses on the second component of the question: *Which kind of fights have the most action?* For this, we decided to use the statistics of each fight from the FIGHT table; during our data cleaning process we were trying to solve data that would produce multivalued attributes, so we decided to add the individual statistics of individual fighters into a single stat called 'TOTALstat', for example: Total Knockdowns, Total Strikes Landed, etc. This type of stats fit the question perfectly since the higher the values in these columns, the more the action there is in a fight. The query retrieves data from the

"FIGHT" table and groups the results by fight type, which is determined by the value of the "FIGHT\_TYPE" column. The query uses a case statement to group the fights as either "Prelim" or "Main Card." The query then calculates the average total knockdowns (TKD), total strikes landed (TSTR), total takedowns (TTK), and total submission attempts (TSUB) for each fight type using the AVG function and the ROUND function to round the results to two or three decimal places.

```
SELECT
    CASE WHEN FIGHT_TYPE = 'Prelim' THEN 'Prelim' ELSE 'Main Card' END AS
    FIGHT_TYPE_GROUP,
    ROUND(AVG(TKD), 2) AS AVG_TKD,
    ROUND(AVG(TSTR), 3) AS AVG_TSTR,
    ROUND(AVG(TTK), 3) AS AVG_TTK,
    ROUND(AVG(TSUB), 2) AS AVG_TSUB
FROM
    FIGHT
GROUP BY
    CASE WHEN FIGHT_TYPE = 'Prelim' THEN 'Prelim' ELSE 'Main Card' END
```

The results for this query are displayed in Figure 14. This query can be used to compare the average performance of fighters in Prelim fights versus Main Card fights, helping fans identify which fights feature more striking, grappling, or a balance of both. In the case of our dataset, over the last year, the Main Card fights have had the upper hand when it comes to Total Knockdowns and Total Strikes landed, while the Preliminary fights have led in Total Takedowns and Total Submission attempts per 15 minutes. While the results of this query don't imply that certain fights have more action than others, they do allow the user to inform themselves on what they can expect in certain types of fights. If someone is new to the sport and they really enjoy striking or boxing, they will probably, according to this data they will want to tune in for the Main Events, but if that person is a big fan of wrestling and BJJ, they won't mind tuning in early to watch the Prelims, since there could be more ground action.

FIGHT_TYPE_GROUP	AVG_TKD	AVG_TSTR	AVG_TTK	AVG_TSUB
Main Card	.46	96.476	1.992	.56
Prelim	.45	82.721	2.224	.63

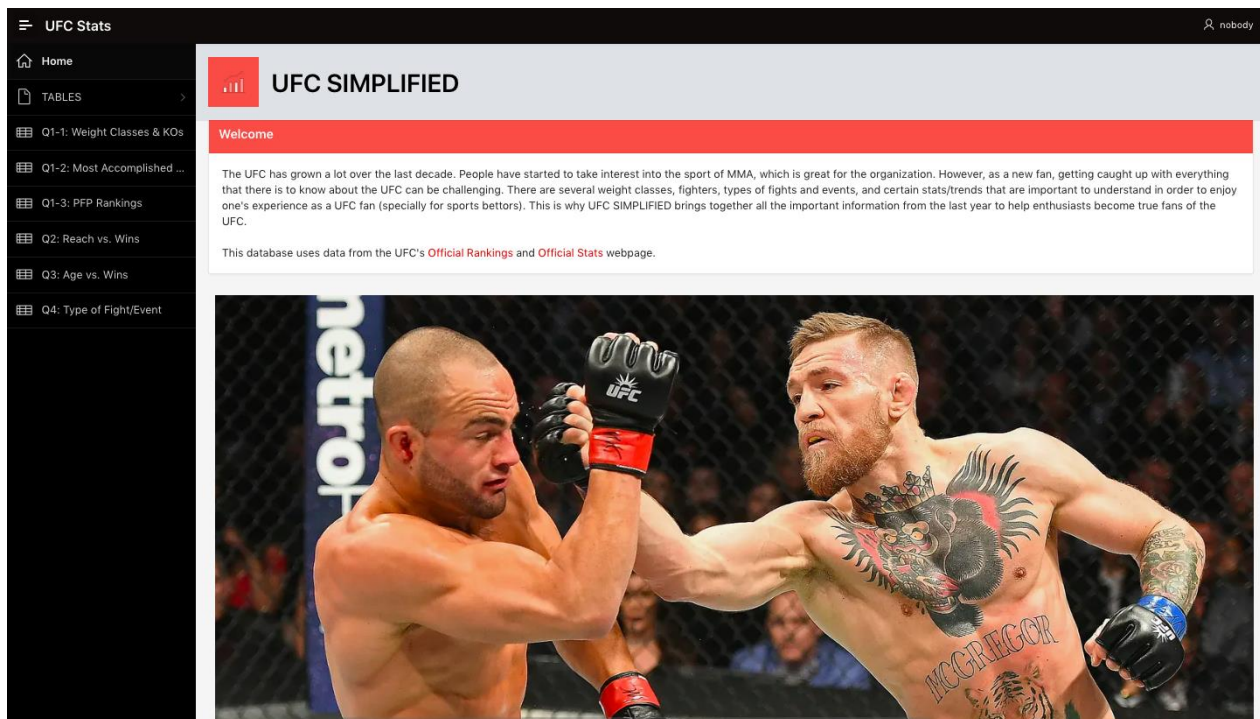
*Fig 14. Fight Type and Average Performance*

