## Part1

Chart

Description automatically generated

## Part2

## Chart Description automatically generated

Observation: The range of the x-axis in the before and after normalization are both from 0 to 500. Therefore, the normalization does not change the graph horizontally. On the other hand, the range of the y-axis in the before normalization graph is from -600 to 400. The range of the y-axis in the after-normalization graph is from -6 to 8. In conclusion, the normalization compresses the frequency vertically.

## Part3

## Chart, bar chart Description automatically generated

Observation: From looking at the data, it is clear to see that data 1, which is the first principal component, looked really closed to the original data. Data 2 has more change and is the second close to the original data. As the label number increases, the scores look far and far away from the original data. Therefore, if you want to get the original data, you can check the first few principal components. Therefore, the first few principal components (new axes) are the most important and can be used to represent most of the information in our data

## Part4

Chart, histogram

Description automatically generated

## Part5

Chart, line chart

Description automatically generated

It needs 4 of PCs minimum to capture 98% of the variance (information) in the original dataset.

## Part6

X axis of the accelerometer:

A picture containing graphical user interface

Description automatically generated

Text

Description automatically generated

Y axis of the accelerometer:

Application

Description automatically generated with low confidence

Text

Description automatically generated

Z axis of the accelerometer:

Application, timeline

Description automatically generated

Graphical user interface, text, application

Description automatically generated

## Part7

Modified code:

A screenshot of a computer

Description automatically generated with medium confidence

Screenshot of the first few rows of feature\_set:

A picture containing graphical user interface

Description automatically generated

## Part8

Observation: The feature table size has been changed from 2440x16 to 4879x16. While the segment size is half of the previous size, the column size remains unchanged at 16 columns, but the row size is doubled.