

Mixed Martial Arts

Study Group 14

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What is Mixed Martial Arts? (MMA)



MMA

- A combat sport
- Boxing, Muay-Thai, Brazilian jiu-jitsu, Wrestling, Judo, Karate
- Win by Knock Out, Submission or Referee Decision



UFC

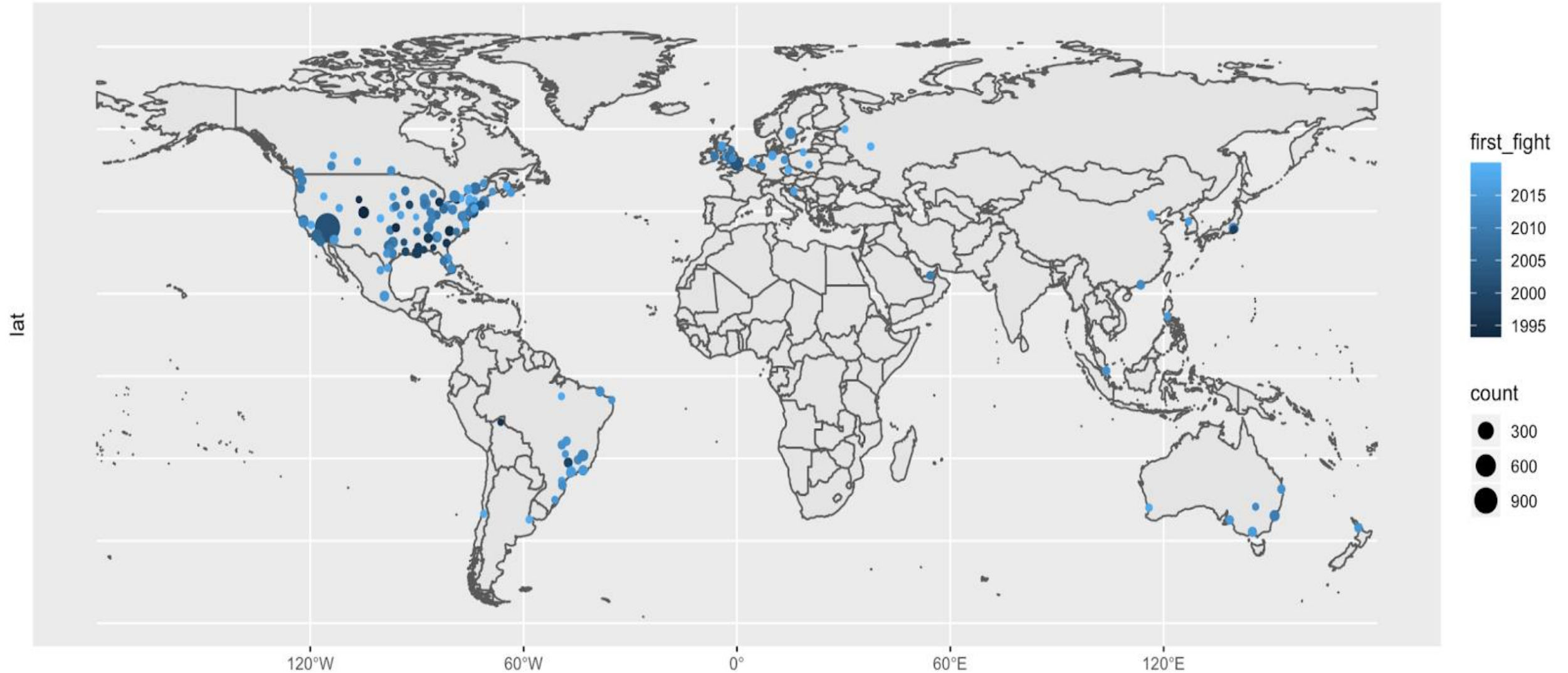
- The Pioneering Promoter of MMA
- *De Facto* the governing body for MMA
- Today, “UFC” is used synonymously with “MMA”

