

EDA & Statistics Project

# Midiendo actividad física y estrés con monitores de salud

2 aproximaciones

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julio| 2022

# Planteamiento del proyecto

1

¿Cómo podemos medir el estrés a partir de los datos de smartwatch?

2

¿Se puede analizar variables de salud para identificar correlación entre ellas?

3

¿Cómo identificar patrones de actividad?



# Metodología de trabajo

**CRISP-DM**



# VARIABLES MEDIDAS

para al menos 1 de las personas del estudio



# VARIABLES MEDIDAS

para al menos 1 de las personas del estudio



# Días medidos

## Por persona por cada variable

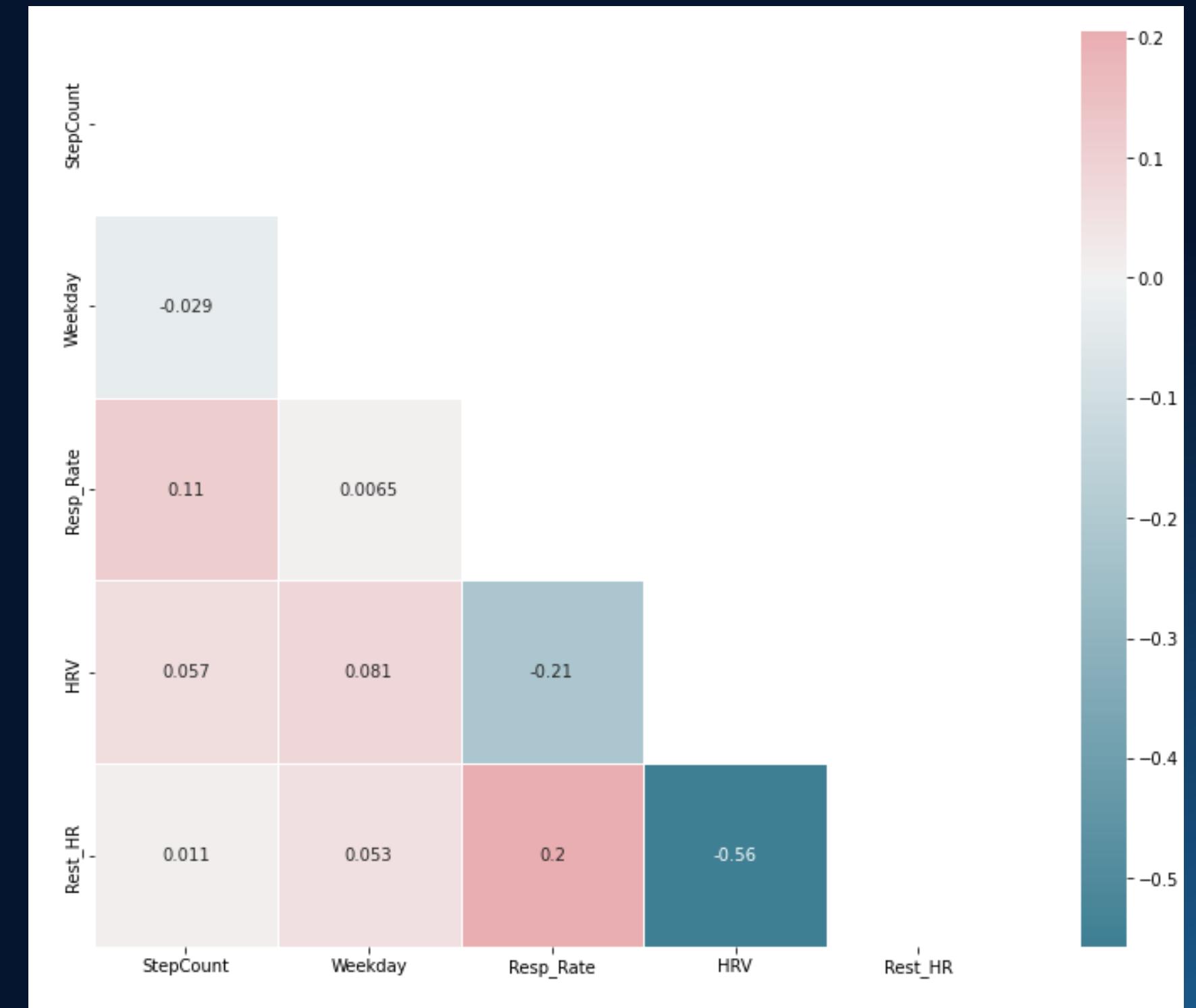
| Person | Count_days | first_day  | Last_day   | Heart Rate | Step Count | Distance Walking Running | Active Energy Burned | Body Mass | Distance Cycling | Resting Heart Rate | Heart Rate Variability | Respiratory Rate | Distance Swimming | Distance Downhill Snow Sports |
|--------|------------|------------|------------|------------|------------|--------------------------|----------------------|-----------|------------------|--------------------|------------------------|------------------|-------------------|-------------------------------|
| 1      | 171 days   | 2022-01-18 | 2022-07-08 | 21.0       | 171.0      | 150.0                    | 171.0                |           |                  |                    |                        |                  |                   |                               |
| 2      | 1607 days  | 2018-02-13 | 2022-07-09 | 6.0        | 1607.0     | 1607.0                   | 6.0                  | 1434.0    | 0.0              | 6.0                | 6.0                    |                  |                   |                               |
| 3      | 1259 days  | 2019-01-29 | 2022-07-11 | 910.0      | 1259.0     | 1259.0                   | 910.0                | 1195.0    |                  |                    |                        |                  |                   |                               |
| 4      | 2094 days  | 2016-10-18 | 2022-07-13 | 365.0      | 2094.0     | 2094.0                   | 840.0                | 2025.0    |                  |                    |                        |                  |                   |                               |
| 5      | 1986 days  | 2017-01-30 | 2022-07-09 | 473.0      | 1555.0     | 1555.0                   | 232.0                | 1538.0    |                  |                    |                        |                  |                   |                               |
| 6      | 32 days    | 2022-06-10 | 2022-07-12 | 14.0       | 31.0       | 31.0                     | 13.0                 | 25.0      |                  |                    |                        |                  |                   |                               |
| 7      | 1041 days  | 2019-09-04 | 2022-07-11 |            | 1041.0     | 1041.0                   |                      |           |                  |                    |                        |                  |                   |                               |
| 8      | 2357 days  | 2016-01-28 | 2022-07-12 | 1608.0     | 2357.0     | 2357.0                   | 2291.0               | 1984.0    | 1706.0           | 854.0              | 855.0                  | 288.0            | 707.0             | 1.0                           |

## Observaciones

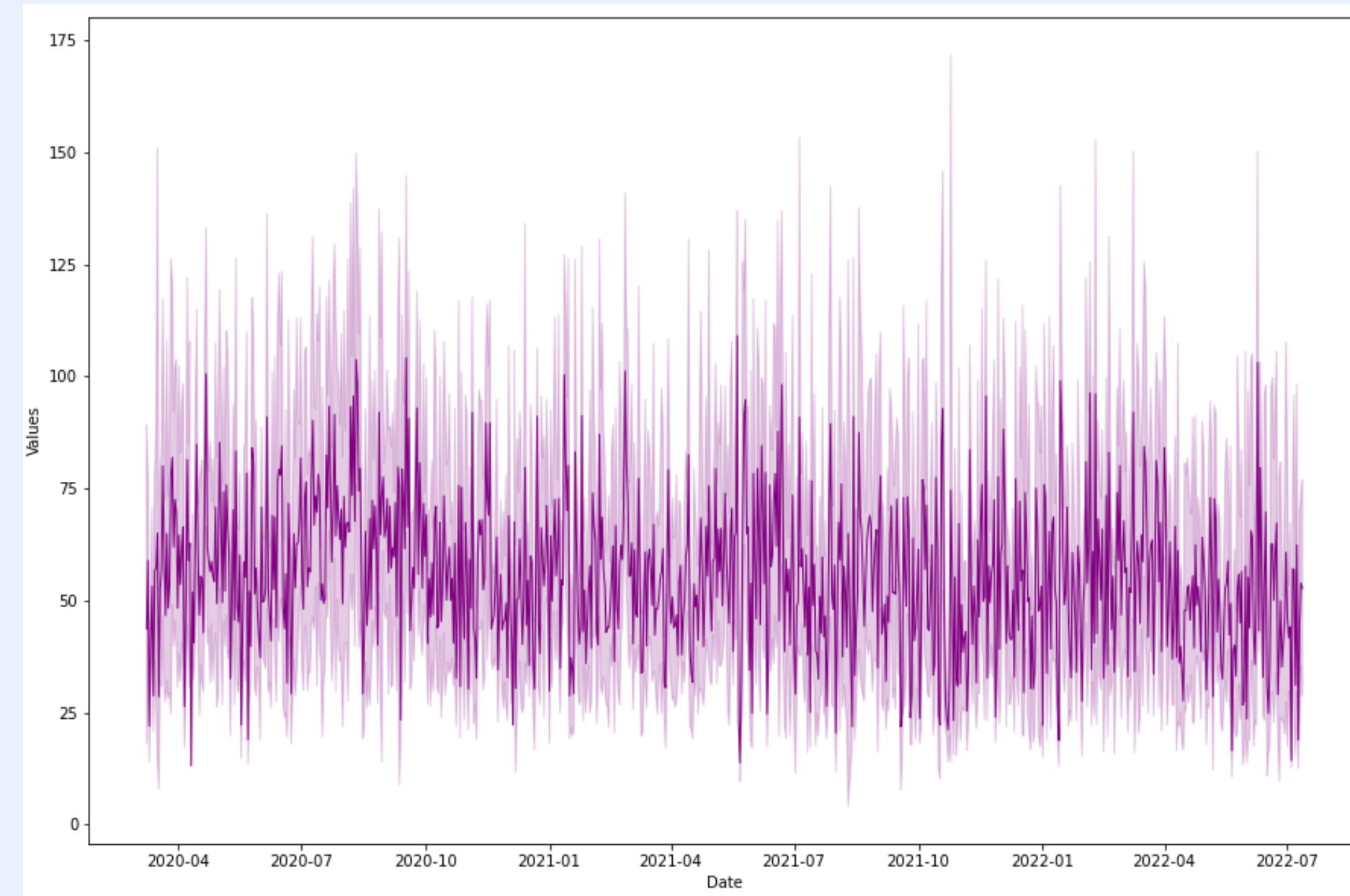
- Pocas variables con suficientes datos como para compararlos.
- Distintos periodos de tiempo para cada persona
- Un solo individuo tiene gran cantidad de datos significativos para análisis individual
- Las conclusiones difícilmente podrán generalizarse.

# ¿Cómo podemos medir el estrés a partir de los datos de smartwatch?

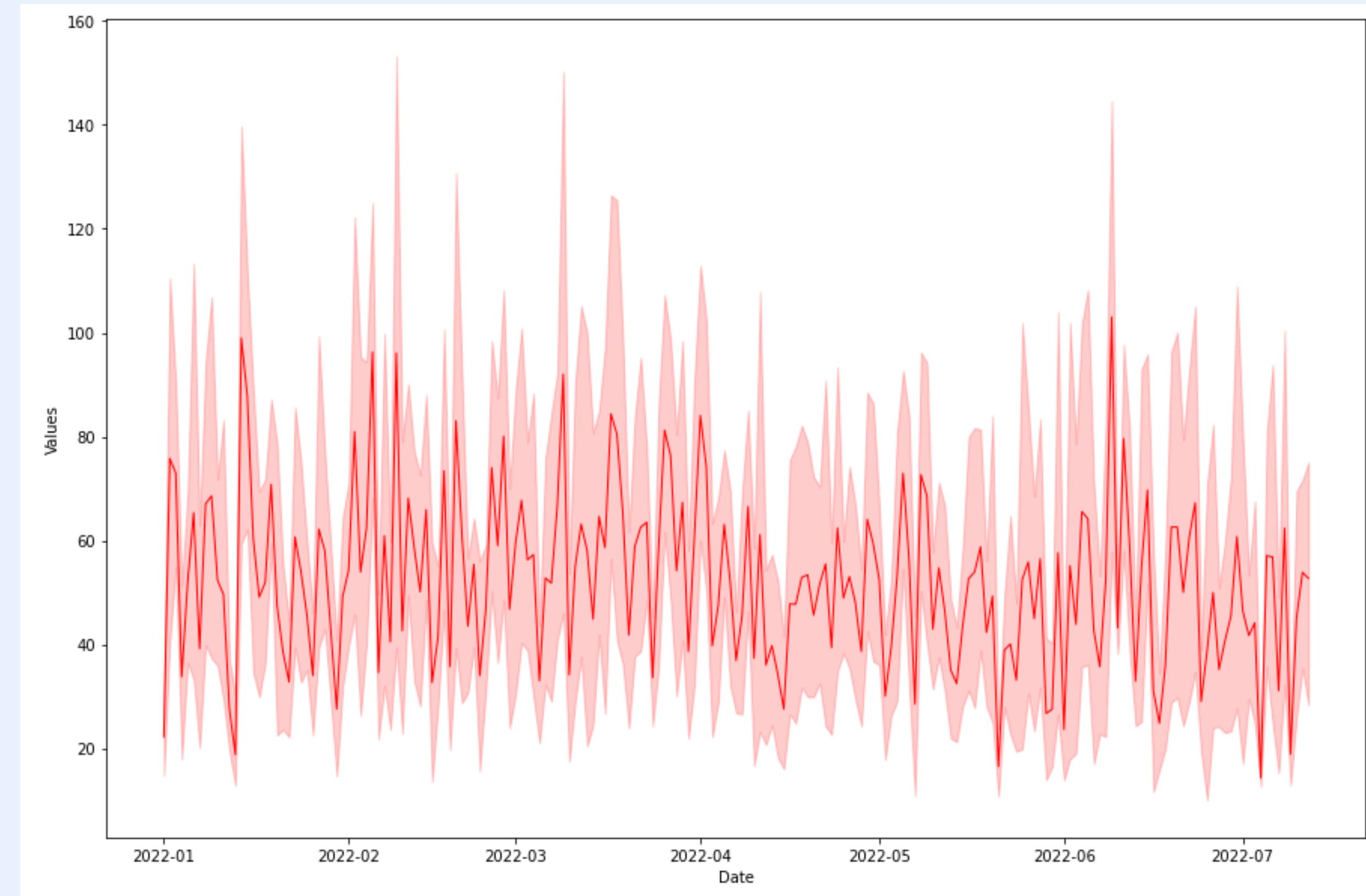
- Variabilidad del ritmo cardiaco
- Frecuencia cardiaca en reposo
- Ritmo respiratorio
- Pasos diarios
- Tiempo de sueño



