**Research on the important KPI’s for cyclists:**

**Speed:**

Speed is majorly used for self-satisfaction. While see the speed and comparing it on a daily or monthly we can see the growth. Measuring the average speed is the best measure because while seeing a long-time review, we can consistently see the growth with average speed as current, min and max keeps varying a lot on a daily basis.

**Power:**

Power is measured to determine how much effort you have put in to for the particular training session. Power is measured in watt. Measuring the average power is a better value considering a long-term analysis. As the average power increases, we can say that there a steady increase in performance and fitness. The average power for a beginner is around 75 – 100 watts.

**FTP:**

FTP stands for Functional threshold power. This measure is considered one of the major measures among the cyclist. This basically means how much power we can generate in a one-hour trial time. This value is determined by performing an 20 mins trial and calculating the average power for this run and multiplying the average power by 0.95, this is done because the hour long wattage will be 5% lower.

**Calories:**

This measure is noted to estimate the number of calories (unit of energy provided by food) that we are burning. Measuring this value is helpful while aiming for weight loss. The main focus of weight loss is burning more calories and less intake of calories that burning. Most of the application and fitness devices use algorithms to calculate calories which is not exact most of the times. The better way to measure calories is by using power meter and heart rate sensors. The ration between power and calories is almost 1:1 with a 5% margin for error.

**Distance:**

Distance is used to measure the endurance of an individual. But calculating distance varies depending on the type of track/road they are riding on. Because riding on a flat track and riding on an elevated track is different because there is more effort put in when the track is a bit elevated. Consider a nominally fit person the average distance covered in kilo meters is 20.

**Elevation:**

Elevation means the total amount of feet/meter we climb from a flat surface. Because we need to put more effort in climbing because of gravity. This means elevation burns more calories than the normal flat track hence more workout is done.

**Heart rate:**

Measuring the heart rate is one of the important measure because it helps us to know about our pressure levels to the heart. When the heart rate is high it is a sign that we are pressurizing the heart too much in such cases we will have to reduce our work and give it a rest. Measuring high, low and average is helpful as it helps us to analyse how we progress with our fitness. Maintaining lower and average heartrate is always better because it helps us avoid sudden heart problems.

**Process for clearing the data:**

1. First, we study about the data and see how each KPI operate.
2. Then we first try to group the data points from the seconds data to daily data to get a better understanding of the data.
3. We did this using the tool PowerBI. Where we used the editor to group the required data first and sort then in a daily fashion.
4. Then in order to get the duration of the workout we had to perform some simple mathematical calculation that is the difference between the end time and start time of the workout.
5. After obtaining the duration we no have to get rid of the null/empty values in the data for this we will be using a simple code in python using the tool Colab.
6. While going through the data set, we came to a conclusion that substituting the mean value for all the missing values would not affect the data on a large scale.
7. So, all the null values in the data set have been substituted with the average values of that column using the python code given in the git repository.
8. No finally the dataset has been taken out is ready for visualization.