The Dataset

- Detailed information on every fight in UFC history (1993-2019)
- Exact information on quantity and types of kicks/punches thrown by each fighter in the fight
 - Same information also included as aggregate career information for all fighters at different points in time
- For the purpose of the analysis we only used the data on **men** (94% of all fights)

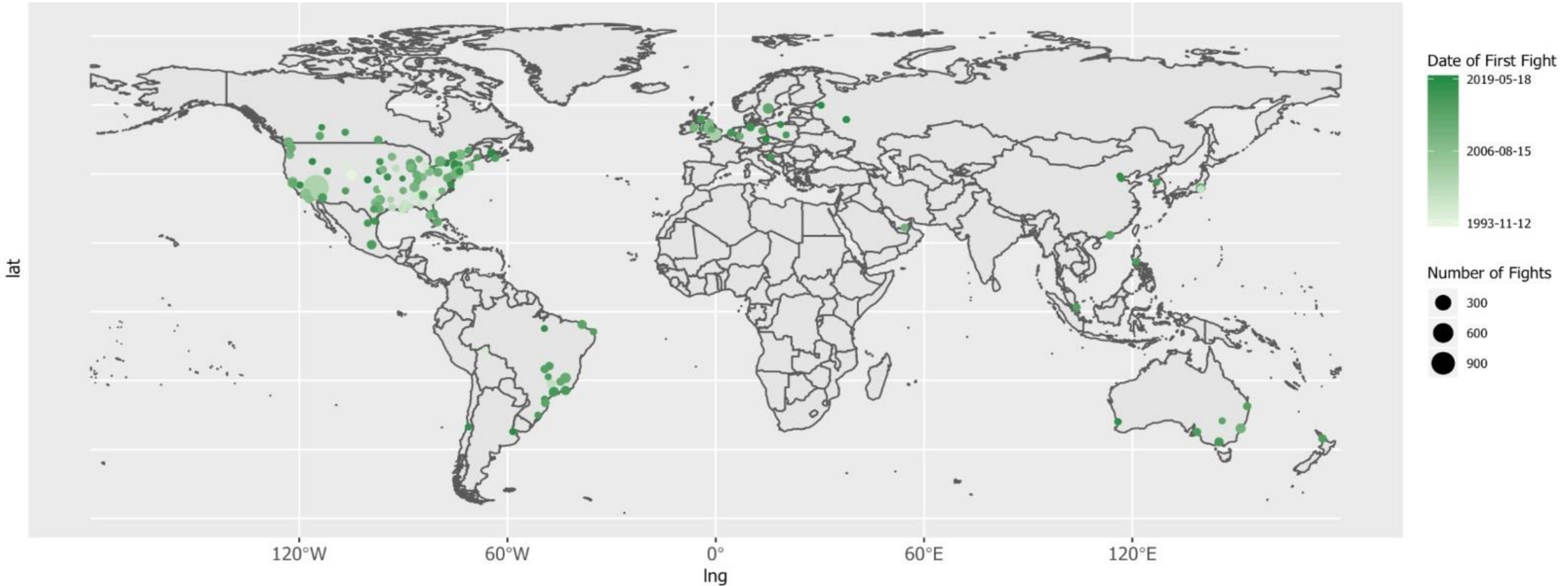


The Rise of UFC Sports Business





The Rise of UFC Sports Business





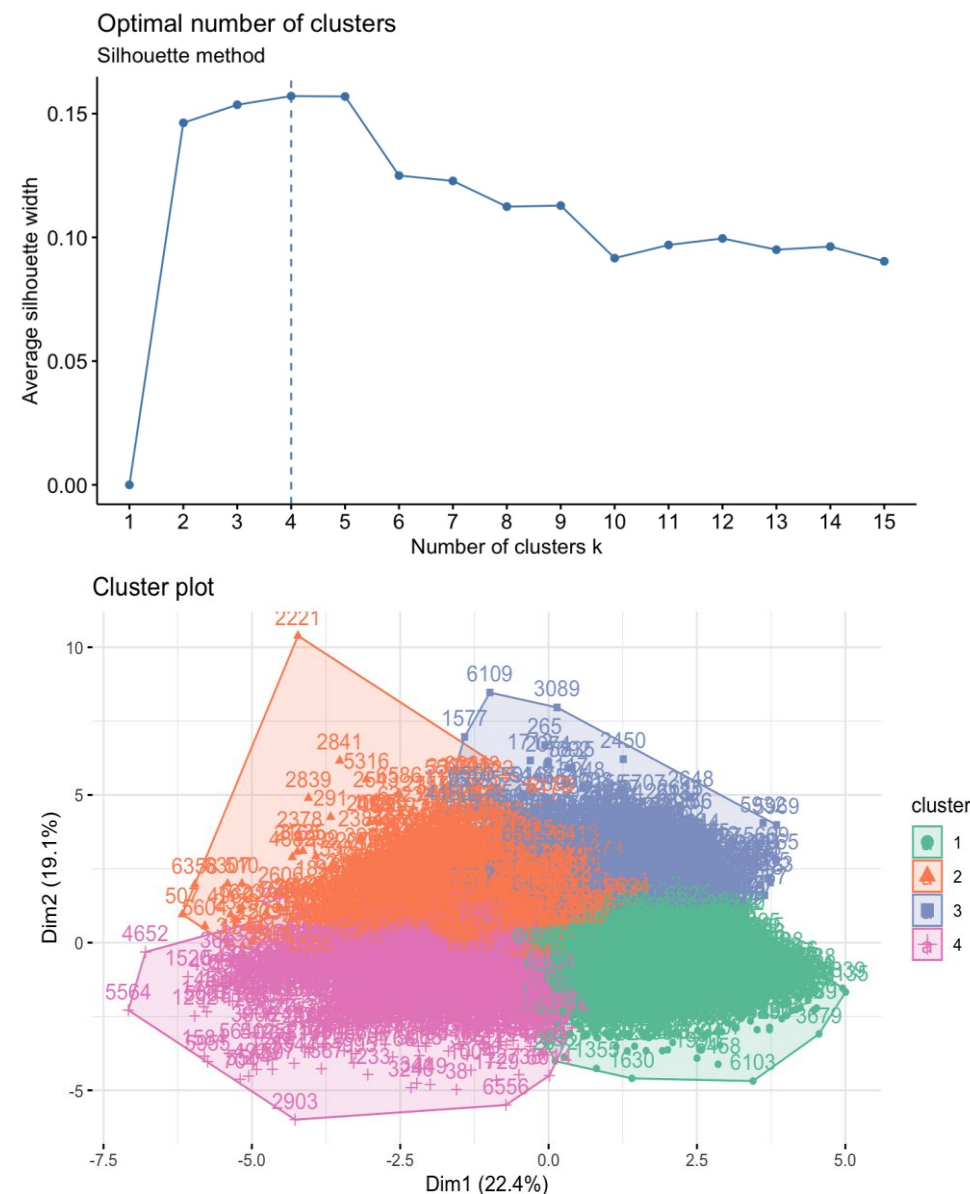
How did we differentiate fighters?

Kmeans Clustering

We identified 4 clusters of fighters, based on the following characteristics:

- **HEAD** - no. of significant strikes to the head (attempted)
- **BODY** - no. of significant strikes to the body (attempted)
- **CLINCH** - no. of significant strikes in the clinch (attempted)
- **GROUND** - no. of significant strikes on the ground (attempted)
- **Sub** - no. of submission (attempted)
- **Leg** - no. of strikes on leg (attempted)
- **PASS** - no. times the guard was passed
- **REV** - no. of reversals
- **TD** - no. of takedowns
- **KD** - number of knockdowns
- **Decision** – proportion of wins via decision
- **KO/TKO** – proportion of wins by knockout
- **Submission** – proportion of wins by submission
- **Arm_reach** - reach of the fighter (in cm)
- **Weight_lbs** - weight of the fighter (in pounds)#

As a by-product to the clustering method we were also able to identify rookie-fighters (0 previous fights) and assign them to a cluster