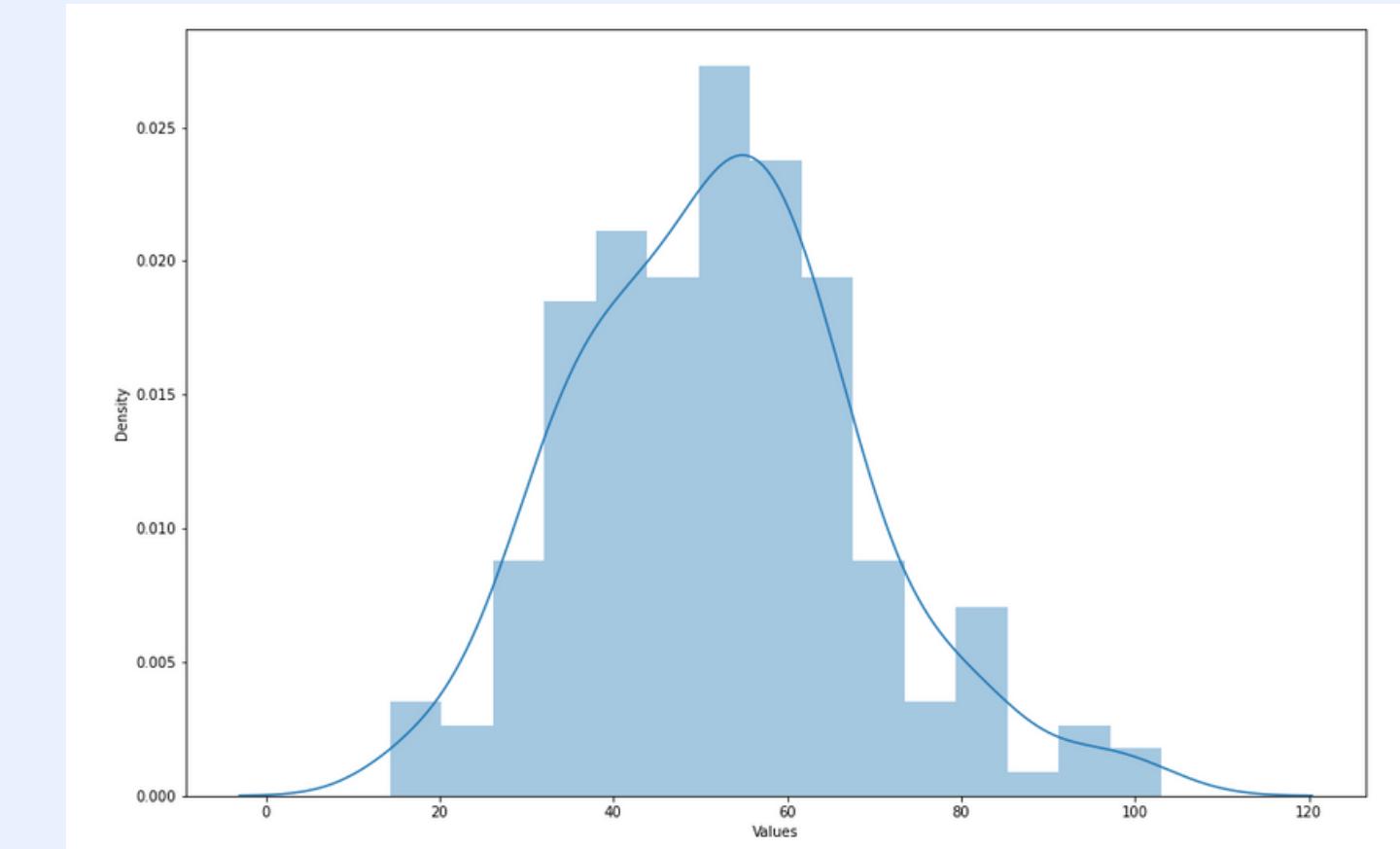
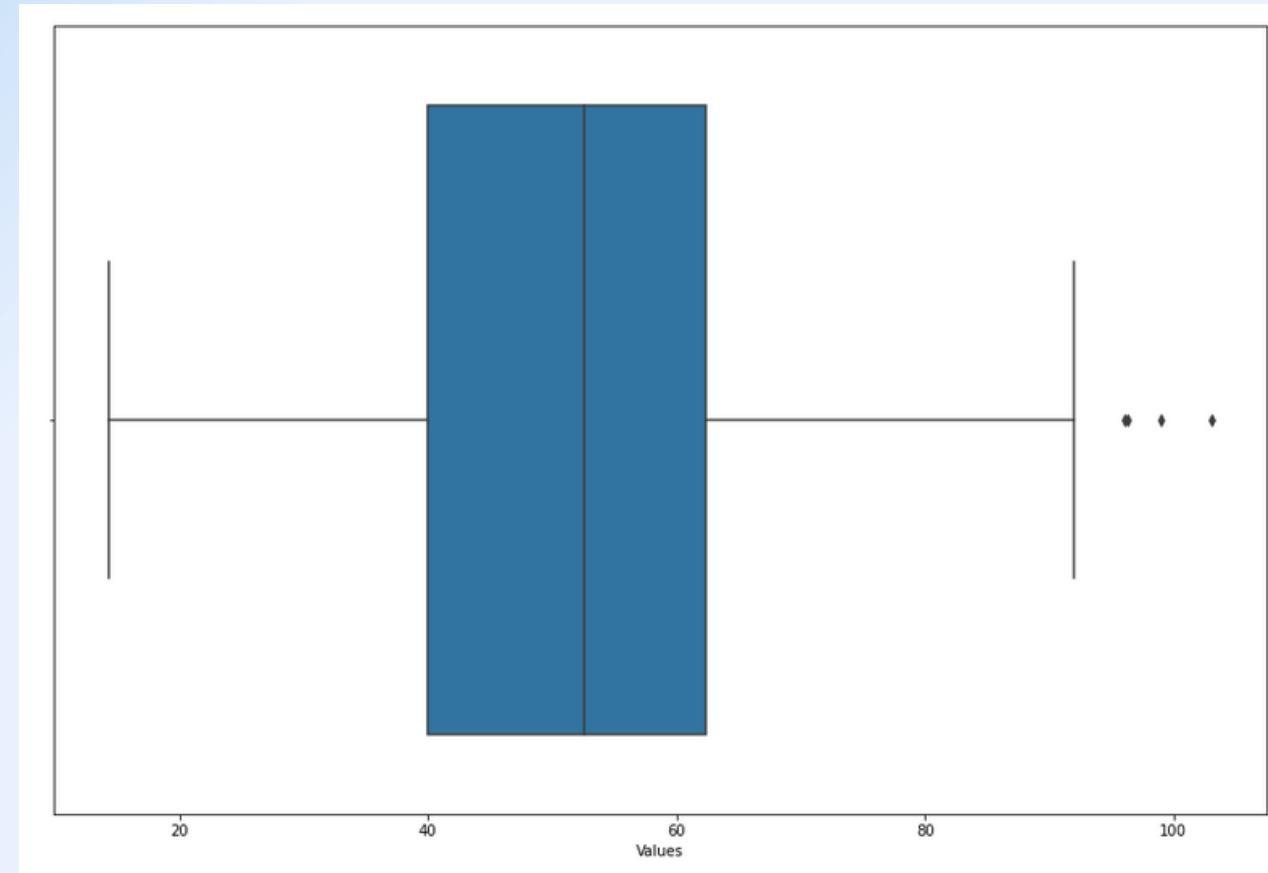
# Variabilidad del ritmo cardiaco



