Eli Daniels
Robert Huey
Luka Kelly

Group Project: Social Good

Health & Fitness Recommender

Problem Statement

This project aims to assist individuals in achieving their fitness goals by analyzing fitness activity through data from two distinct tracking devices, being Apple Watch vs Fitbit. Leveraging data from these devices, including health-related attributes, we will calculate BMI, combine user-specific insights and employ a predictive activity type model to create recommended fitness activities personalized to the individual to help them attain a BMI within the "normal" range.

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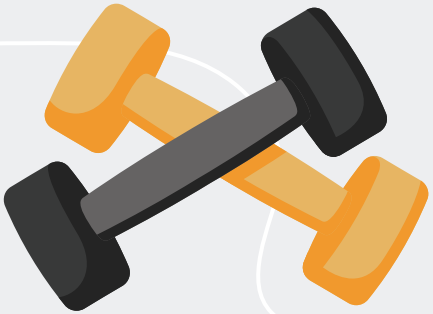


01.

INTRODUCTION TO HEALTH AND FITNESS

Describing our Data

CONCEPTUALIZE

Participants wore one of two devices the Apple Watch or the Fitbit that would take in health data and also activity data.

Factors to consider

Age	HEART_RATE
GENDER	RESTING HEART RATE
WEIGHT	DEVICE
HEIGHT	CALORIES PER HOUR
BMI / BMR	PHYSICAL ACTIVITY

How to Calculate BMI.

```
first['bmi'] = (first['weight_pounds'] * 703)
/ (first['height_inches'] ** 2)
```