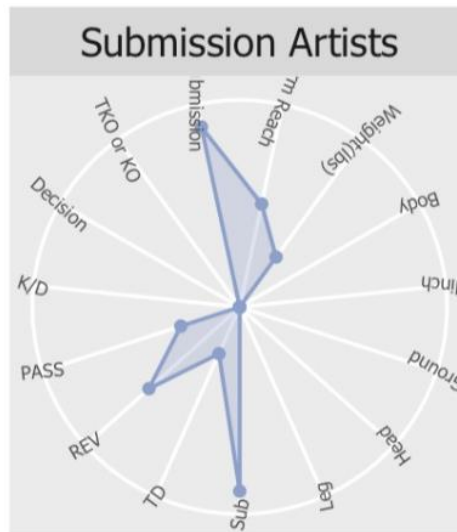
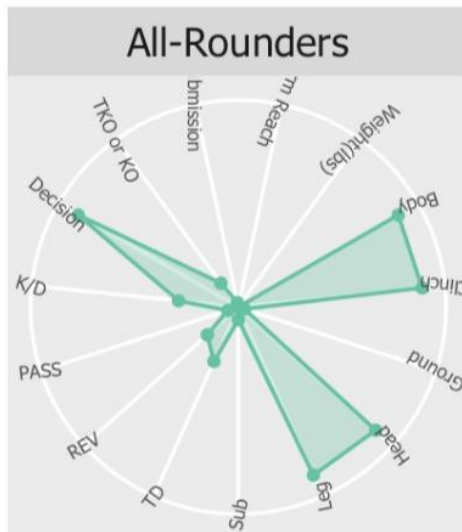


So what are the different styles of fighters?

Cluster 1: GREEN

All-Rounders

- Attack on body, head, leg, clinch, and takedowns
- High number of wins by decision following by know-out



Cluster 3: BLUE

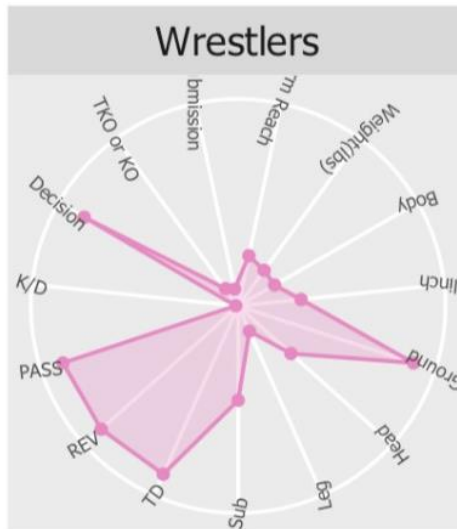
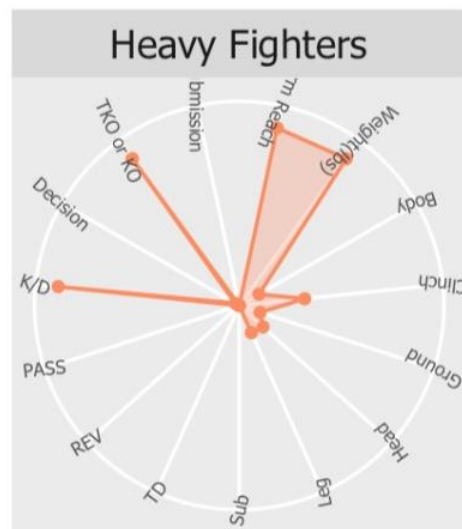
Submission Artists

- Do not prefer offence by striking
- Consists of jiu-jitsu specialists
- Great at take-down, reversals, and passing the guard

Cluster 2: RED

Heavy Fighters

- Leverage on punching power
- High number of knockdowns
- High number of wins by KO/TKO.