# Variabilidad del ritmo cardiaco



# Variabilidad del ritmo cardiaco



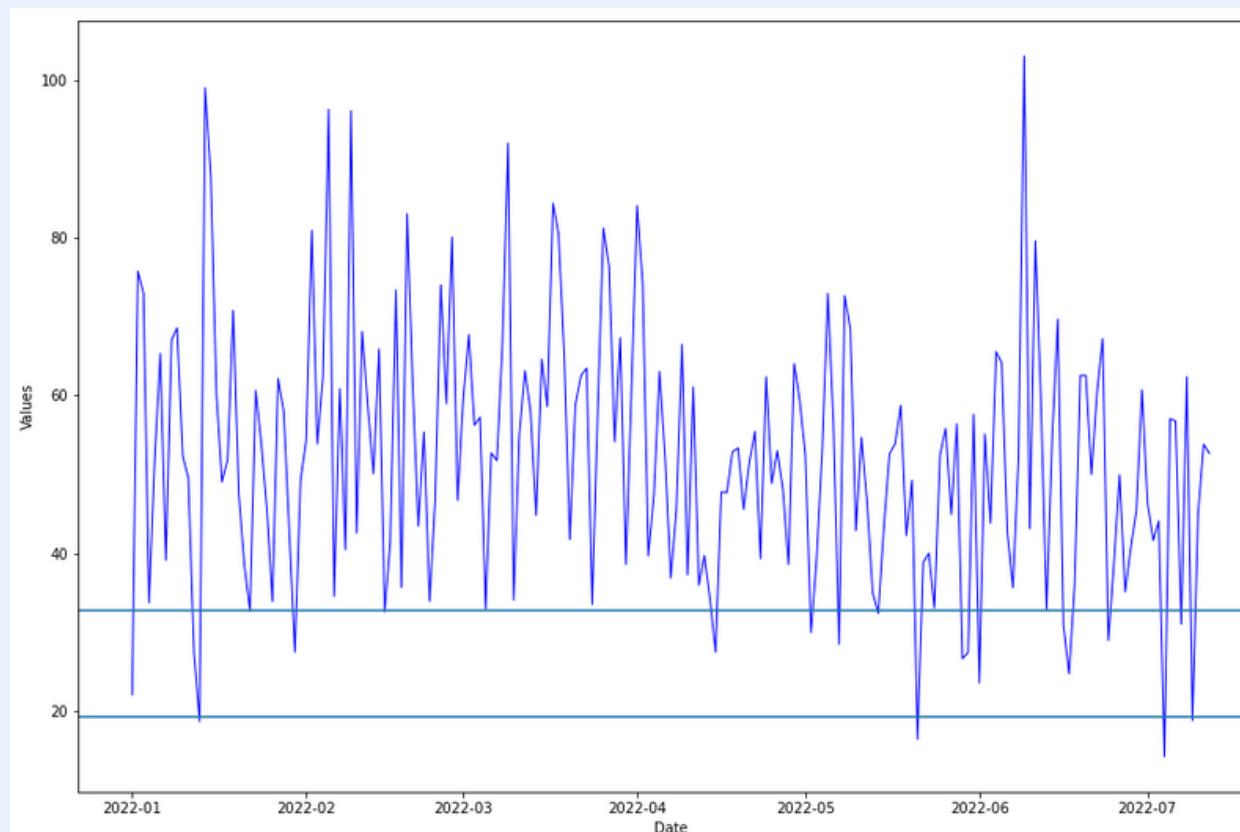
**Media: 52.30**

**Desviación estándar: 16.52**

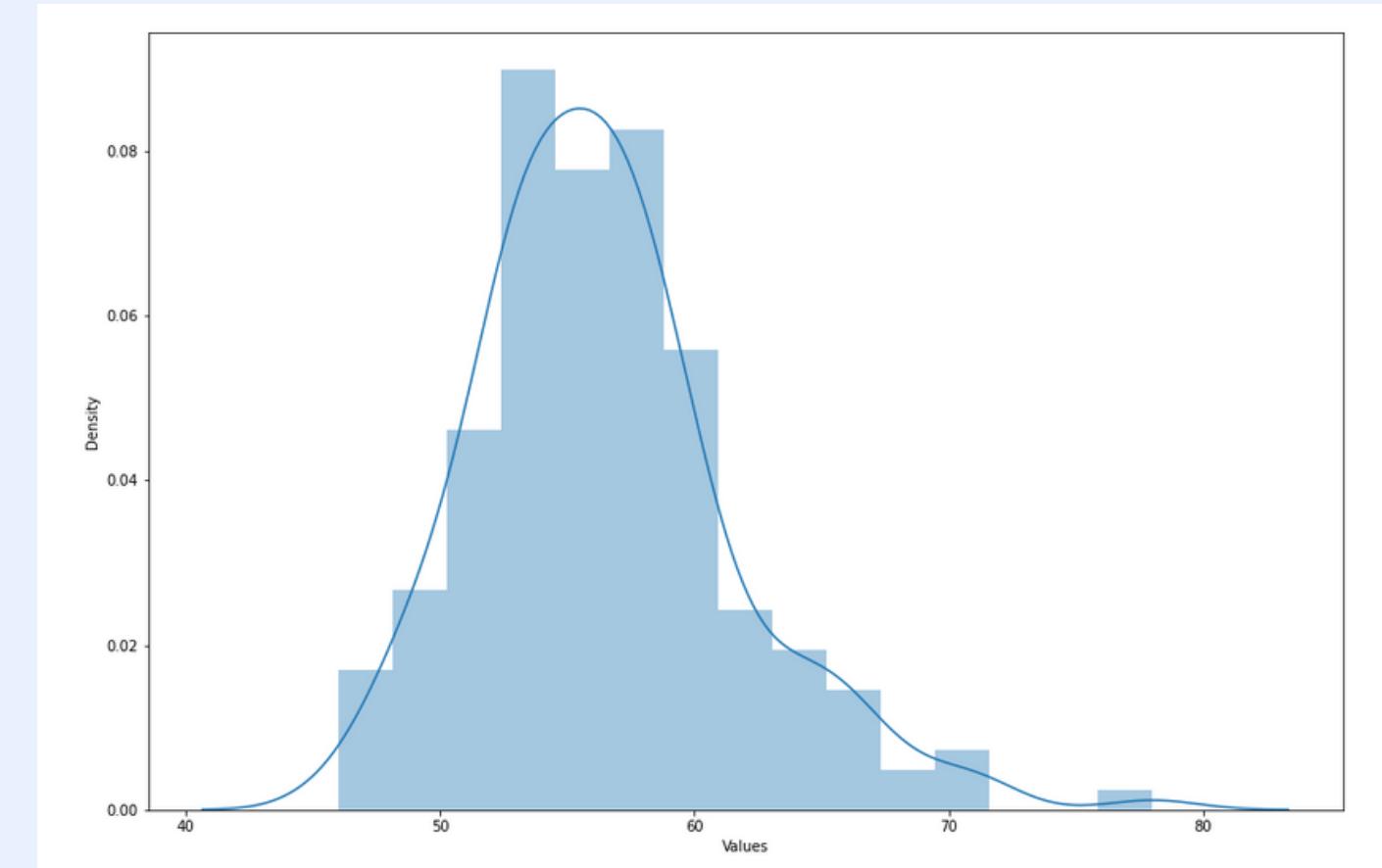
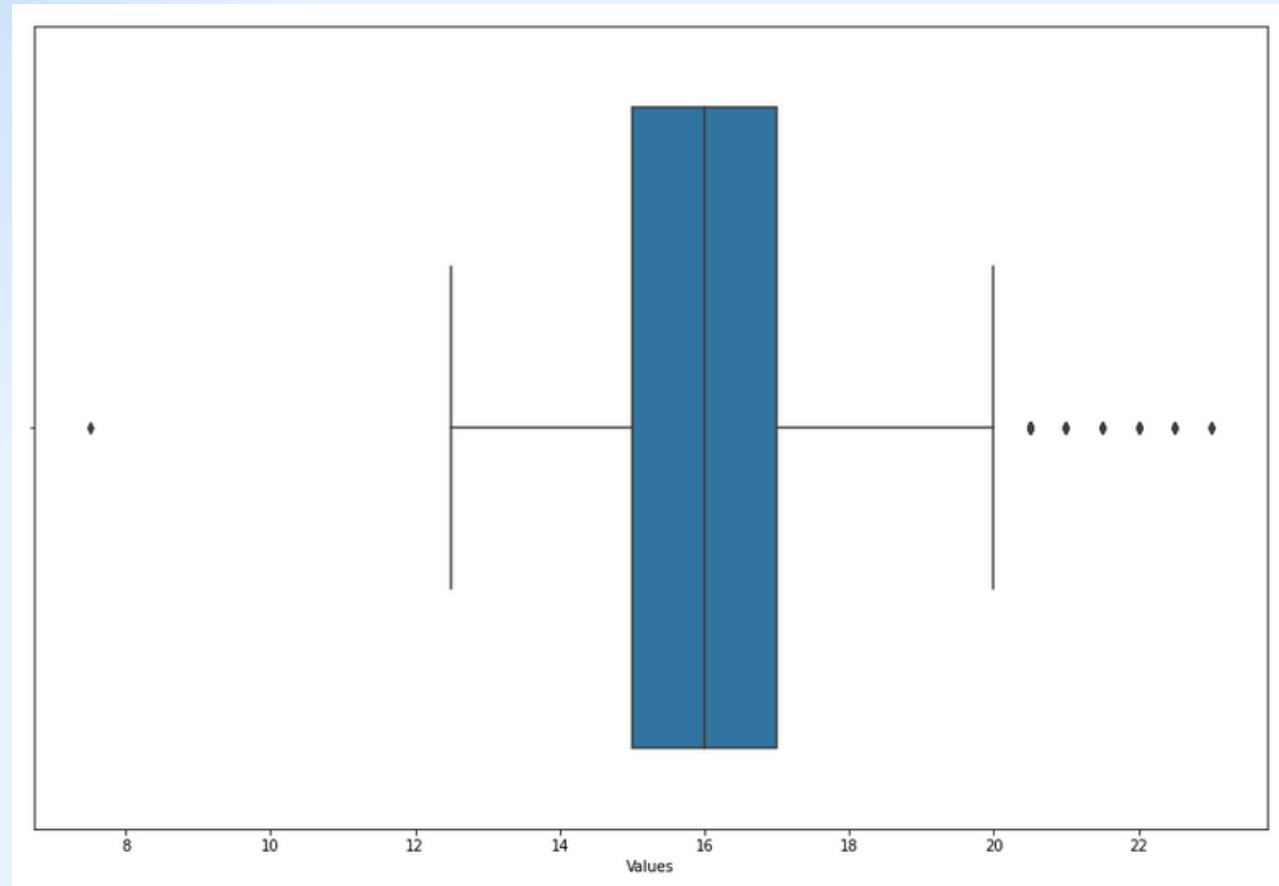
**Líneas de outliers:**

**2 std = 19.25**

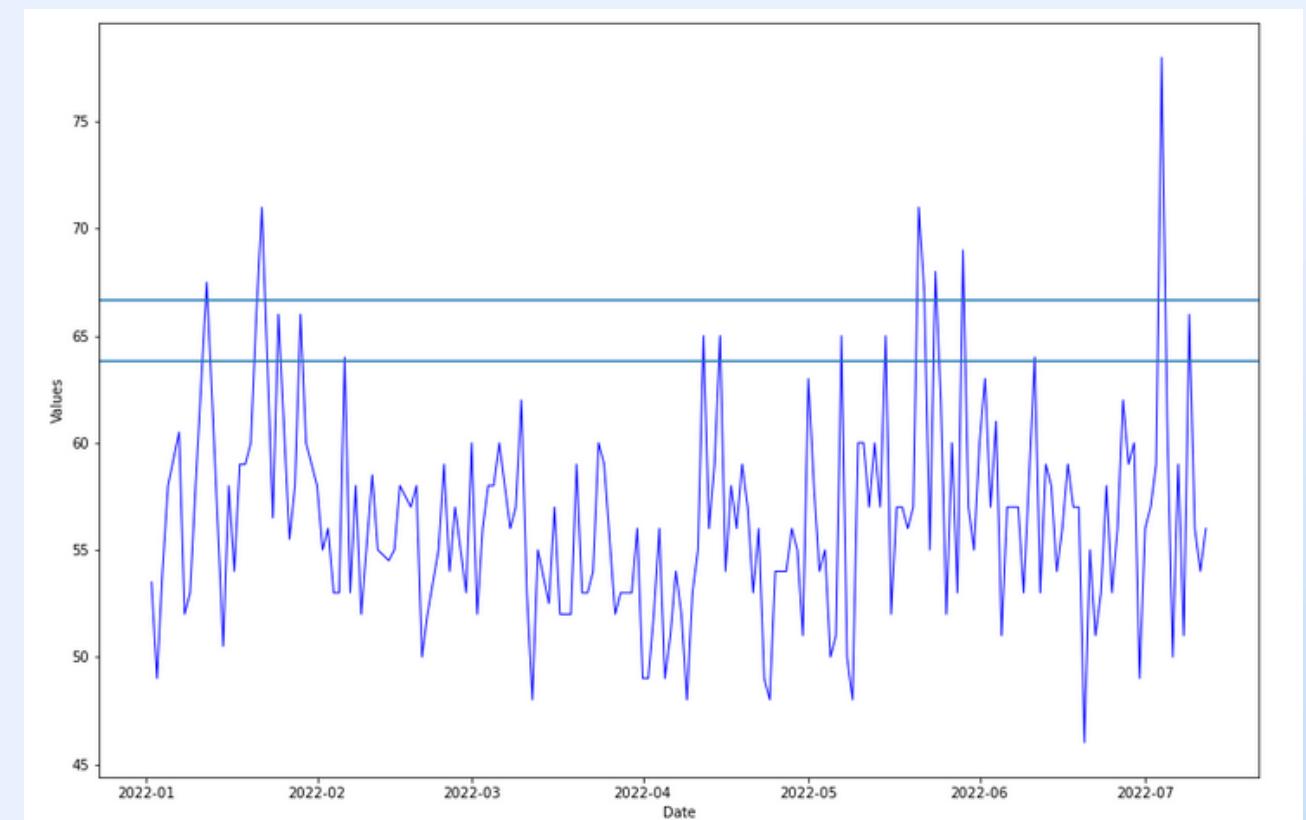
**percentil 10 = 32.76**



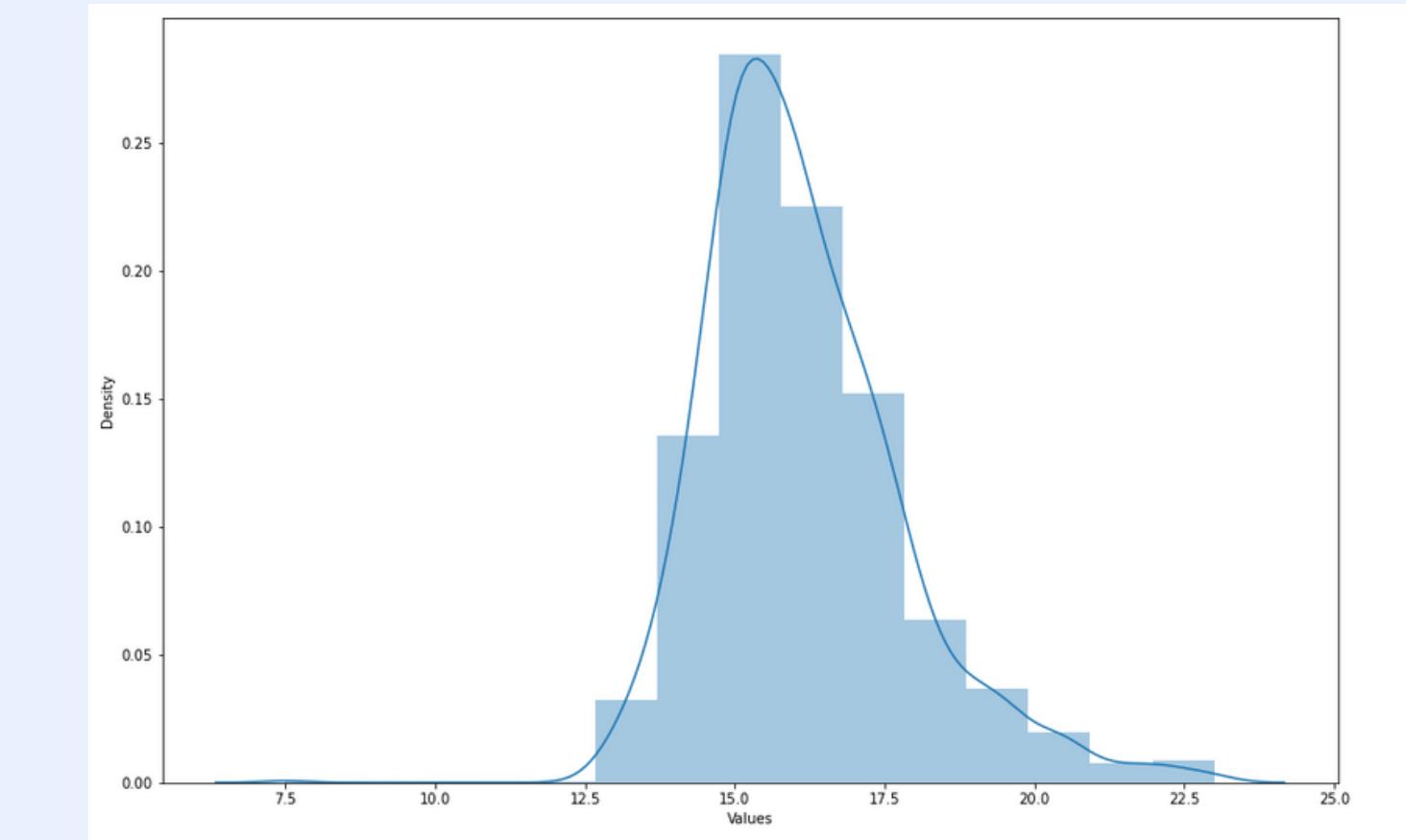
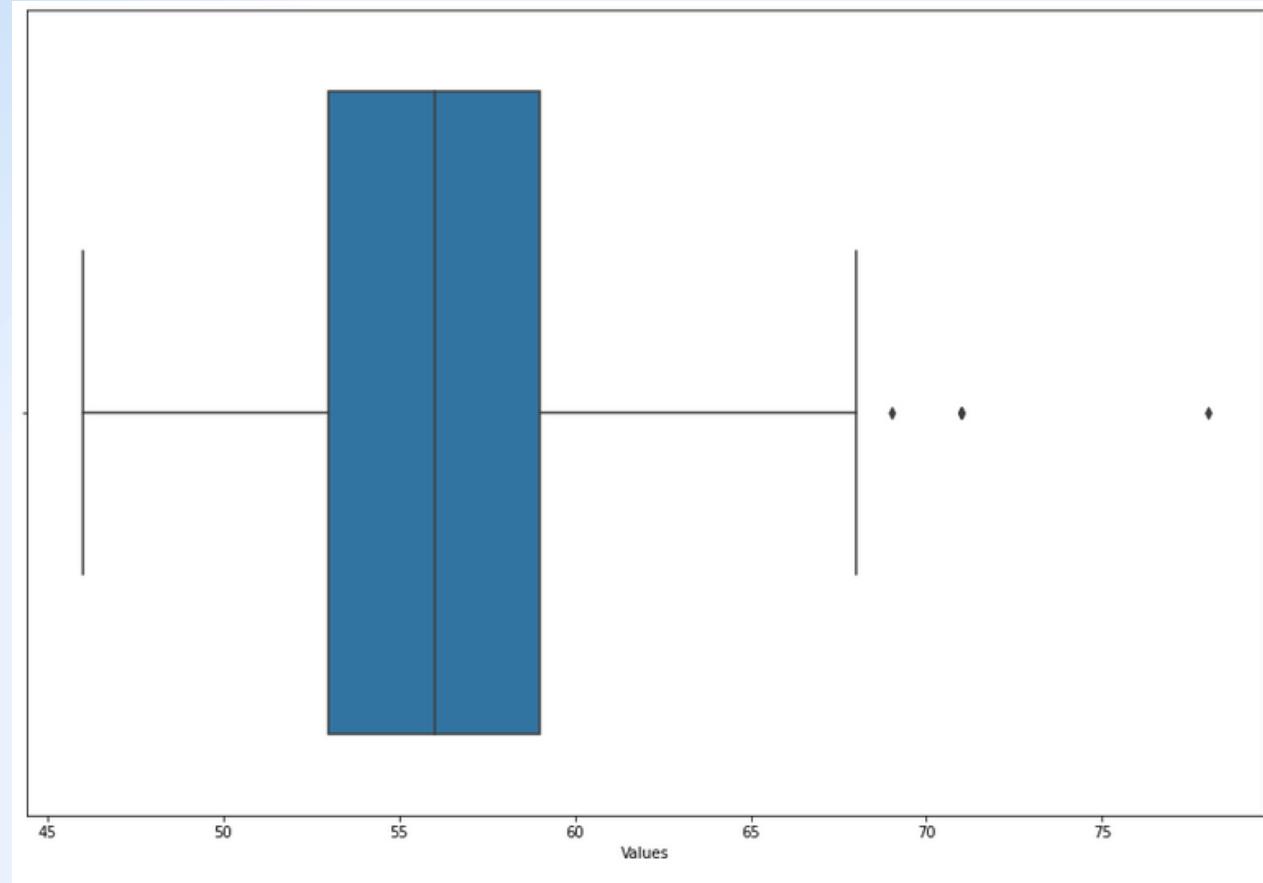
# Frecuencia cardiaca en reposo