## Web Design

[https://apex.oracle.com/pls/apex/r/ufc\\_project/ufc-stats/home?session=12483788421646](https://apex.oracle.com/pls/apex/r/ufc_project/ufc-stats/home?session=12483788421646)

### Home Page

The home page of our web application displays a brief description of the project and our goal: getting UFC enthusiasts to become true fans of the sport. At the end of the description there are 2 hyperlinks to the original sources where we scraped the data from. We included an image of Conor McGregor fighting Eddie Alvarez in 2015 for the lightweight title (<https://i.ytimg.com/vi/2sXOenFizsc/maxresdefault.jpg>), even though these fighters don't appear in our data, this fight is one of the most memorable fights in the history of the organization. Our application contains a navigation menu with nested elements and custom icons, and we used consistent colors throughout the application to match the UFC's main colors: black and red.



*Fig. 15*

### Tables

We created an interactive report for each database table, which allows users to search, filter, and group the data (Figures 16-19). All the column headings were customized (mainly switching an underscore for an actual space) to ensure that titles are understandable. A data dictionary was included for the FIGHTER and FIGHT table to ensure that the user understood what the stats columns stood for.

UFC Stats

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TABLES

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FIGHT INFO

PERFORMANCES OF THE NIGHT

Q1-1: Weight Classes & KO's

Q1-2: Most Accomplished ...

Q1-3: PFP Rankings

Q2: Reach vs. Wins

Q3: Age vs. Wins

Q4: Type of Fight/Event

EVENT INFO

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Event Name	Fight Date	Event Type	City	State	Country	Attendance
UFC 287: Pereira vs. Adesanya 2	4/8/2023	PPV	Miami	Florida	USA	19032
UFC Fight Night: Vera vs. Sandhagen	3/25/2023	Fight Night	San Antonio	Texas	USA	16076
UFC 286: Edwards vs. Usman 3	3/18/2023	PPV	London		England	17588
UFC Fight Night: Yan vs. Dvalishvili	3/11/2023	Fight Night	Las Vegas	Nevada	USA	
UFC 285: Jones vs. Gane	3/4/2023	PPV	Las Vegas	Nevada	USA	19471
UFC Fight Night: Muniz vs. Allen	2/25/2023	Fight Night	Las Vegas	Nevada	USA	
UFC Fight Night: Andrade vs. Blanchfield	2/18/2023	Fight Night	Las Vegas	Nevada	USA	
UFC 284: Makhachev vs. Volkanovski	2/11/2023	PPV	Perth	Western Australia	Australia	14124
UFC Fight Night: Lewis vs. Spivac	2/4/2023	Fight Night	Las Vegas	Nevada	USA	
UFC 283: Teixeira vs. Hill	1/21/2023	PPV	Rio de Janeiro	Rio de Janeiro	Brazil	13604
UFC Fight Night: Strickland vs. Imavov	1/14/2023	Fight Night	Las Vegas	Nevada	USA	
UFC Fight Night: Cannonier vs. Strickland	12/17/2022	Fight Night	Las Vegas	Nevada	USA	
UFC 282: Blachowicz vs. Ankalaev	12/10/2022	PPV	Las Vegas	Nevada	USA	18455
UFC Fight Night: Thompson vs. Holland	12/3/2022	Fight Night	Orlando	Florida	USA	17065
UFC Fight Night: Nzechukwu vs. Cutelaba	11/19/2022	Fight Night	Las Vegas	Nevada	USA	
UFC 281: Adesanya vs. Pereira	11/12/2022	PPV	New York City	New York	USA	20845
UFC Fight Night: Rodriguez vs. Lemos	11/5/2022	Fight Night	Las Vegas	Nevada	USA	
UFC Fight Night: Kattar vs. Allen	10/29/2022	Fight Night	Las Vegas	Nevada	USA	
UFC 280: Oliveira vs. Makhachev	10/22/2022	PPV	Abu Dhabi	Abu Dhabi	United Arab Emirates	13400
UFC Fight Night: Grasso vs. Araujo	10/15/2022	Fight Night	Las Vegas	Nevada	USA	
UFC Fight Night: Dern vs. Yan	10/1/2022	Fight Night	Las Vegas	Nevada	USA	
UFC Fight Night: Sandhagen vs. Song	9/17/2022	Fight Night	Las Vegas	Nevada	USA	
UFC 279: Diaz vs. Ferguson	9/10/2022	PPV	Las Vegas	Nevada	USA	19125
UFC Fight Night: Gane vs. Tuivasa	9/3/2022	Fight Night	Paris	Ile-de-France	France	15405