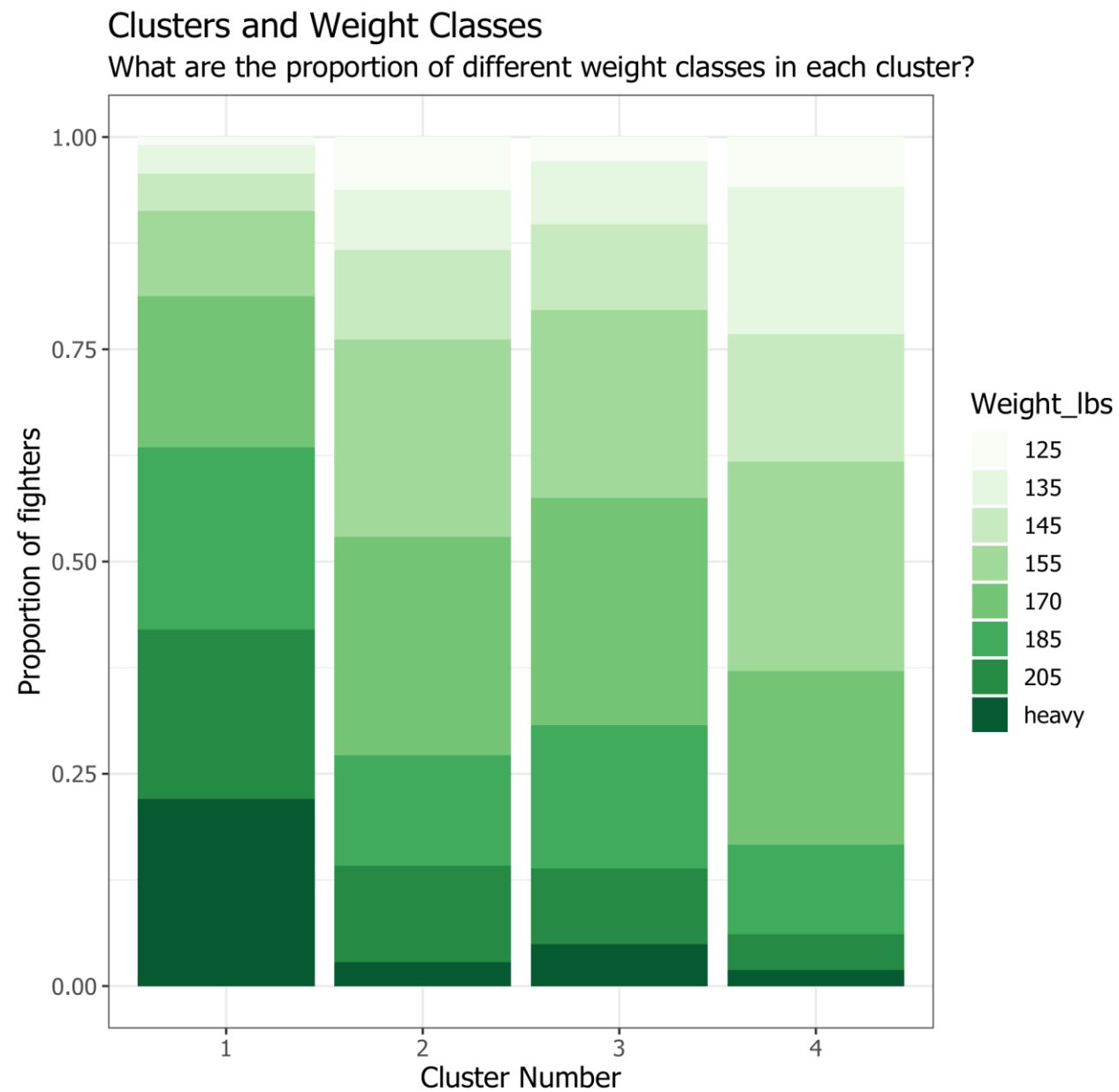


Cluster 4: PINK

Wrestlers

- Do not prefer offence by striking
- Consists of jiu-jitsu specialists
- Great at take-down, reversals, and passing the guard
- High number of wins by submission

Which fighters make up
each cluster?



What are fighters' strategies associated with their wins?