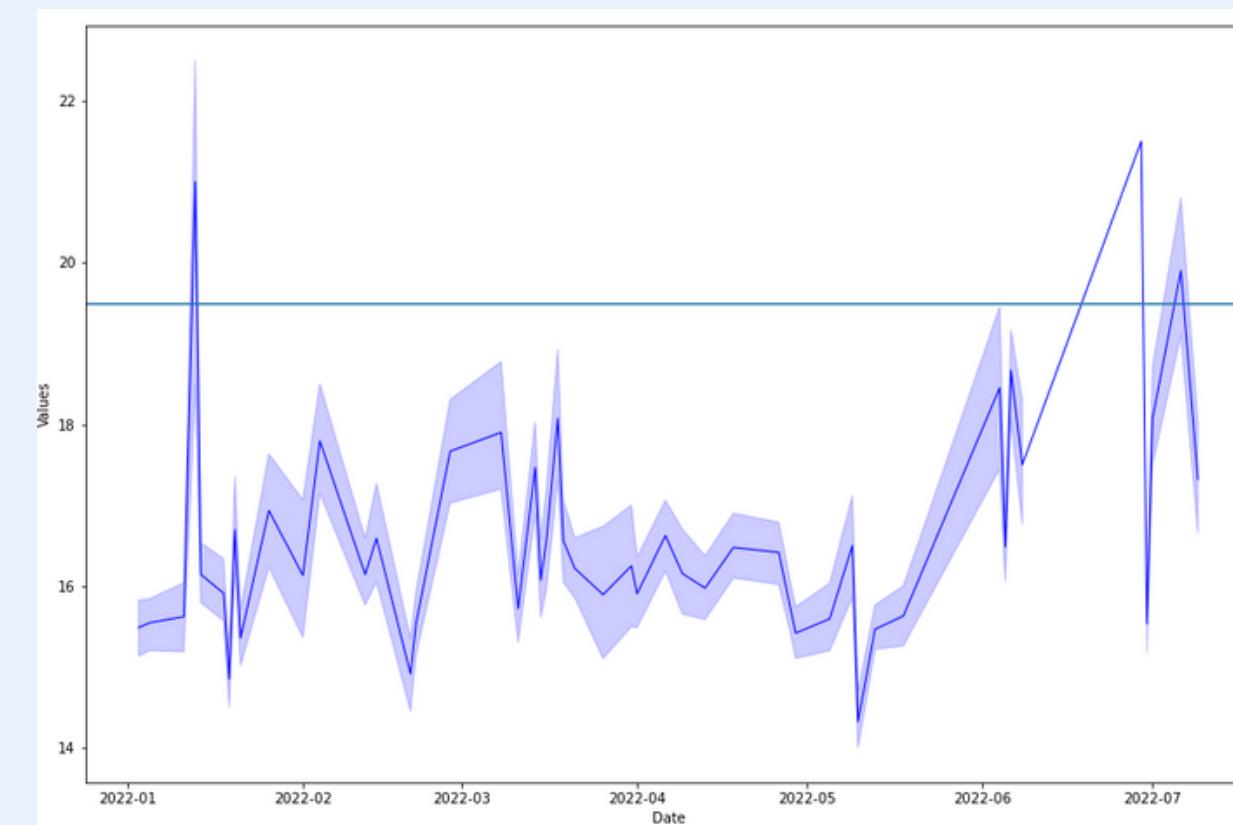
Líneas de outliers:  
2 std = 66.65  
percentil 90 = 63.80



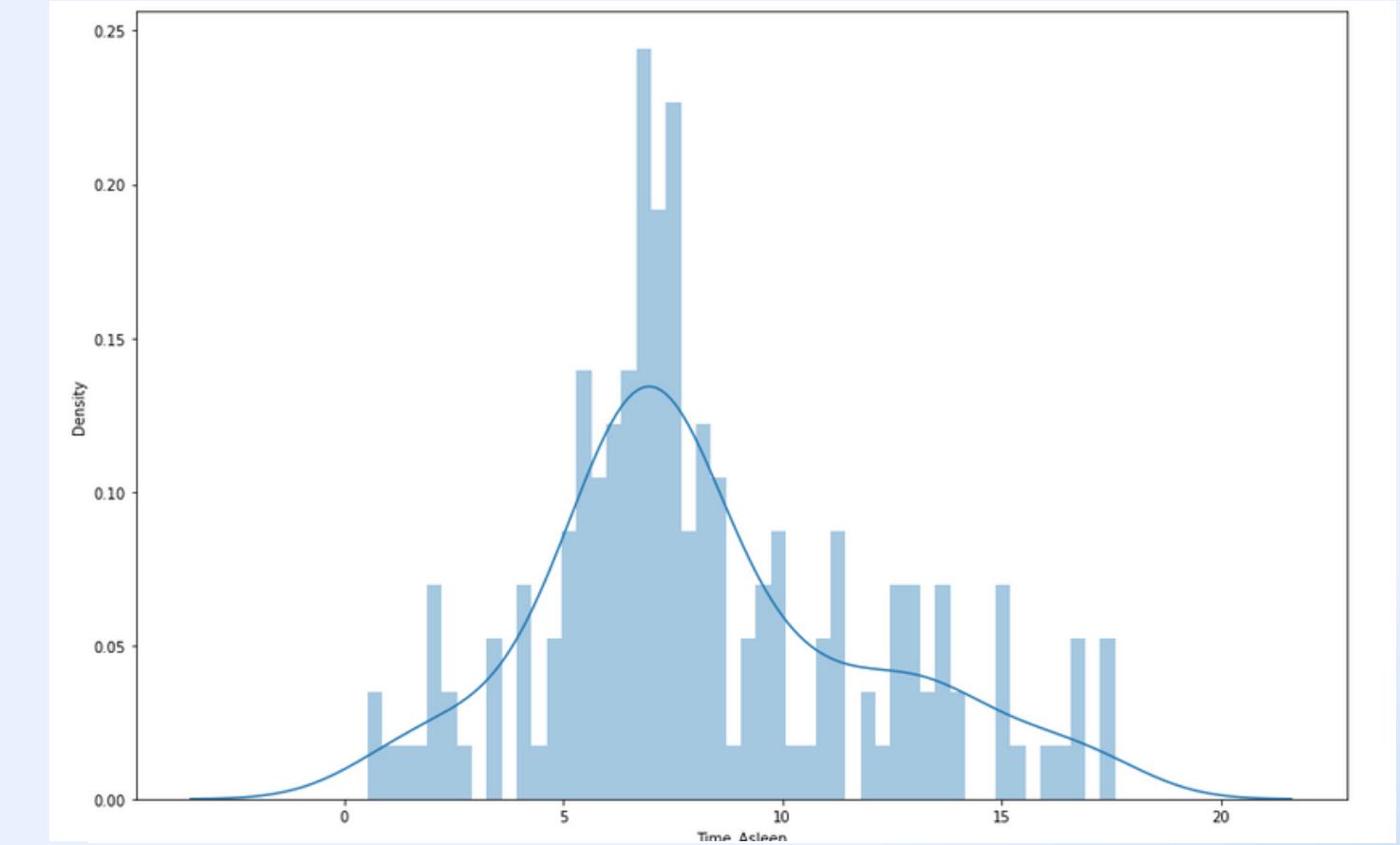
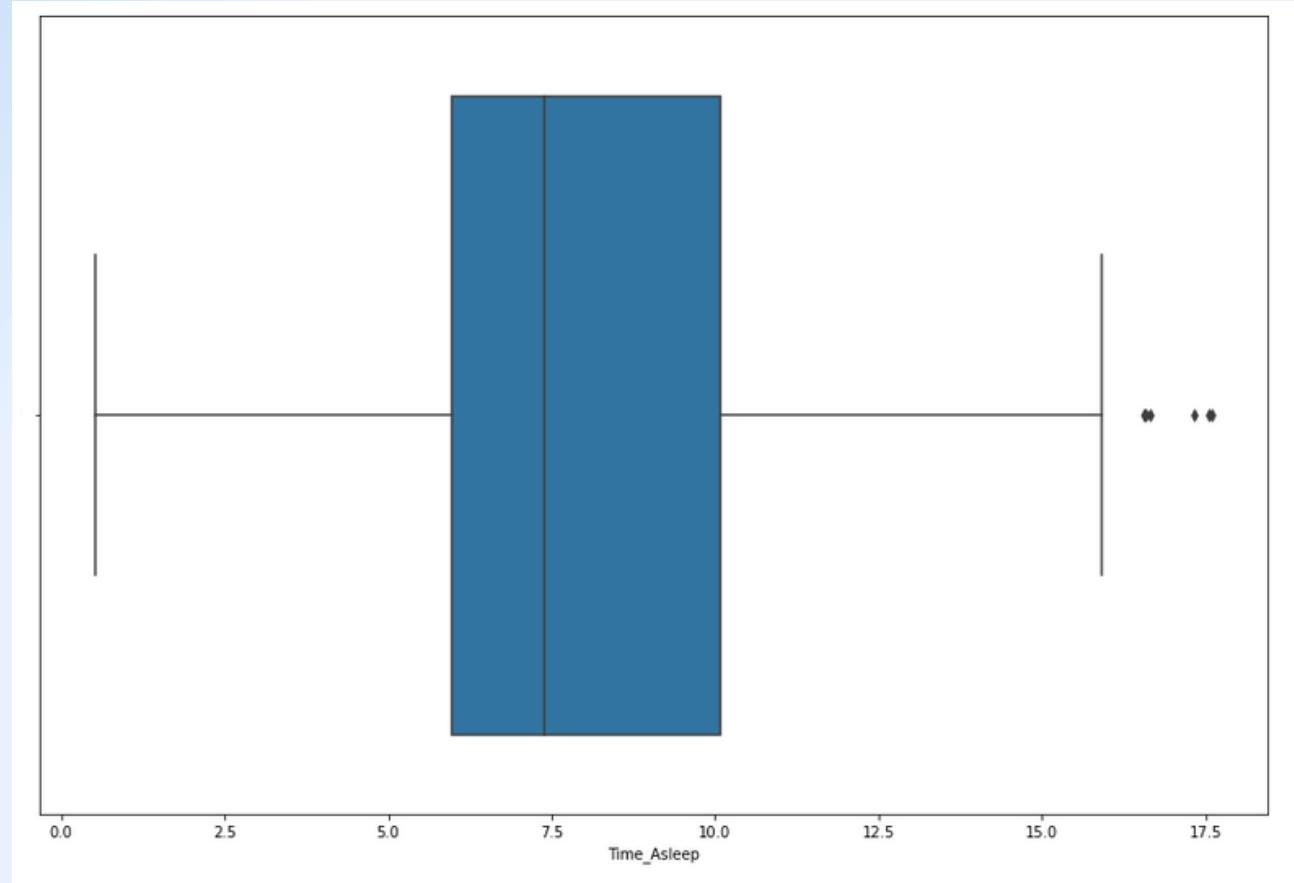
# Ritmo respiratorio



