**Final Report**

**Linear Regression Modeling and Analysis Results for Body Dimensions**

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December 9th, 2017

**Abstract**

**Introduction**

1. **Description for the dataset**

The raw dataset was obtain from The Journal of Statistical Education in October 2017. This dataset contains 21 body dimension measurements as well as age, weight, height, and gender on 507 individuals. The 247 men and 260 women were primarily individuals in their twenties and thirties, with a scattering of older men and women, all exercising several hours a week.

The variables with their corresponding descriptions are in the following list and all details are accessible through the raw dataset website provided in the reference:

1. biacromialD: biacromial diameter (cm)
2. biiliacD: biiliac diameter, or "pelvic breadth" (cm)
3. bitrochantericD: bitrochanteric diameter (cm)
4. chest\_depth: chest depth between spine and sternum at nipple level, mid-expiration (cm)
5. chestD: chest diameter at nipple level, mid-expiration (cm)
6. elbowD: elbow diameter, sum of two elbows (cm)
7. wristD: wrist diameter, sum of two wrists (cm)
8. kneeD: diameter, sum of two knees (cm)
9. ankleD: ankle diameter, sum of two ankles (cm)
10. shoulderG: shoulder girth over deltoid muscles (cm)
11. chestG: chest girth, nipple line in males and just above breast tissue in females, mid-expiration (cm)
12. waistG: waist girth, narrowest part of torso below the rib cage, average of contracted and relaxed position (cm)
13. navelG: navel (or "Abdominal") girth at umbilicus and iliac crest, iliac crest as a landmark (cm)
14. hipG: hip girth at level of bitrochanteric diameter (cm)
15. highG: thigh girth below gluteal fold, average of right and left girths (cm)
16. bicepG: bicep girth, flexed, average of right and left girths (cm)
17. forearmG: forearm girth, extended, palm up, average of right and left girths (cm)
18. kneeG: knee girth over patella, slightly flexed position, average of right and left girths (cm)
19. calfMaxG: calf maximum girth, average of right and left girths (cm)
20. ankleMinG: ankle minimum girth, average of right and left girths (cm)
21. wristMinG: wrist minimum girth, average of right and left girths (cm)
22. age: age (years)
23. weight: weight (kg)
24. height: height (cm)
25. gender: gender (1 - male, 0 - female)
26. **Research Questions & Reasons**

Three main objectives are primary selected for this research project:

1. What are the best body features that can influence the body weight?
2. Which body feature has the most influence on the body weight?
3. What is the best model for predicting one’s body weight?

Reasons for research questions:

1. We want to study how one’s body features can reflect one’s body weights. Since there are so many body features, we do not know which features can significantly influence one’s body weight and which body factor is the most important part that one wants to pay attention with if he or she is worried about his or her body weight. In nowadays, more and more people are getting diabetes and having trouble dealing with once they actually get the diabetes. Our society is also trying to help people out with this problem and control the number of people who are having the risk of getting diabetes. Our research on body weight model will surely help people to know more about their body, and thus people will be able to control their body weight more efficiently.
2. We try to find the “best” model for body weight model because we want to find a model that can help people. If we get a model that is too complicated, it will be hard for people to use such model for measuring their body weight. If the model is too simple, such model may not be useful. Therefore, we want to balance “useful” and “simple” and get a good model, which may not be the “best” model in the world but could still offer people a lot of useful information in analyze their body weight.

**Exploratory Data Analysis**

We first trying to find the outliers

**Methods**

**Results**

**Conclusions**

**Team Member Contributions**

**Reference**

1. **"Exploring Relationships in Body Dimensions." Journal of Statistics Education - Data Archive (2014). Accessed October 18, 2017. http://ww2.amstat.org/publications/jse/jse\_data\_archive.htm.**