Fig. 16 EVENT

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PERFORMANCES OF THE NIGHT

Q1-1: Weight Classes & KOs

Q1-2: Most Accomplished ...

Q1-3: PFP Rankings

Q2: Reach vs. Wins

Q3: Age vs. Wins

Q4: Type of Fight/Event

FIGHTER INFO

SLpM - Significant Strikes Landed per Minute || Str. Acc. - Significant Striking Accuracy || SAPM - Significant Strikes Absorbed per Minute || Str. Def. - Significant Strike Defence (the % of opponents strikes that did not land)  
TD Avg. - Average Takedowns Landed per 15 minutes || TD Acc. - Takedown Accuracy || TD Def. - Takedown Defense (the % of opponents TD attempts that did not land) || Sub. Avg. - Average Submissions Attempted per 15 minutes

Q 🔍

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Actions ▼

FighterID	First Name	Middle Name	Last Name	Suffix	Sex	Height	Weight	Reach	Stance	DOB	SLPM	StrAcc	SAPM	StrDef	TdAvg	TdAcc	TdDef	SubAvg	PFPR	Active Belts
1256	Javid		Basharat		M	69	135	69	Orthodox	9/7/1995	5.64	.6	2.3	.66	2.03	.57	.85	.2		0
1257	Mateus		Mendonca		M	66	135	71	Orthodox	1/17/1999	2.41	.38	6.27	.29	1.9	.18	.4	0		0
1258	Abdul	Razak	Alhassan		M	70	185	73	Orthodox	8/11/1985	3.54	.48	4.02	.55	.97	.38	.52	0		0
1259	Claudio		Ribeiro		M	73	185	77	Orthodox	7/17/1992	3.91	.62	2.89	.45	0	0	1	0		0
1260	Mateusz		Rebecki		M	67	155	66	Southpaw	11/3/1992	4.92	.51	2.05	.62	4.15	.62	.66	.8		0
1261	Nick		Fiore		M	70	155	72	Orthodox	12/10/1997	2.27	.36	5.93	.47	1	.33	.25	0		0
1262	Allan		Nascimento		M	68	125	69	Orthodox	9/11/1991	3.21	.61	2.28	.5	1.55	.26	.16	.9		0
1263	Carlos		Hernandez		M	68	125	67	Orthodox	10/25/1993	4.93	.47	4.12	.45	.9	.11	.66	.5		0
1264	Dan		Argueta		M	67	145	68	Southpaw	8/13/1993	2.47	.51	1.53	.52	2.5	.55	.5	1		0
1265	Nick		Aguirre		M	69	145	74	Southpaw	1/15/1996	.93	.31	3.13	.44	0	0	.33	1		0
1266	Jimmy		Flick		M	67	125	68	Orthodox	9/7/1990	1.9	.57	3.41	.45	2.13	.42	0	5.7		0
1267	Jared		Cannonier		M	71	185	77	Switch	3/16/1984	4	.5	3.86	.61	.17	.25	.64	0		0
1268	Arman		Tsarukyan		M	67	155	72	Orthodox	10/11/1996	3.56	.45	1.93	.54	3.3	.33	.75	0		0
1269	Damir		Ismagulov		M	70	155	74	Orthodox	2/3/1991	3.78	.42	2.51	.62	1.17	.28	.75	0		0
1270	Amir		Albazi		M	65	125	68	Orthodox	10/27/1993	3.54	.43	2.47	.61	2.47	.5	.66	.8		0
1271	Alessandro		Costa		M	64	125	67	Orthodox	1/28/1996	2.28	.3	3.16	.63	0	0	.87	0		0
1272	Alex		Caceres		M	70	145	73	Southpaw	6/20/1988	4.16	.51	2.92	.64	.57	.7	.64	.8		0
1273	Julian		Erosa		M	73	145	74	Southpaw	7/31/1989	6.19	.48	6.27	.48	1.69	.48	.61	.7		0
1274	Drew		Dober		M	68	155	70	Southpaw	10/19/1988	4.47	.4	4.4	.51	.71	.17	.55	.1		0
1275	Bobby		Green		M	70	155	71	Orthodox	9/9/1986	5.97	.51	3.67	.62	1.28	.37	.72	.3		0
1276	Michal		Oleksiejczuk		M	72	185	74	Southpaw	2/22/1995	4.94	.5	3.98	.64	.67	.42	.43	0		0