BMR Men.
BMR = 10W + 6.25H - 5A + 5

BMR Women
BMR = 10W + 6.25 -5A - 161

Further into BMI Classes

Normal Weight = 18.5 - 24.9

2

Overweight = 25 - 29.9

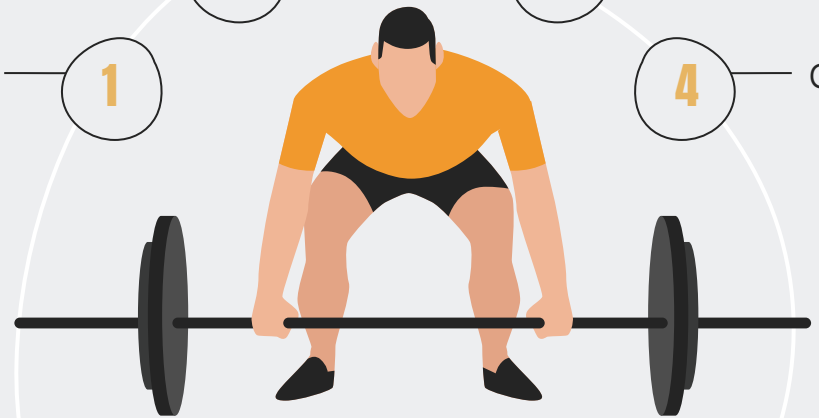
3

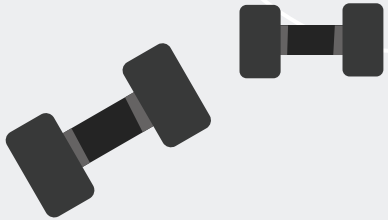
Underweight = < 18.5

1

4

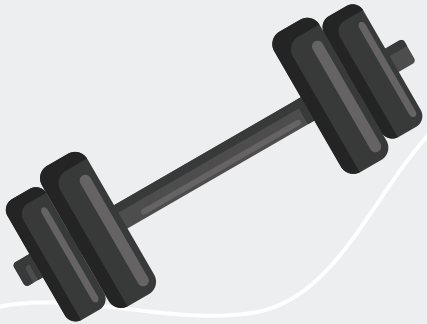
Obesity = BMI of 30



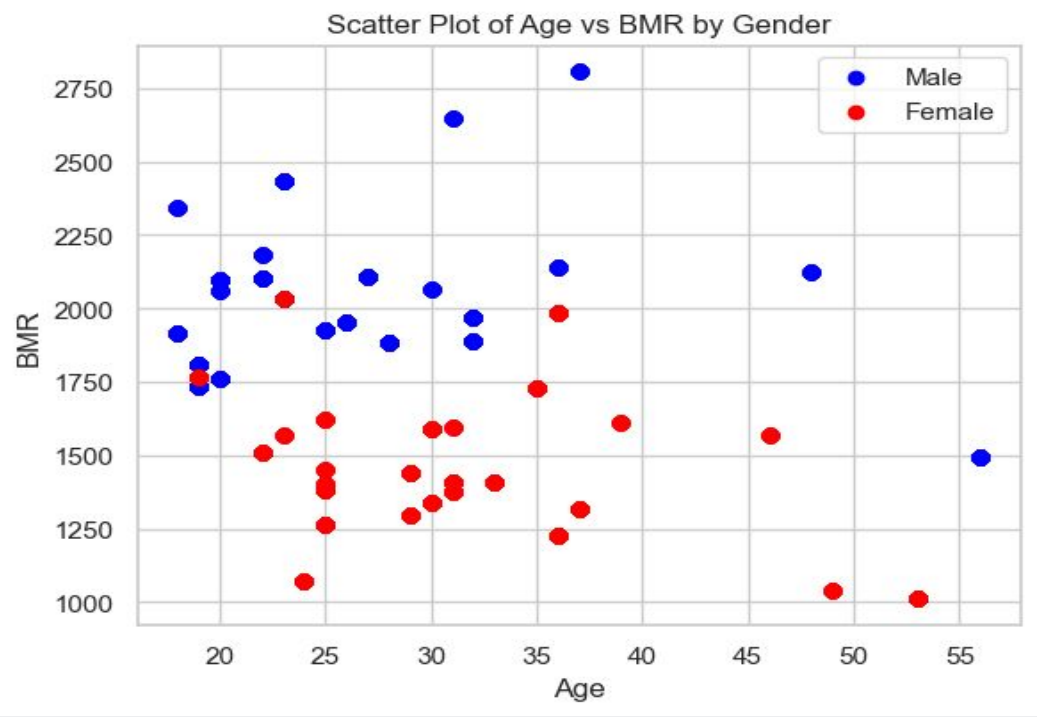


Which device do you think would have a higher BMI?