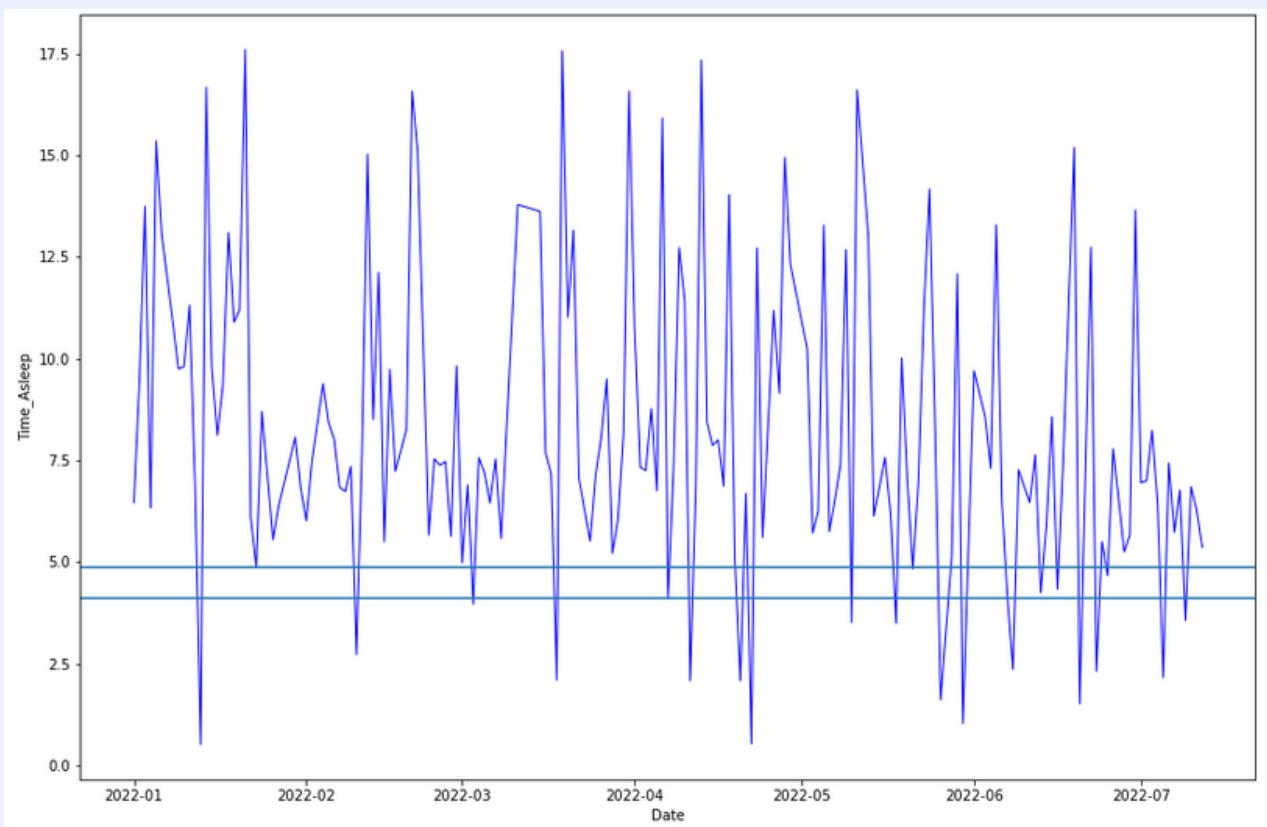
Líneas de outliers:  
2 std = 19.484  
percentil 90 = 18