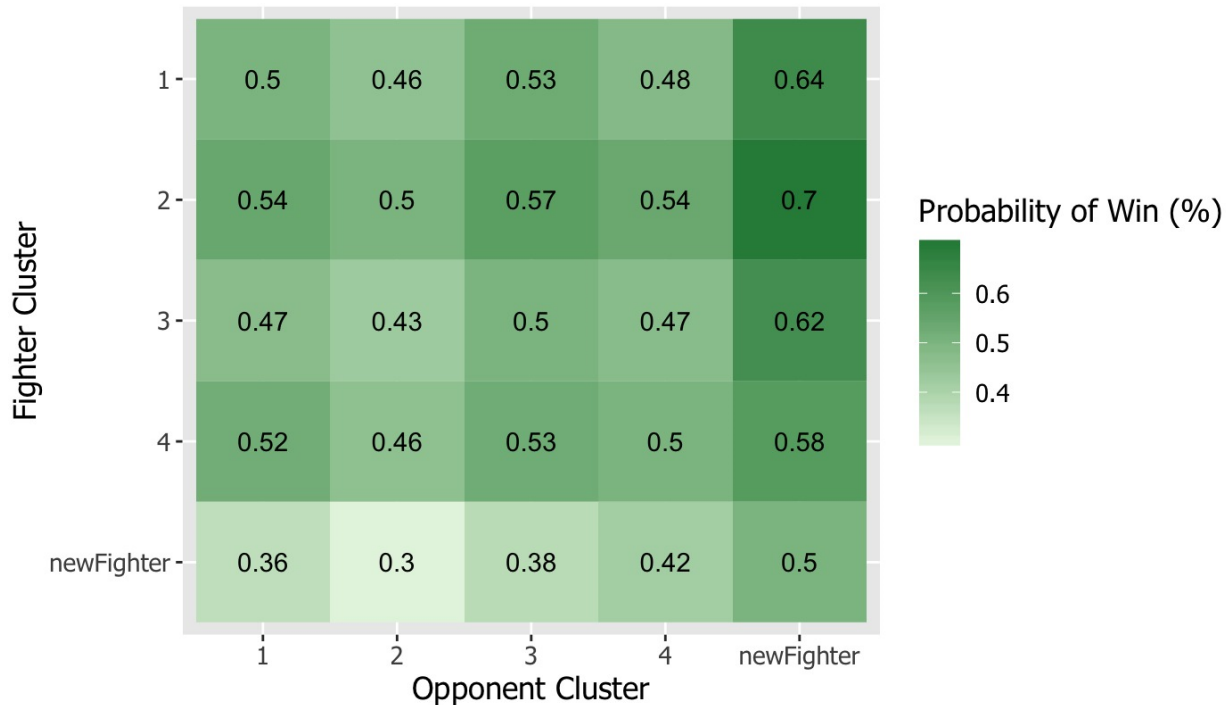
Making the Style Fights!