Fig. 17 FIGHTER

UFC Stats

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Q1-2: Most Accomplished ...

Q1-3: PFP Rankings

Q2: Reach vs. Wins

Q3: Age vs. Wins

Q4: Type of Fight/Event

FIGHT INFO

TKD : Total Knockdowns || TSTR: Total Strikes Landed || TTK: Total Takedowns || TSUB: Total Submission Attempts

Qv

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Actions

Event Name	Fight ID	Fight Type	Fotn	Weight Class	Method	Round	Time	Winnerid	Loserid	TKD	TSTR	TTK	TSUB
UFC Fight Night: Grasso vs. Araujo	Todorovic vs. Wright	Main Card	Y	Middleweight	KO/TKO Elbows	2	192	Dusko	Jordan	0	86	3	1
UFC Fight Night: Grasso vs. Araujo	Assuncao vs. Henry	Main Card	N	Bantamweight	U-DEC	3	300	Raphael	Victor	0	115	2	0
UFC Fight Night: Grasso vs. Araujo	Menfield vs. Cirkunov	Main Card	N	Light Heavyweight	KO/TKO Punch	1	88	Alonzo	Misha	1	13	0	0
UFC Fight Night: Grasso vs. Araujo	Martinez vs. Davis	Prelim	N	Bantamweight	S-DEC	3	300	Mana	Brandon	2	163	2	0
UFC Fight Night: Grasso vs. Araujo	Malkoun vs. Maximov	Prelim	N	Middleweight	U-DEC	3	300	Jacob	Nick	0	117	9	0
UFC Fight Night: Grasso vs. Araujo	Brito vs. Alexander	Prelim	N	Featherweight	SUB Rear Naked Choke	1	122	Joanderson	Lucas	0	5	2	1
UFC Fight Night: Grasso vs. Araujo	Rodriguez vs. Hughes	Prelim	N	Women's Strawweight	U-DEC	3	300	Piera	Sam	0	152	5	0
UFC Fight Night: Grasso vs. Araujo	Taira vs. Vergara	Prelim	N	Flyweight	SUB Armbar	2	259	Tatsuro	CJ	0	41	3	2
UFC Fight Night: Grasso vs. Araujo	Rodriguez vs. Jackson	Prelim	N	Welterweight	KO/TKO Knee	1	93	Pete	Mike	1	32	0	0
UFC Fight Night: Dern vs. Yan	Xiaonan vs. Dern	Main Event	N	Women's Strawweight	M-DEC	5	300	Yan	Mackenzie	0	174	2	2
UFC Fight Night: Dern vs. Yan	Brown vs. Trinaldo	Main Card	N	Welterweight	U-DEC	3	300	Randy	Francisco	1	100	1	1
UFC Fight Night: Dern vs. Yan	Barcelos vs. Jones	Main Card	N	Bantamweight	U-DEC	3	300	Raoni	Trevin	1	84	2	0
UFC Fight Night: Dern vs. Yan	Yusuff vs. Shainis	Main Card	N	Featherweight	SUB Guillotine Choke	1	30	Sodiq	Don	0	12	0	1
UFC Fight Night: Dern vs. Yan	Davis vs. Borshev	Main Card	N	Lightweight	U-DEC	3	300	Mike	Viacheslav	0	128	9	1
UFC Fight Night: Dern vs. Yan	Santos vs. Castaneda	Prelim	Y	Catch Weight	KO/TKO Knee	2	268	Daniel	John	2	126	5	0
UFC Fight Night: Dern vs. Yan	Latifi vs. Oleinik	Prelim	N	Heavyweight	U-DEC	3	300	Iir	Aleksei	0	66	3	0
UFC Fight Night: Dern vs. Yan	Silva vs. Ronson	Prelim	N	Lightweight	KO/TKO Flying Knee	2	188	Joaquim	Jesse	1	84	0	0
UFC Fight Night: Dern vs. Yan	Allen vs. Jotko	Prelim	N	Middleweight	SUB Rear Naked Choke	1	257	Brendan	Krzysztof	0	6	1	1
UFC Fight Night: Dern vs. Yan	Chandler vs. Stollarenko	Prelim	N	Catch Weight	KO/TKO Punches	1	255	Chelsea	Julija	0	50	1	0
UFC Fight Night: Dern vs. Yan	Cannetti vs. Costa	Prelim	N	Bantamweight	SUB Rear Naked Choke	1	64	Guido	Randy	0	10	1	1
UFC Fight Night: Sandhagen vs. Song	Sandhagen vs. Song	Main Event	N	Bantamweight	KO/TKO	4	300	Cory	Song	0	148	3	0
UFC Fight Night: Sandhagen vs. Song	Rodriguez vs. Njokuani	Main Card	Y	Middleweight	KO/TKO Punches	2	87	Gregory	Chidi	1	92	1	0