# Tiempo de sueño

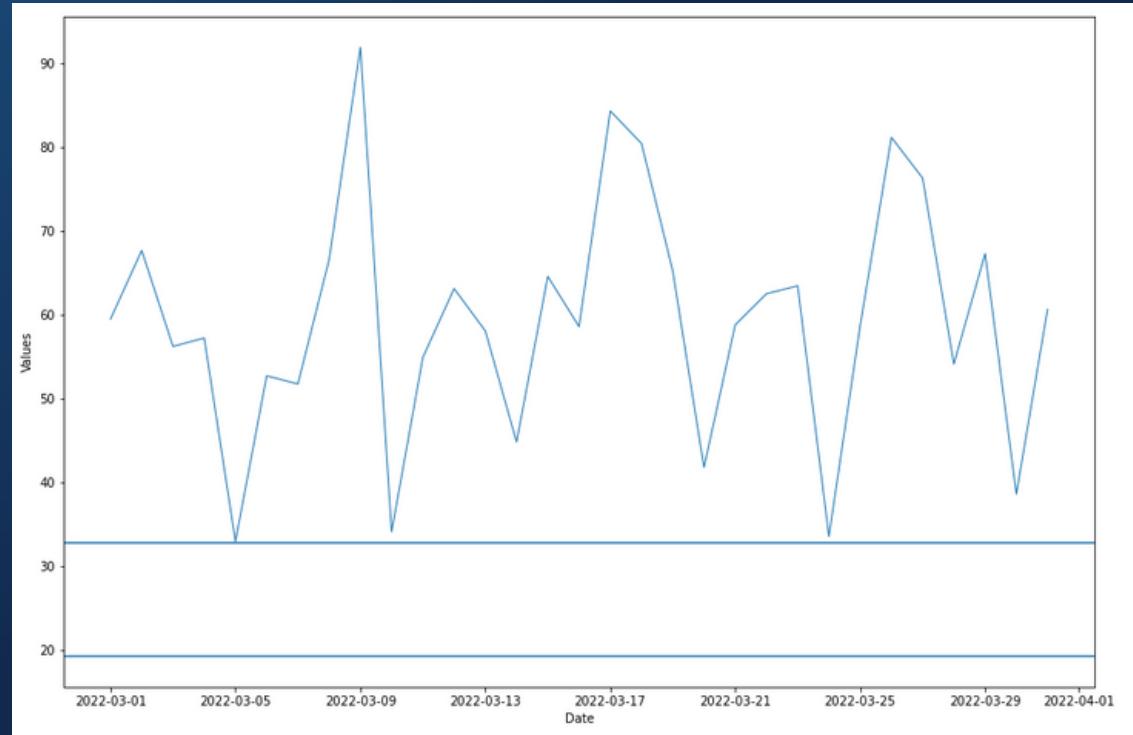


Líneas de outliers:  
 $2 \text{ std} = 4.86$   
percentil 10 = 4.12



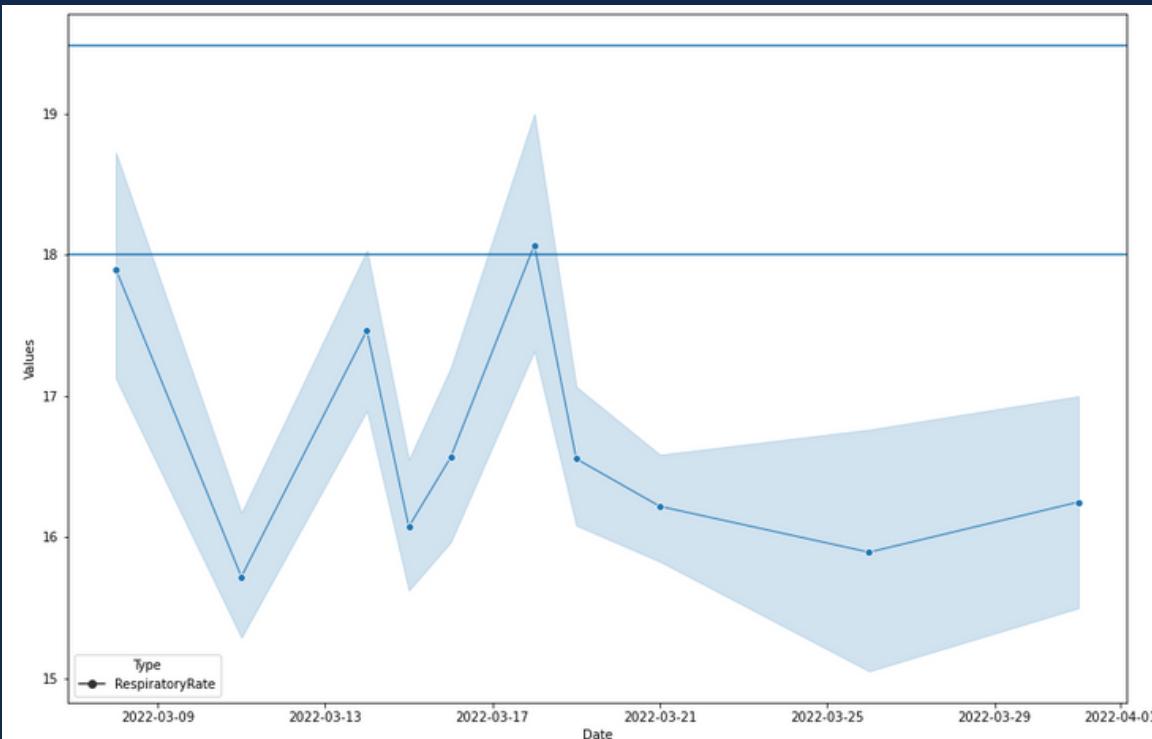
# Marzo

VRC



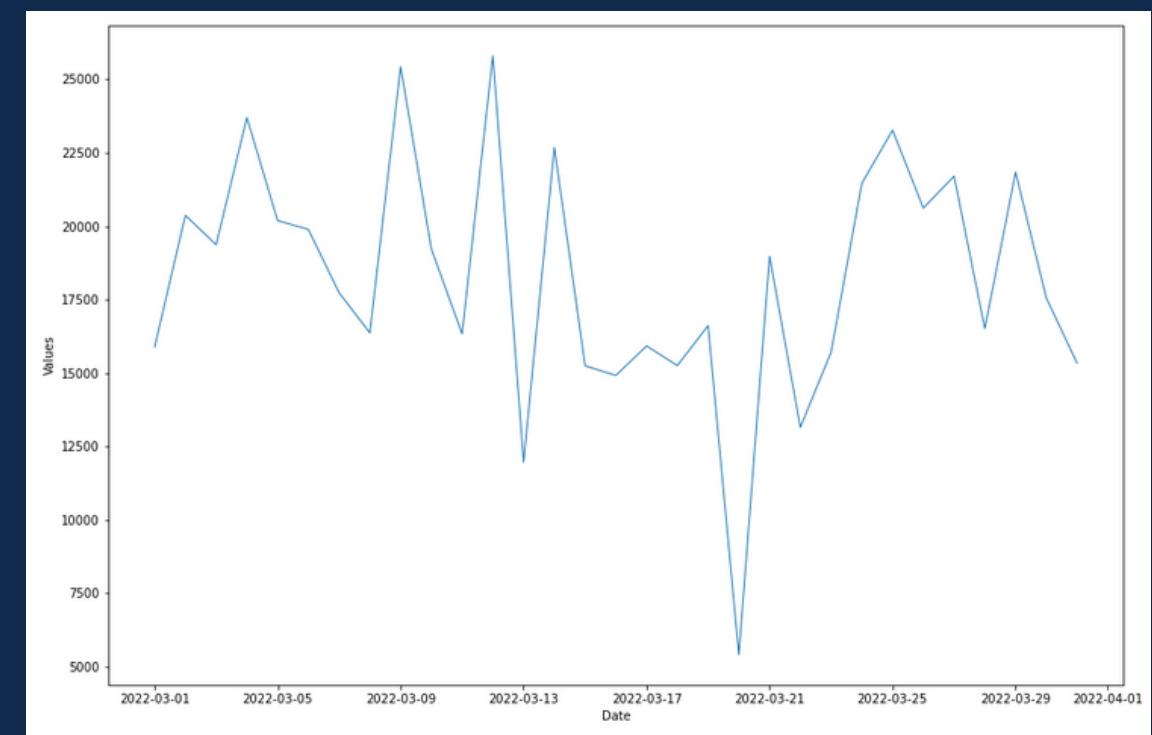
5/10/24

Ritmo respiratorio



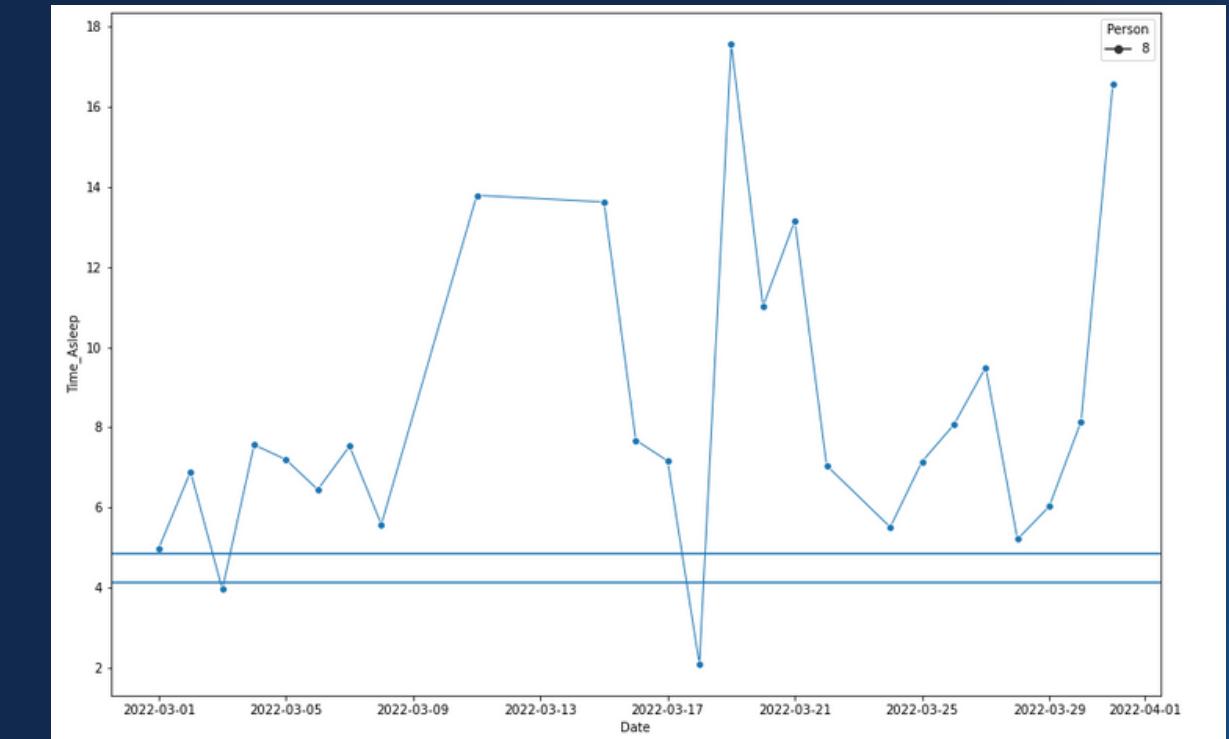
14 y 18

Pasos



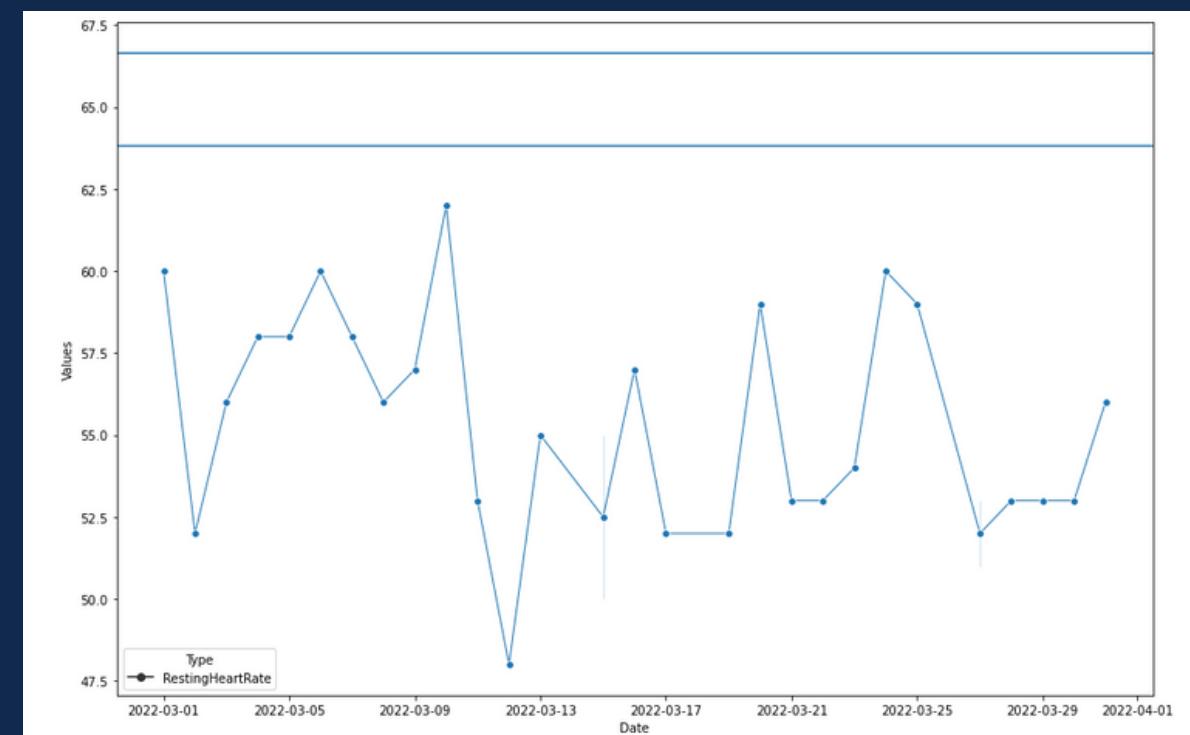
9/12/20

Tiempo de sueño