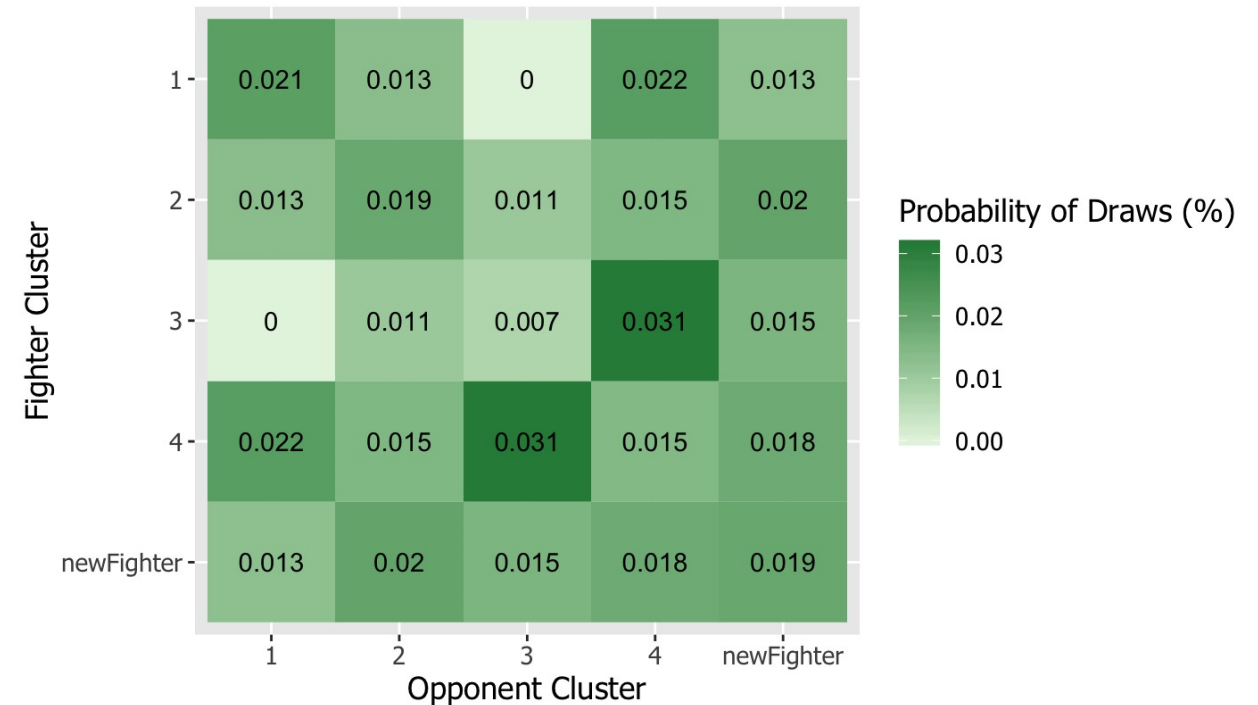
Are certain clusters more likely to win against others?

Are certain clusters more likely to draw against others/itself?

Heatmap for Probability of Win



Heatmap for Probability of Draws





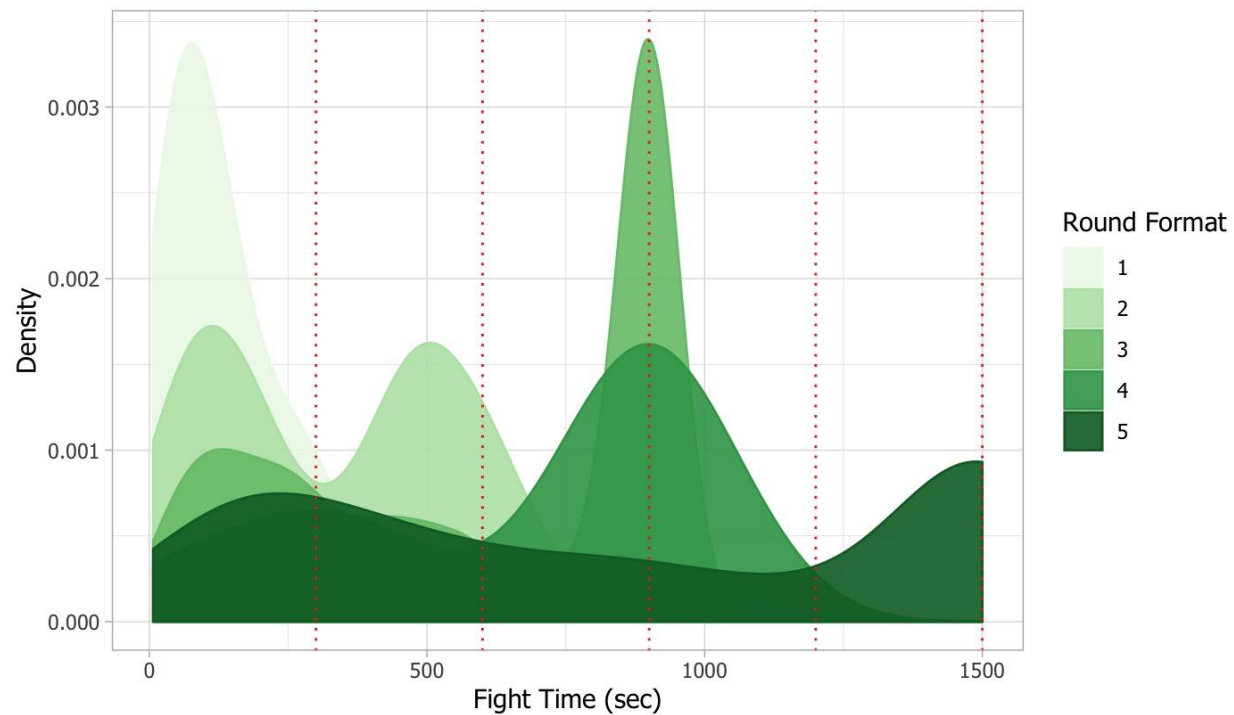
Time!