Fig. 18 FIGHT

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PERFORMANCES OF THE NIGHT

Q1-1: Weight Classes & KOs

Q1-2: Most Accomplished ...

Q1-3: PFP Rankings

Q2: Reach vs. Wins

Q3: Age vs. Wins

Q4: Type of Fight/Event

PERFORMANCES OF THE NIGHT

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Actions

POTN WinnerID	Event Name
1000	UFC 287: Pereira vs. Adesanya 2
1004	UFC 287: Pereira vs. Adesanya 2
1028	UFC Fight Night: Vera vs. Sandhagen
1034	UFC Fight Night: Vera vs. Sandhagen
1048	UFC 286: Edwards vs. Usman 3
1066	UFC 286: Edwards vs. Usman 3
1088	UFC Fight Night: Yan vs. Dvalishvili
1096	UFC Fight Night: Yan vs. Dvalishvili
1100	UFC 285: Jones vs. Gane
1102	UFC 285: Jones vs. Gane
1108	UFC 285: Jones vs. Gane
1128	UFC Fight Night: Muniz vs. Allen
1132	UFC Fight Night: Muniz vs. Allen
1134	UFC Fight Night: Muniz vs. Allen
1136	UFC Fight Night: Muniz vs. Allen
1140	UFC Fight Night: Muniz vs. Allen
1144	UFC Fight Night: Muniz vs. Allen
1148	UFC Fight Night: Andrade vs. Blanchfield
1160	UFC Fight Night: Andrade vs. Blanchfield
1172	UFC 284: Makhachev vs. Volkanovski
1174	UFC 284: Makhachev vs. Volkanovski

