**Project: HUDK4050 – Assignment 6**

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**Experiment Activity:** Jumping Rope in 1-minute

**AIM:**To analyze the rope jumping abilities of individuals in our group, explore correlations to other personal factors (asked in our survey) and make suggestions to improve performance.

**Problems Encountered:**

1. After we have collected everyone’s raw data from the app “Phyphox” and begun to do the data cleaning part, our data cleaning team found out that there were some members data are different than the other’s. There were some data that has several xyz value in one same time plots which would make the further data analysis to be inefficient. Therefore, we managed to take the average value of xyz at the same time plots to eliminate such problems which the progress has shown in the R\_cleaning\_H5 file. Therefore, we came to an agreement to use the “Clean\_data\_h5.csv” for the data analysis part.
2. The second problem we faced is that there were some y variable that have negative values. When the data analysis team initially used the negative values together with positive ones, the plots seemingly to be inefficient. Thus, we decided that we assumed that all of us put the phone vertically in our pockets when doing the activity and some of us might put the phone reversely and thus caused the appearance of the negative values. Based on this assumption, the data analysis team finally decided that they would take the absolute value of these negative y values to do the plot again and it turned out to be much more meaningful.
3. When computing the code for constructing the plot for K-means with k=2, we found out that every time the plot turns out to be different. Therefore, we decided to use the one that looks the most meaningful to us where we grouped cluster1: Ruoyi, Vidya, and Paolo are the novices; and group 2: Xiyun, Kaijie, Hangshi, Yifei, Qiyu, and Wenning are the experts.

图表, 折线图

描述已自动生成

**Conclusions based on both K-mean cluster, PCA, and other plots.**

1. Personal height is not a significant indicator for being good at jumping ropes.
2. Fitness level and illness level can be used as moderate indicator for being an expert at jumping rope.
3. Prior experience on jumping rope can lead to a better performance.
4. Experts have a lower acceleration during the activity.
5. The most interesting part is that people whose mood is more on the positive side, which in this experiment we generally categorized as the happiness level, have a lower average of acceleration when jumping rope which means that they are better at doing the activity.
6. Personal height does not influence the performance of jumping rope.

Future Improvement:

1. Though some of the survey questions show a relationship between the performance, most of them do not provide a clear separation between novices and experts. We might have to search more on which variables would affect jumping ropes.
2. Not all of us put our phone in the same direction. Though we encountered it by simply assuming everyone puts their phone vertically, we still cannot eliminate the potential problem which might make the xyz variable interpretations differently. In future experiment, it is important to decide how to put phone in a same direction.
3. Survey questions are self-reported which bring some biases. Most of us reported the question moderately might be one possible reason that we are unable to get more clear relationship between these questions and the data.