Mean Apple Watch BMI: 24.31
Mean Fitbit BMI: 23.66



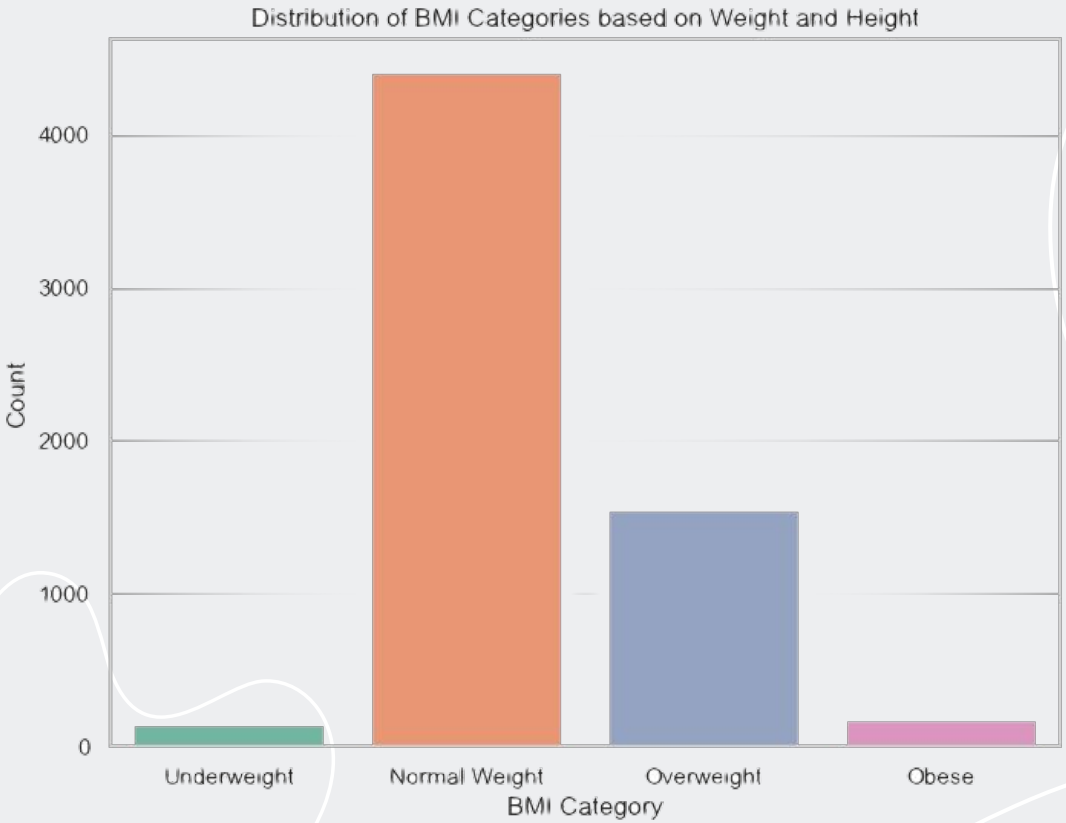
Male vs Female BMR Scores



AGE v BMI v BMR

Age, BMI (Body Mass Index), and BMR (Basal Metabolic Rate) are important factors in assessing an individual's health, fitness, and metabolic profile. Let's explore the significance of each of these factors:

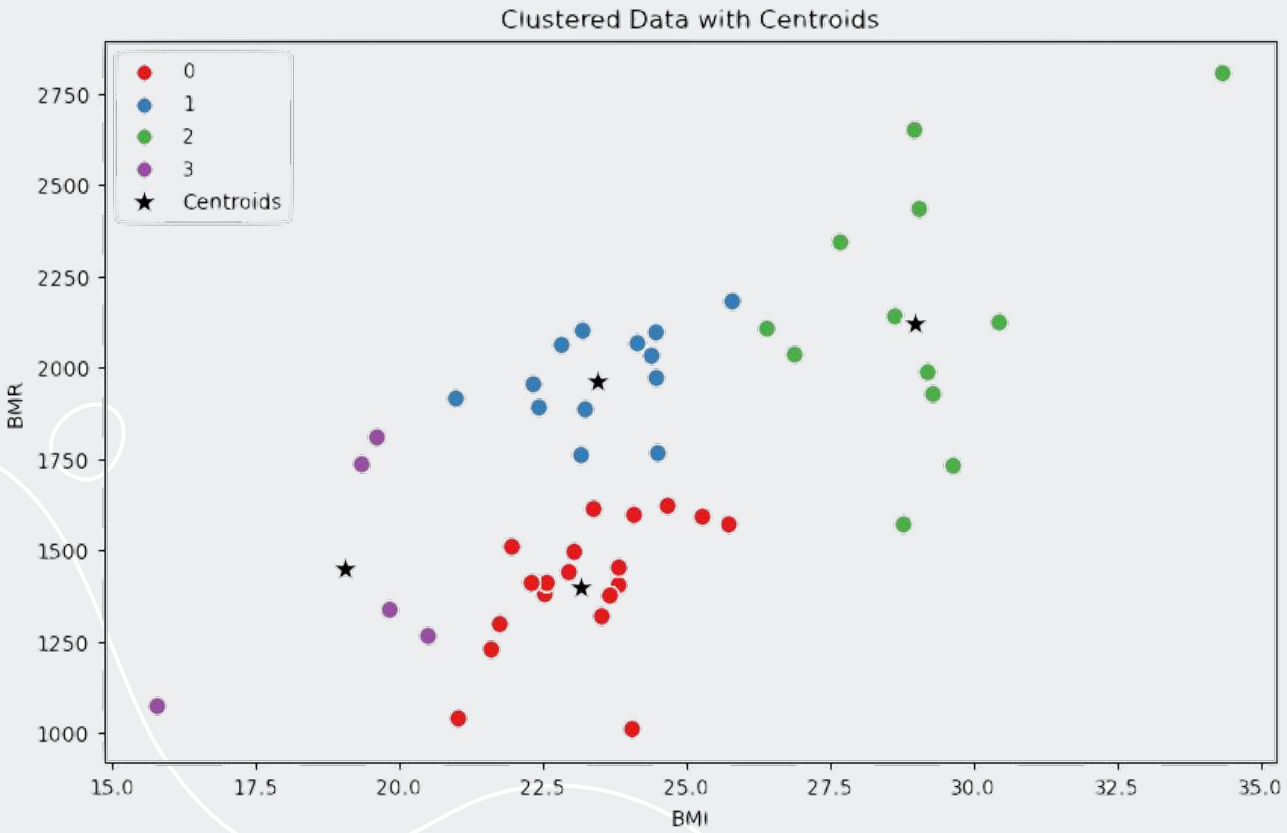
Data distribution Categories on based on BMI



This is the distribution of our BMI classes through our dataset that we one hot encoded to get a better understanding of individuals who would be our target audience for our final recommender