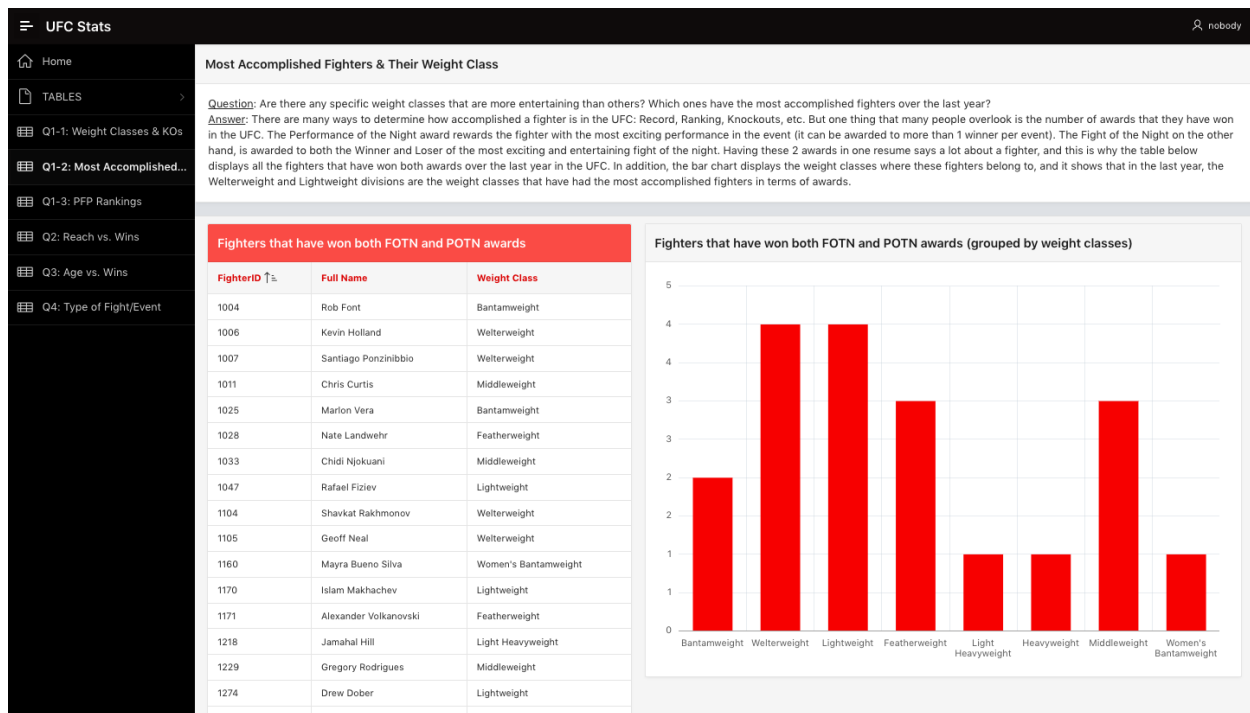
Fig. 19 POTN

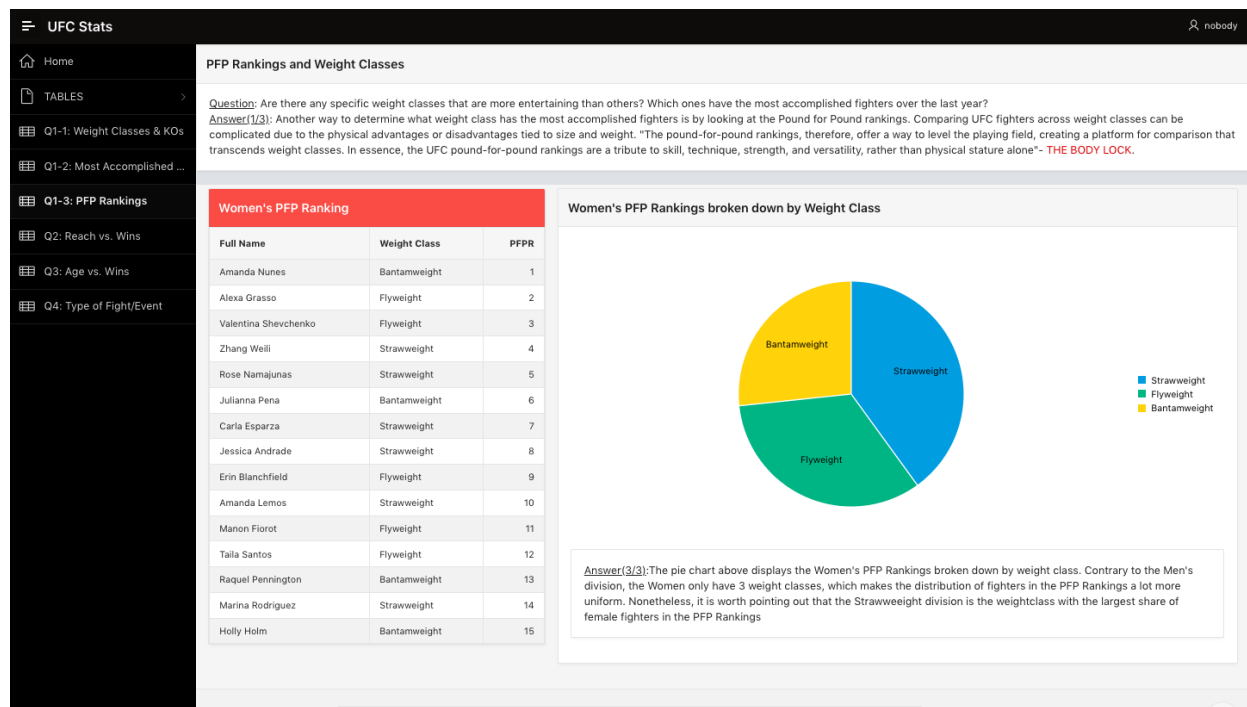


Queries

Figures 20 – 23 all answer the first question. The data was split into 3 components with the objective of presenting a full and detailed answer. All of the pages contain a text box clarifying what the research question is and what the results mean.







Figures 24 and 25 show the results/answers for the second research question. Both reports are presented in the same page with the objective of showing the user how similar data can portray completely different things when seen from different perspectives. We included two text boxes in separate locations of the page so that the user is always guided while navigating through the report. We opted to display the table as an interactive report since there were 50 rows of data.