3 y 18

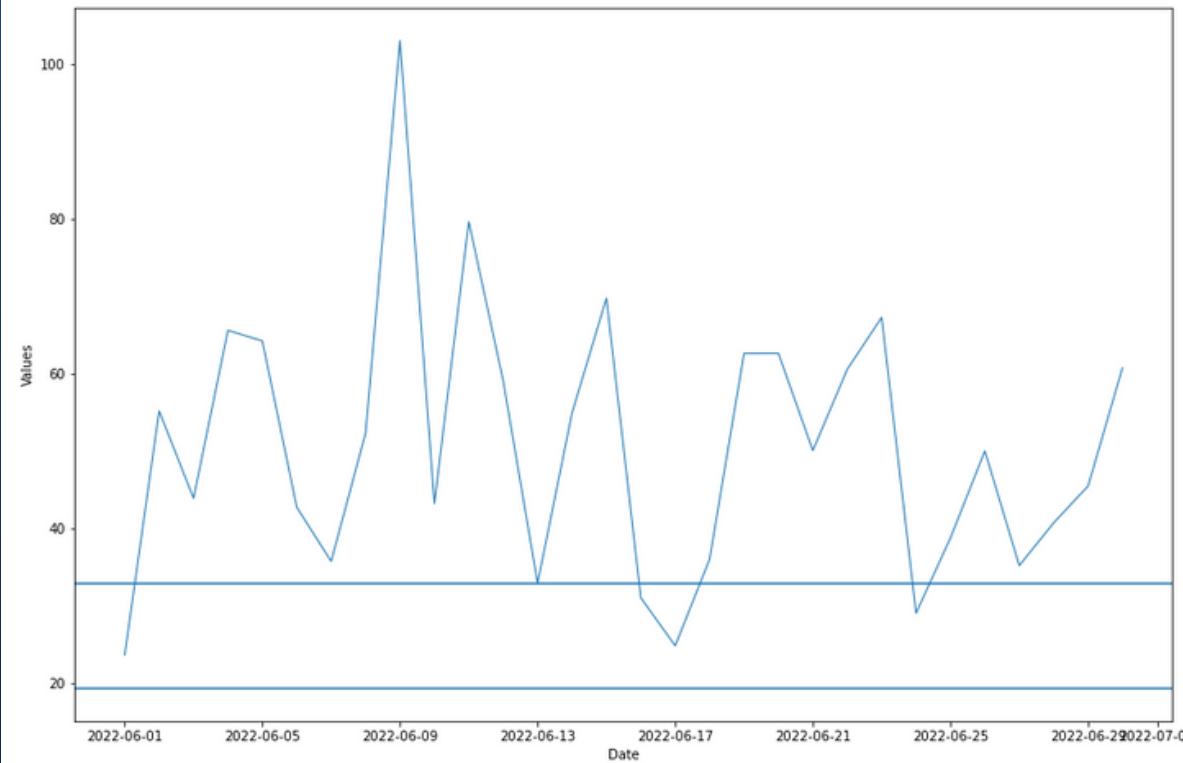
Frecuencia cardiaca en reposo



10/20 /24

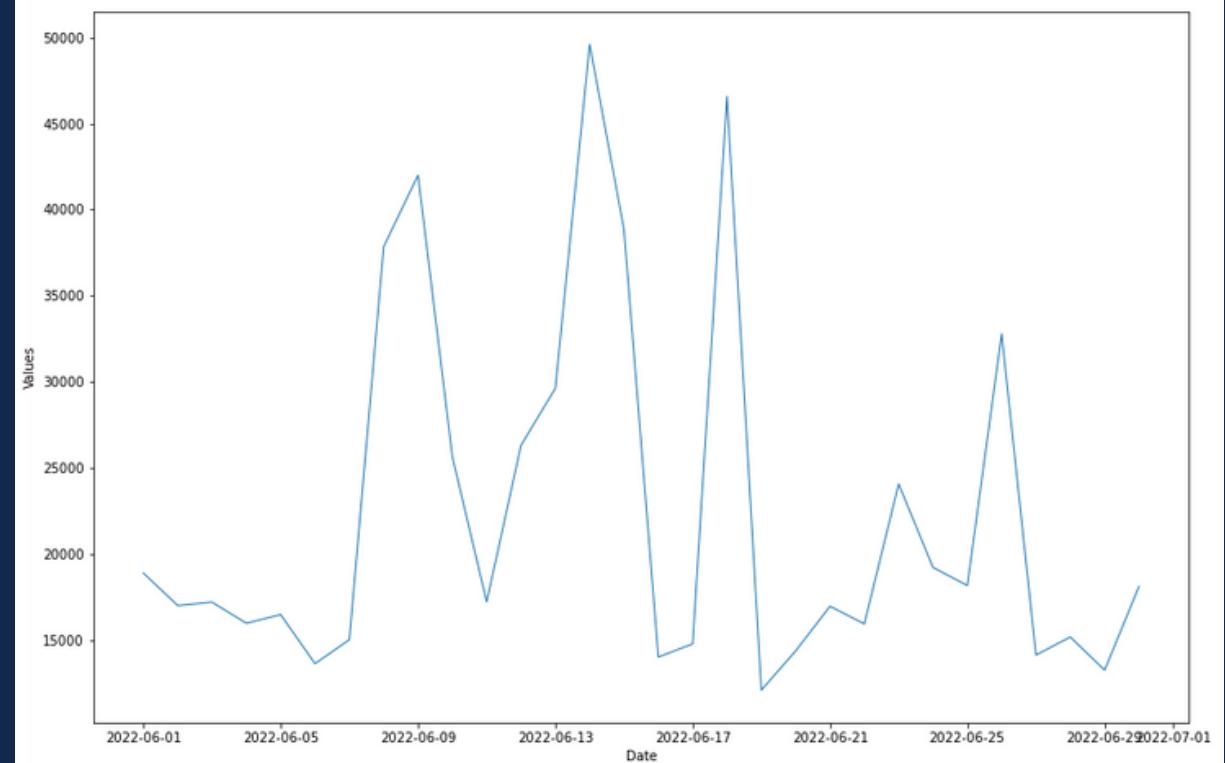
# Junio

VRC



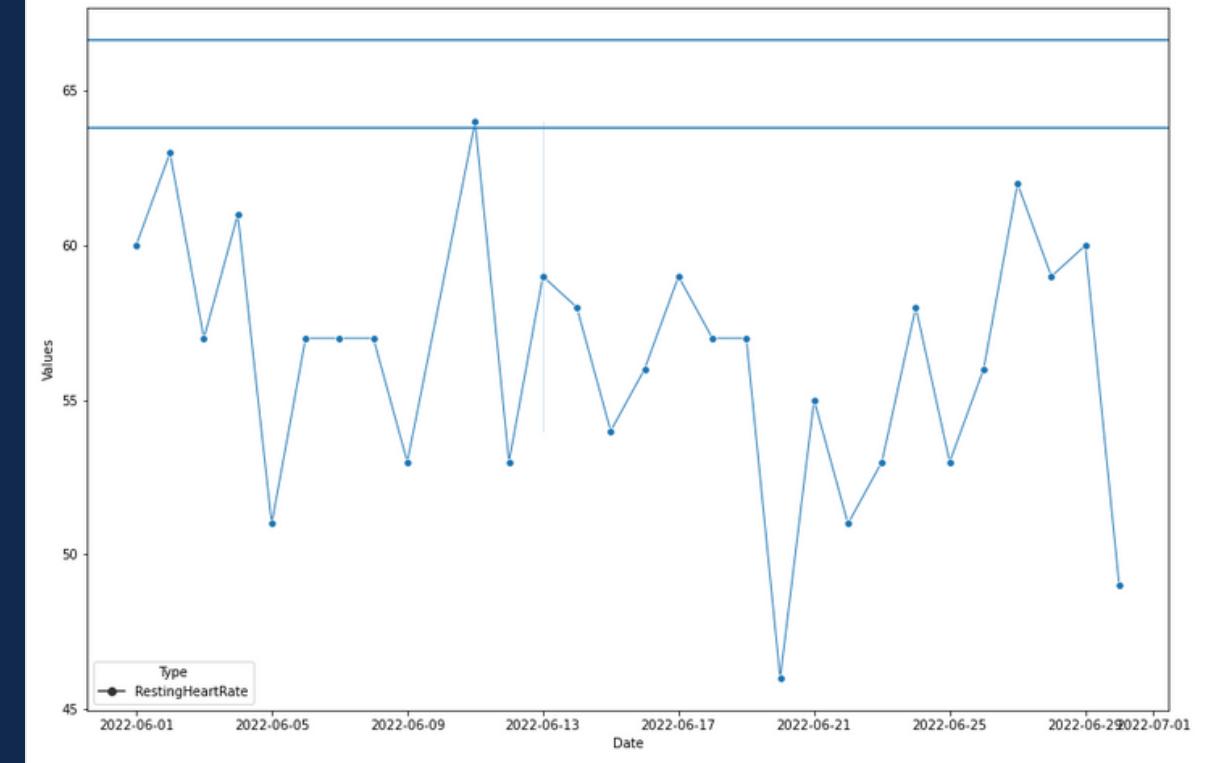
1/16/17/24

Pasos



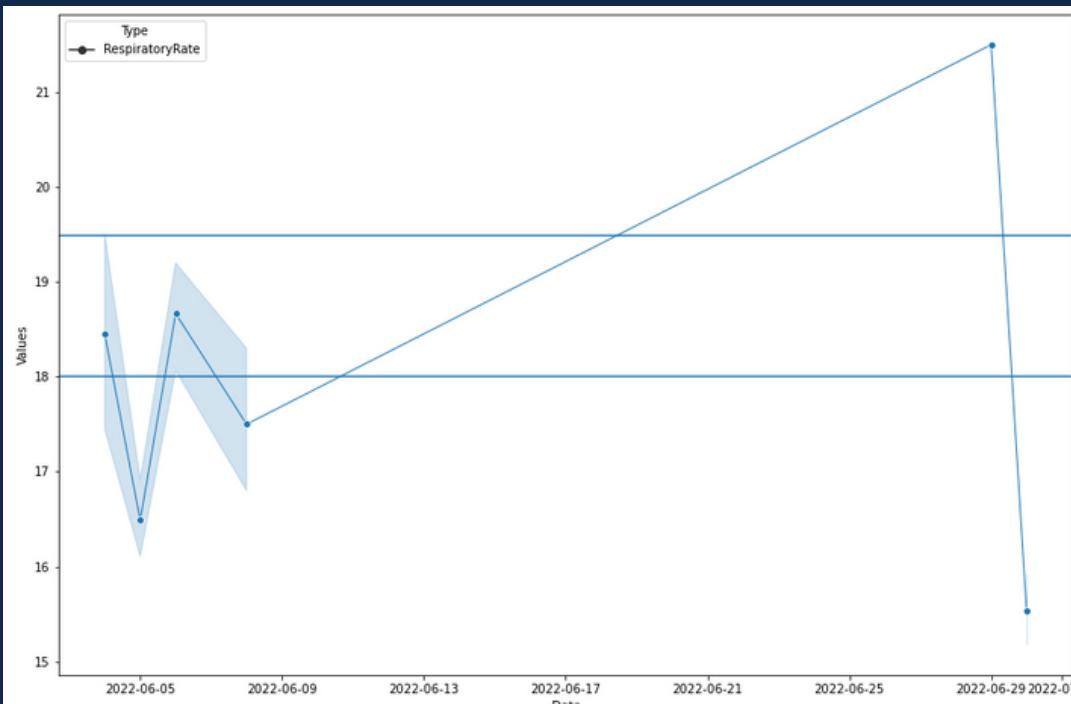
9/14/17/18

Frecuencia cardiaca en reposo



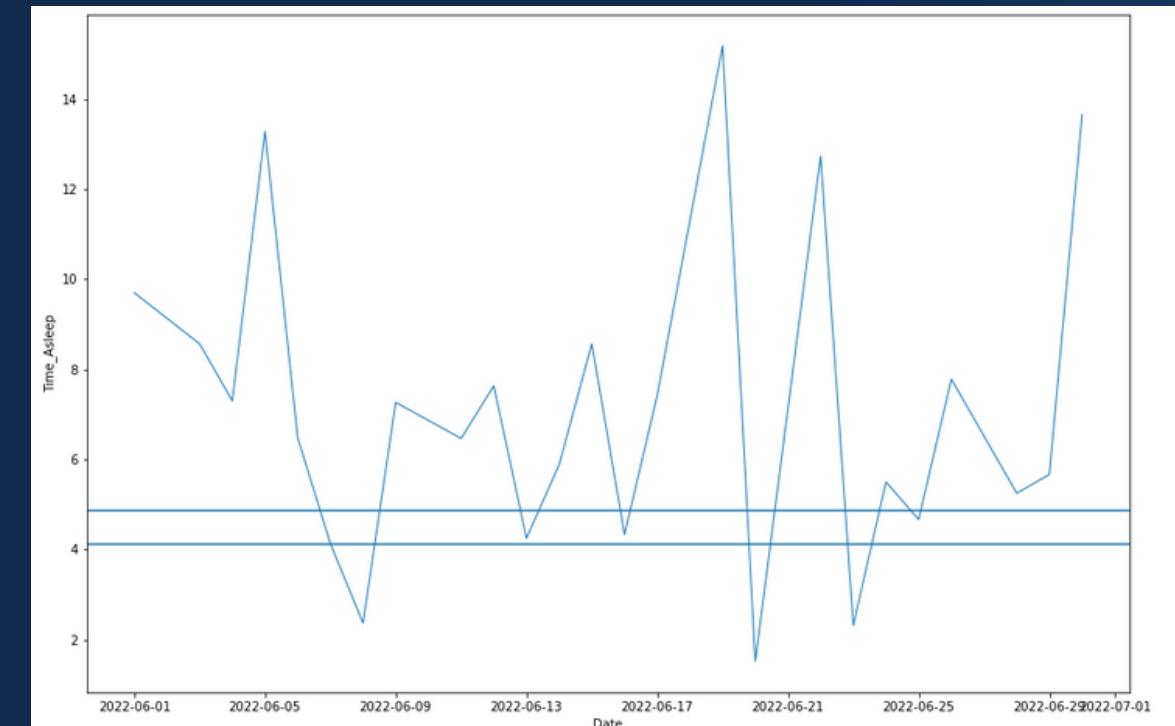
4/ 13/27

Ritmo respiratorio



