

DSC680 – Weight Training Strength to weight ratios

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Abstract

In the second term project I chose to examine the topic of weightlifting. As an avid gym goer, and a passion for lifting, it would be interesting to discover what makes most happy at the gym while discovering the natural theoretical limits of the human body under workloads and physical stress. This paper intends to discover the strength to weight ratio based on gender, age, and the most common exercises used for strength gain.

Business Problem

Weight training is a healthy and enjoyable experience. Getting into the gym could be daunting for some, but for many who have been training for years still might find that performance is not adequate compared to others. This research paper is going to dive into the strength to weight ratios of an aggregate for many lifters, explore the most common exercises that many enjoy, and explore the data on the impact of gender age and weight for weightlifting.

Datasets

Data is limited for powerlifting, but from the datasets found the information that would be important is found such as height, weight, sex, level of intensity, and raw strength numbers. This data covers over twenty-two thousand meets with four hundred twelve thousand lifters from around the world. The data is as recent as April of 2019. Other datasets contain data used to track personal activity using wearable devices such as Jawbone Up, Nike Fuel Band, and Fitbit. One other set will contain information on weight and exercise movement prediction.

Summary of Methods

Methods would include bar charts, scatter plots, K-means clustering and other classification methods. It would also be interesting to see if there are other Indicators that might reveal some information on how the gender and age of a person affects the strength to weight ratio.

Ethical Considerations

Natural lifting is always an ethical concern, as a person under the influence of different pharmaceuticals could be creating a skewed strength to body weight ratio. Performance enhancing drugs often lead to premature death and many other terrible outcomes such as gynecomastia, mood swings, and unfair advantages in sports strength training. This could skew data heavily or suggest those who are older, stronger than their normal counterparts could be under the influence of steroids. These would be treated like outliers, but without the data of steroid use, it would be very difficult to tell thus making the accuracy of the results come into question.

Challenges/Issues

Data for this topic is prevalent but often regurgitated. Data that is aggregated is also very difficult to find as sports nutrition and other data points are often either kept secret or made public but very anecdotal in nature. Data points that seem to be outliers do come into question on whether the individual is genetically engineered, or genetically gifted by nature. Another concern is to know if the data contains an aggregate of the individual's performance over time. As intensity and workload go up, there is more opportunities for injury or longer recovery which could show a lower overall strength to weight potential overall, and depending on the when the data was collected there could be a point that shows that the user was not at one hundred percent when the data was collected, giving a less than accurate picture overall.

References

<https://www.kaggle.com/datasets/open-powerlifting/powerlifting-database>

<https://www.kaggle.com/datasets/athniv/exercisepatternpredict>

<https://www.kaggle.com/datasets/nithilaa/fitness-analysis>

<https://www.kaggle.com/datasets/jiunn1998/workout-exercise>