Modeling

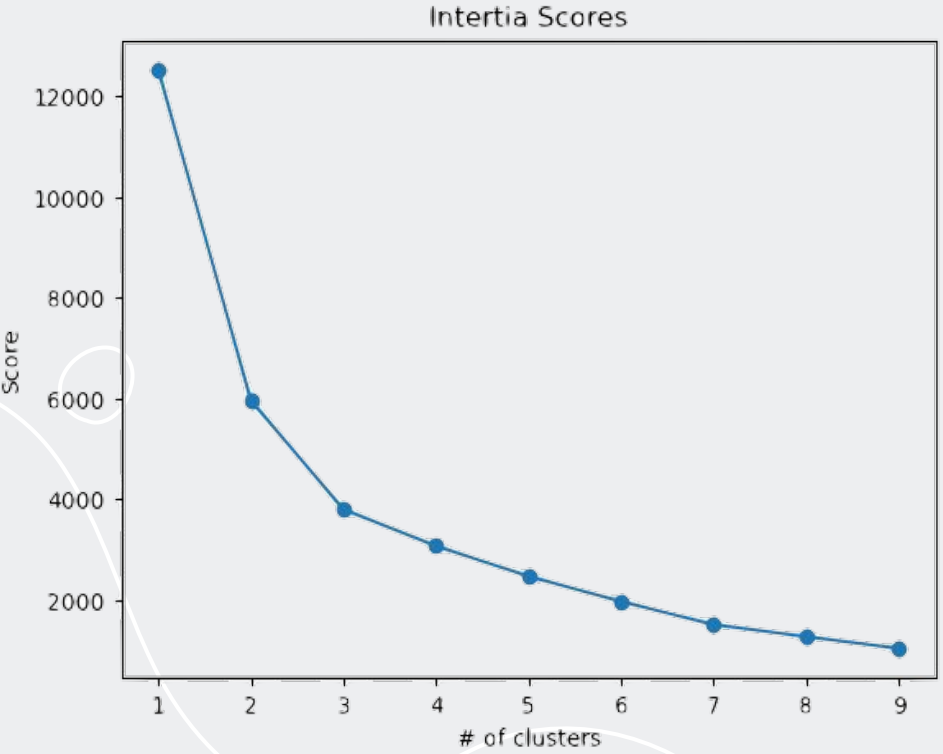
K-Means Clustering

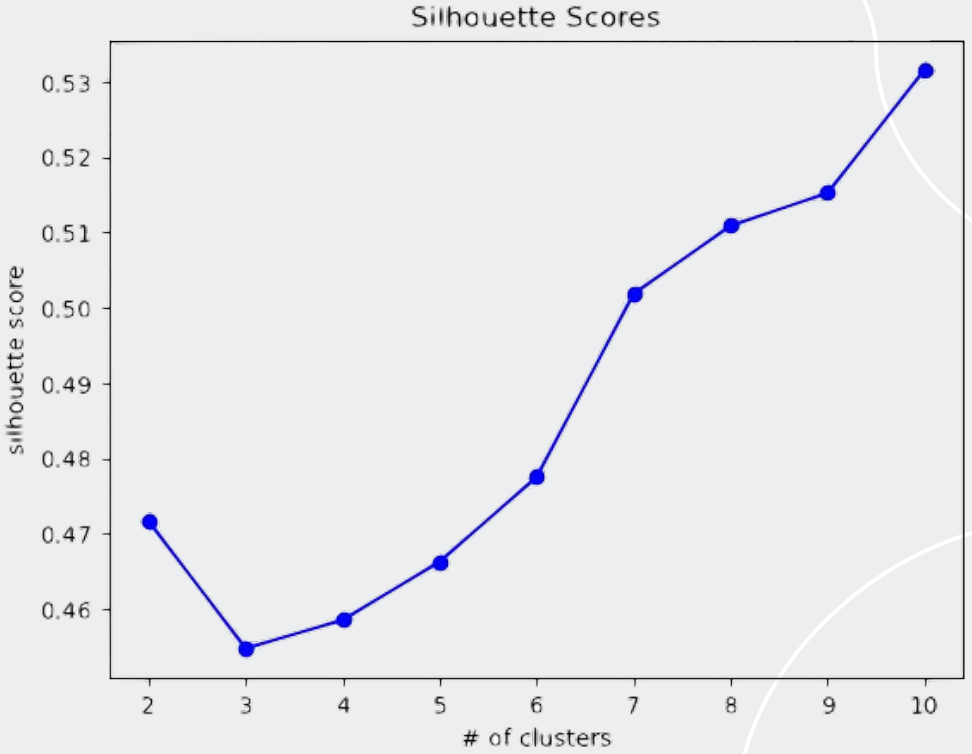


Graph shows purple being our underweight category, with red being normal, blue being overweight, and green being obese.