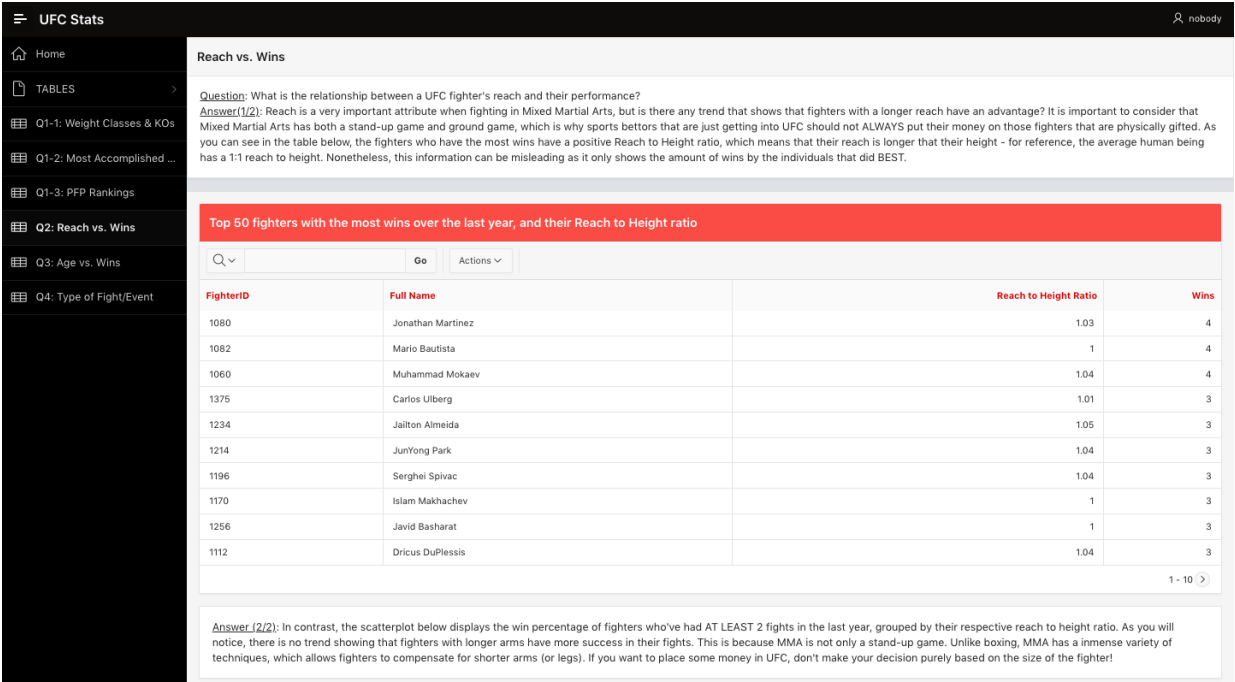


Figure 26 displays the results of the third research question. Although the text answer and the classic report should be enough to show the user the trend found in the data, we thought it would be a good idea to plot it so that the user could compare different age groups and their win percentage at the same time.