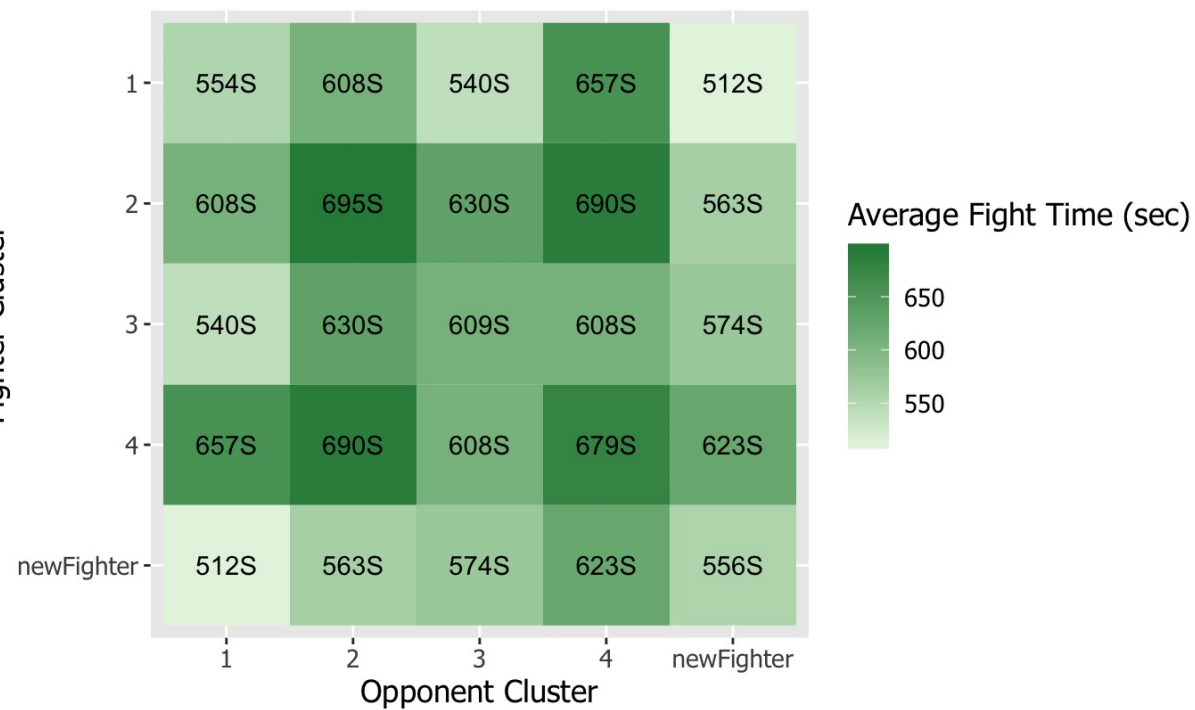
How long do fights in the UFC last?

Do fights among certain clusters drag on for longer than others?

How long do the fights of different formats last?



Heatmap of Average Fight Time





What's the point?



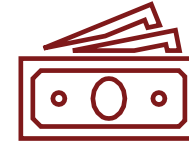
Insight

e.g. rookie fighters are most likely to struggle against heavy ground-and-pound opponents



Prediction

build a predictive model based on the insights produced



Monetisation

leverage the insights for betting purposes.

Any Limitations?

- We just considered Men's fighting data
- Unavailable data of many small regional organizations