The clusters were not fully separated, giving us different values than the original dataset assigned

What is the prime K?

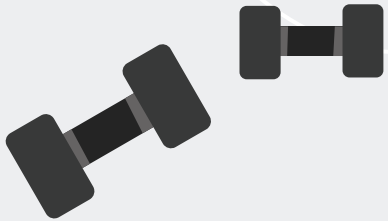




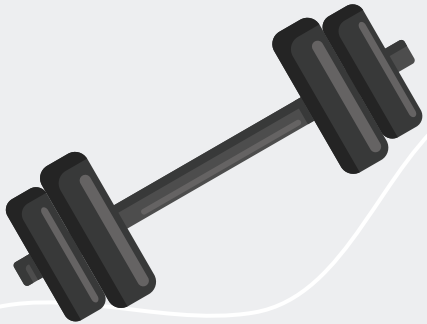
Random Forest

Our Random Forest predictor for Activity showed an accuracy of 0.88 on the test data suggests that the model accurately predicted the activity labels for about 88% of the unseen test samples. This is a reasonably strong

ALTHOUGH our model.score(X_train, y_train) achieved a 1.0 score and was overfit this was to be expected because we are predicting an Activity type to implement.



Recommender System



Calories

	Activity, Exercise or Sport (1 hour)	130 lb	155 lb	180 lb	205 lb	Calories per kg
4	Moderate Cycling	472	563	654	745	1.647825
14	Light Calisthenics	207	246	286	326	0.721008
16	Vigorous Weight Lifting	354	422	490	558	1.234853
17	Light Weight Lifting	177	211	245	279	0.617427
19	Stair Machine	531	633	735	838	1.852957
21	Moderate Rowing	413	493	572	651	1.441339
28	General Aerobics	384	457	531	605	1.338435
29	Jazzercise	354	422	490	558	1.234853
30	Hatha Yoga Stretching	236	281	327	372	0.823236
49	General Running	472	563	654	745	1.647825
116	Moderate Jumping Rope	590	704	817	931	2.059443
131	Tai Chi	236	281	327	372	0.823236
141	Backpacking Hiking	413	493	572	651	1.441339
169	Moderate Walking	195	232	270	307	0.679711
199	Leisurely Swimming	354	422	490	558	1.234853

Calories Burned per exercise for each weight class

Since everyone burns calories different it is important our recommender system takes weight into consideration

BUYER PERSONA INFOGRAPHICS

"I WANT TO LEAD A HEALTHY LIFESTYLE WITHOUT EXTREME DIETING AND EXERCISE."

Goat James

BIO

Our average client is outdoorsy, has creative jobs and a passion for the environment and the planet

PERSONALITY

- Positive, Motivated
- Great Coder
- Keeps up to date with trends
- Confident he will get a passing grade on his group project

MOTIVATIONS

1. Self-improvement
2. Organization
3. Ecology

PAIN POINTS

Doesn't know where to start or what exercises would be ideal for his fitness goals

ATTRIBUTE INPUTS: Example

Inputs	TRAINING 1-2 Hours	Recommend Exercises:	Cardio exercises	Low-impact exercises	Calories burned per hour for each exercise
Weight	Pounds	High-intensity interval training (HIIT) Pilates or light resistance	running, cycling	swimming, yoga	All our recommended Exercises contingent on body weight
BMI	18.5 to 24.9				
BMR	1,000 and 2,300				
Gender	Male/ Female				
AGE	25-60+				

Conclusions

From our analysis and modeling, we can conclude that the K-Means Clustering Model and DBSCAN Model perform best with three clusters as compared to the four classes made by the CDC. These models however were not performing well due to the clusters not being clearly separated. This however was different from the random forest that we made that gave us an 88% accuracy score in predicting the activity type. Since our accuracy rate was high, we then took the activity types in question and created a recommender system to inform users what the best activity would be for them to reach their a healthy BMI. We also found that Apple Watch users have a higher average BMI than Fitbit users.

Recommendations

We would recommend that users do the activities recommended to them by our system to check to see if significant results were made towards moving their BMI to the desired range. If possible, it would be great to gather more data for different activities using these devices.

THANK YOU