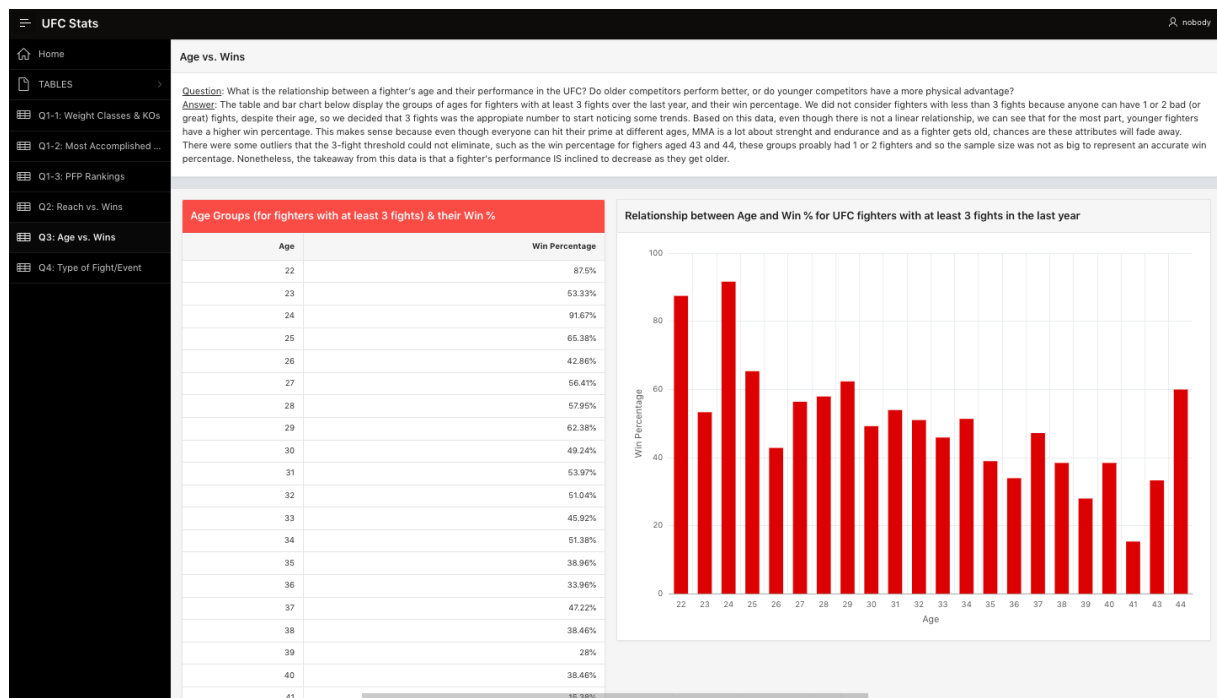


Fig. 26 Relationship between a fighter's age and their win percentage

Finally, Figure 27 shows the two classic reports constructed to answer the last research question. Since this answer involved a lot of interpretation, we decided to split the answers into two paragraphs and just leave the reports as tables, not display them as any type of charts. This way, all the information is more compact, and it becomes easier for the user to switch back and forth from the text answer to the table report.

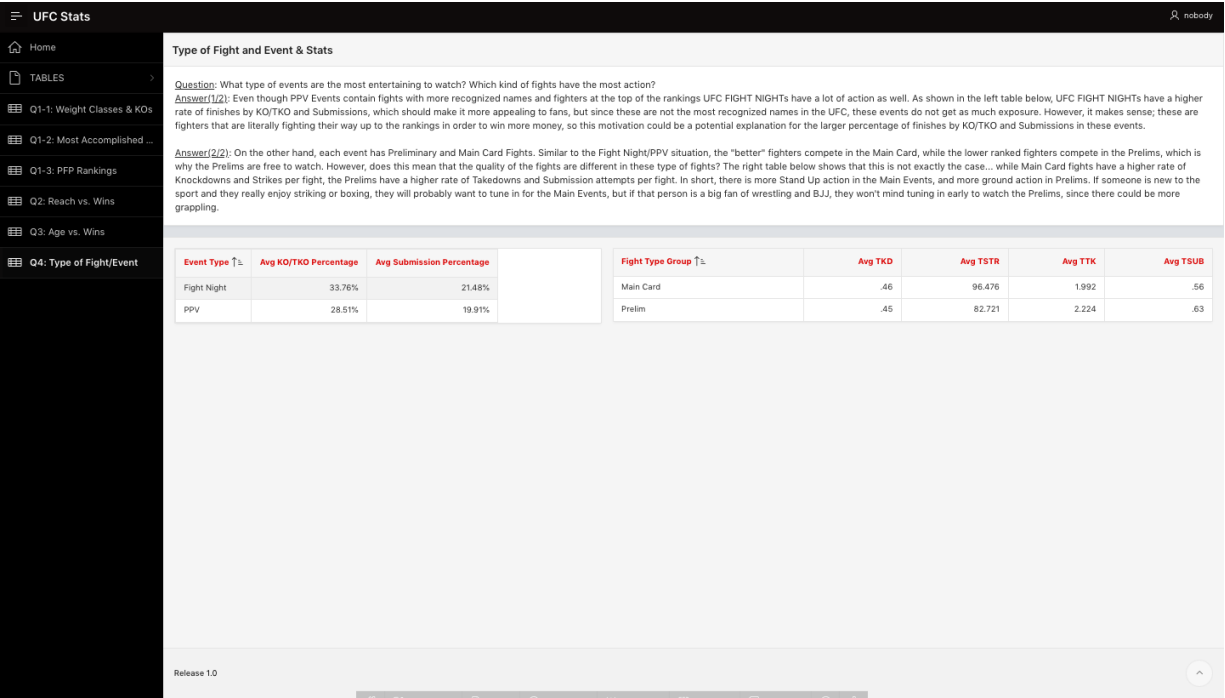


Fig. 27 Type of fights and events and their corresponding statistics