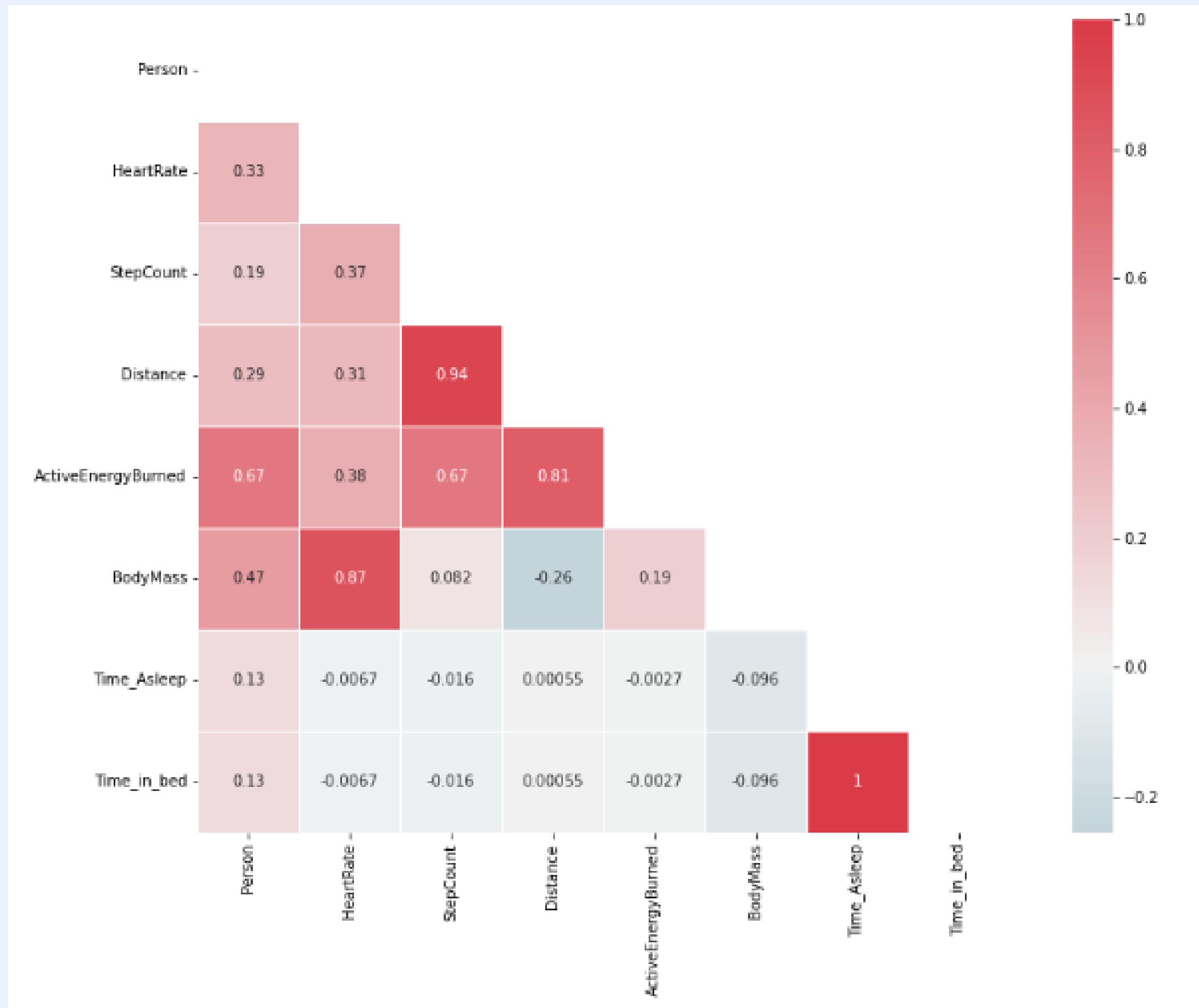
4, 6 y 30

Tiempo de sueño



7, 8, 13, 16, 20, 23 y 25

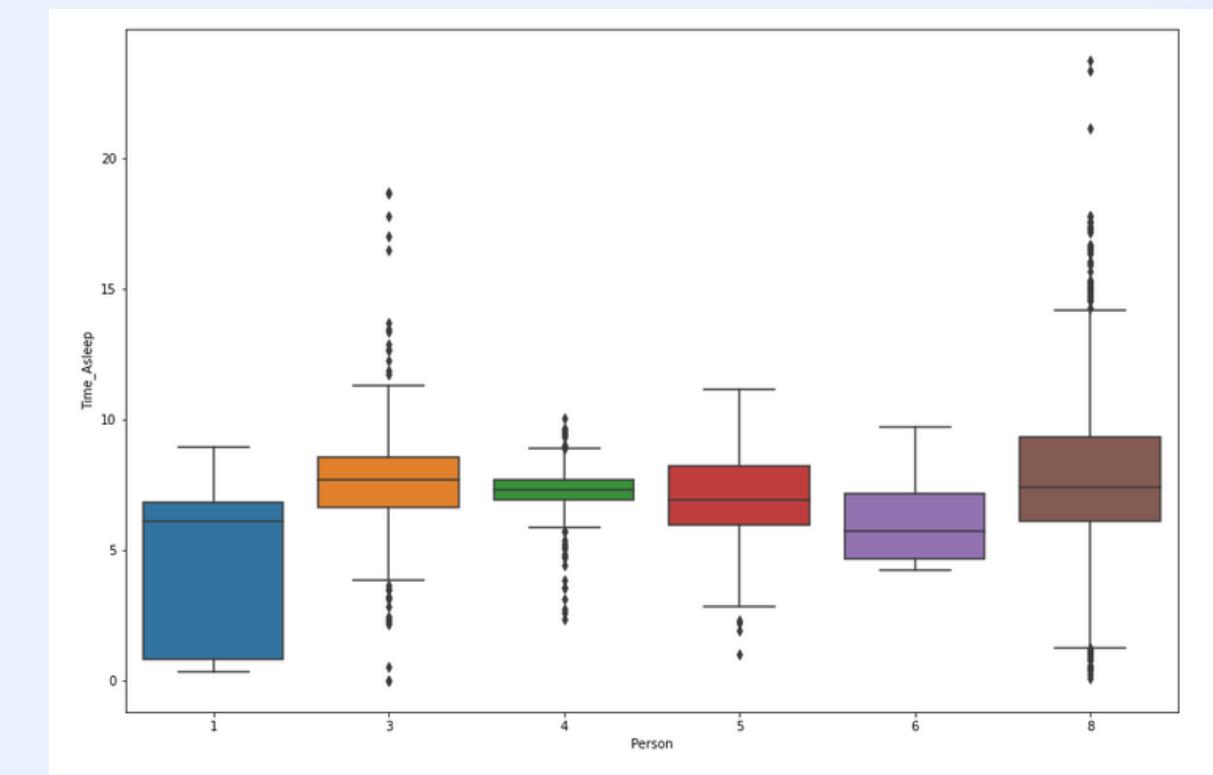
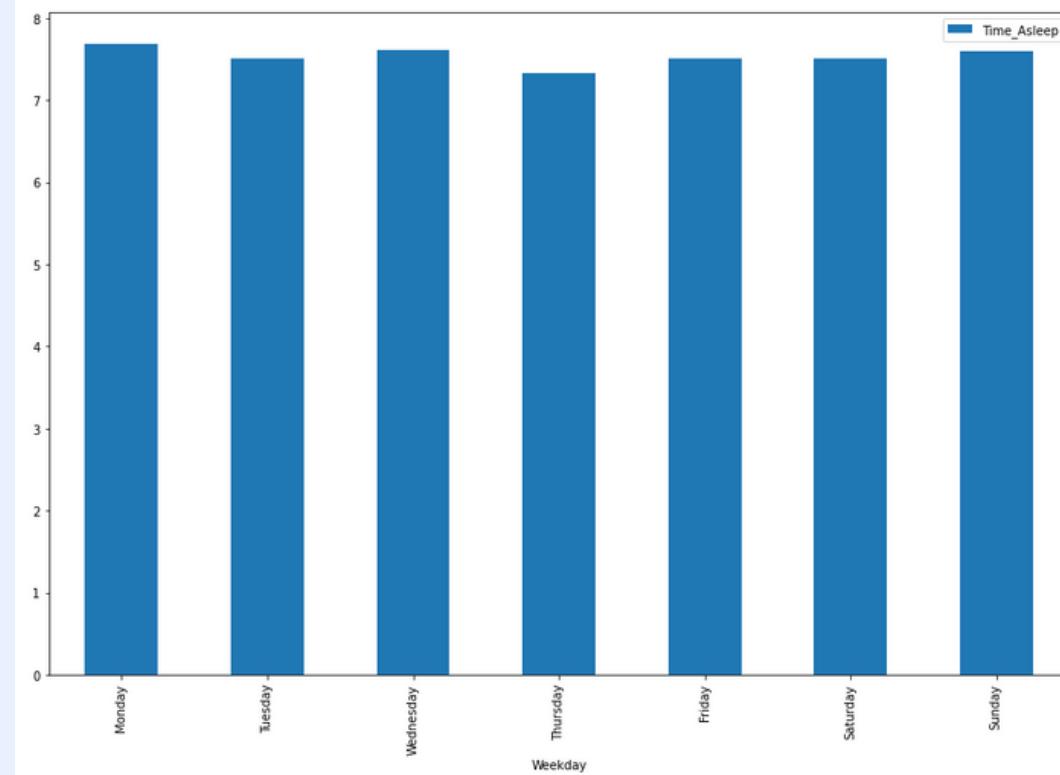
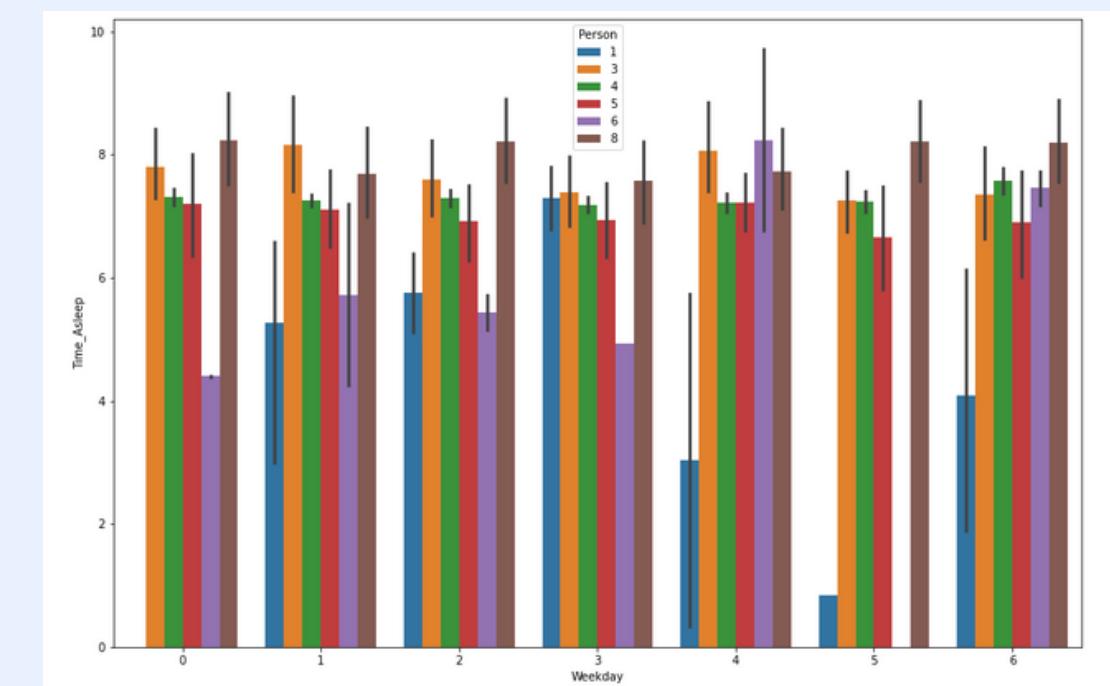
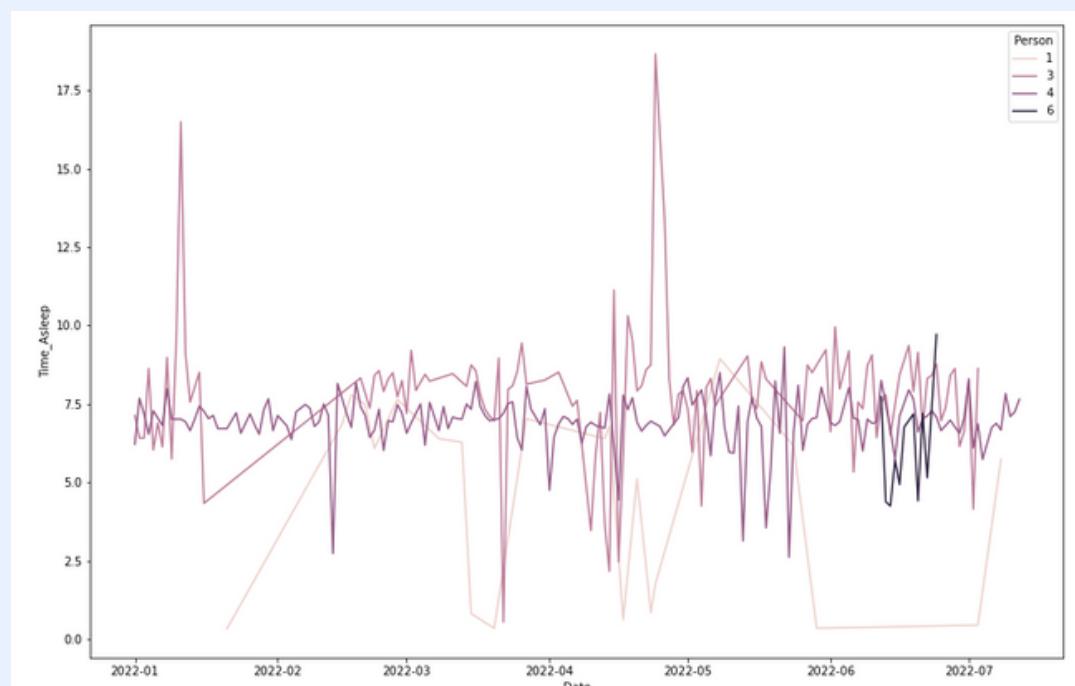
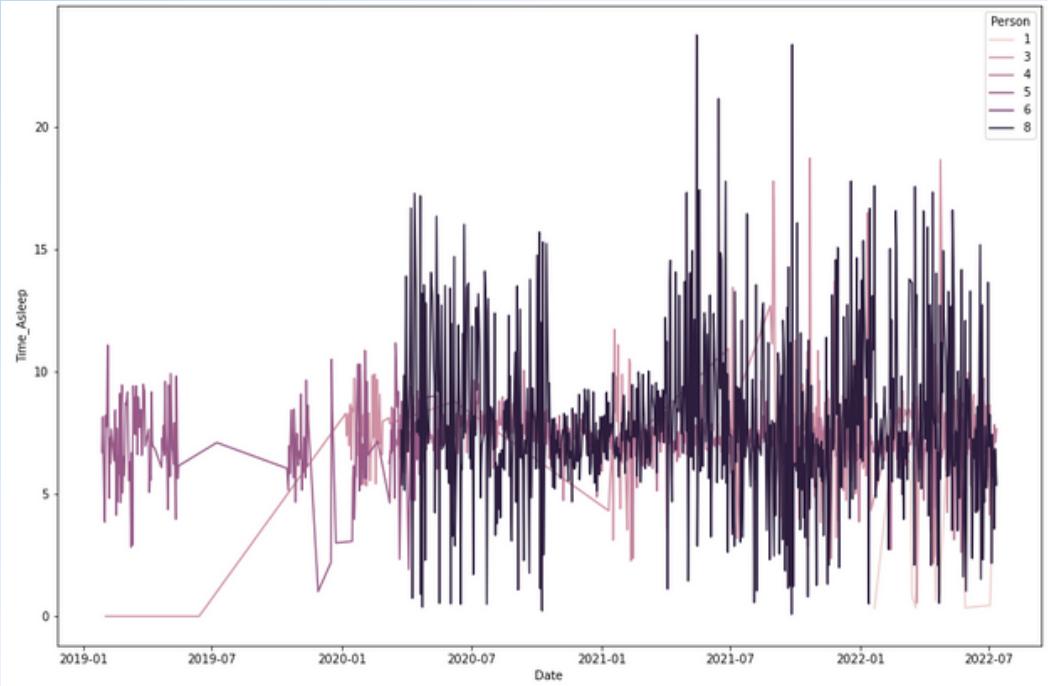
# Análisis comparativo



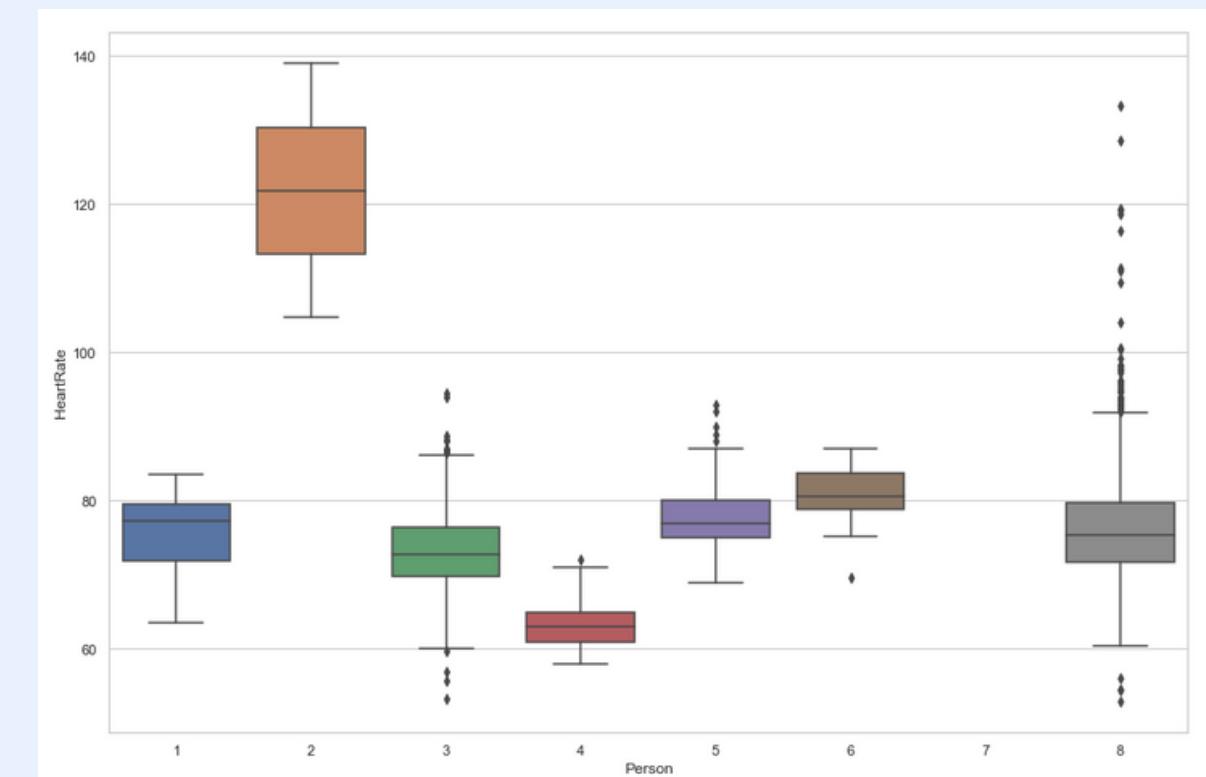
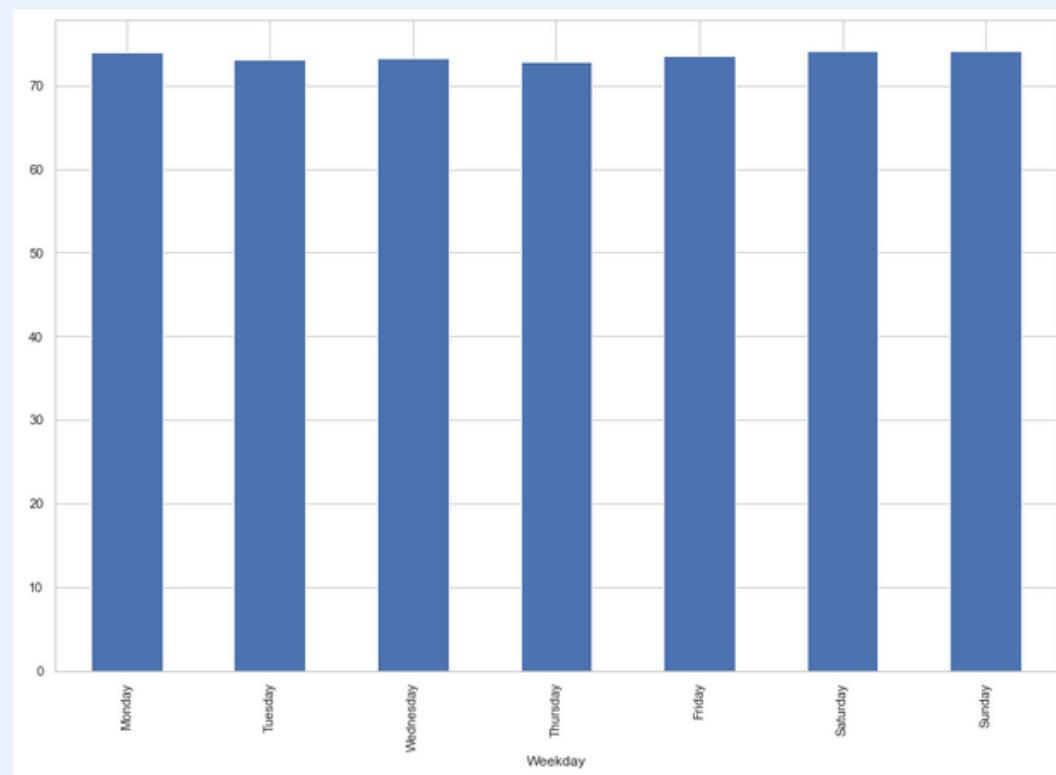
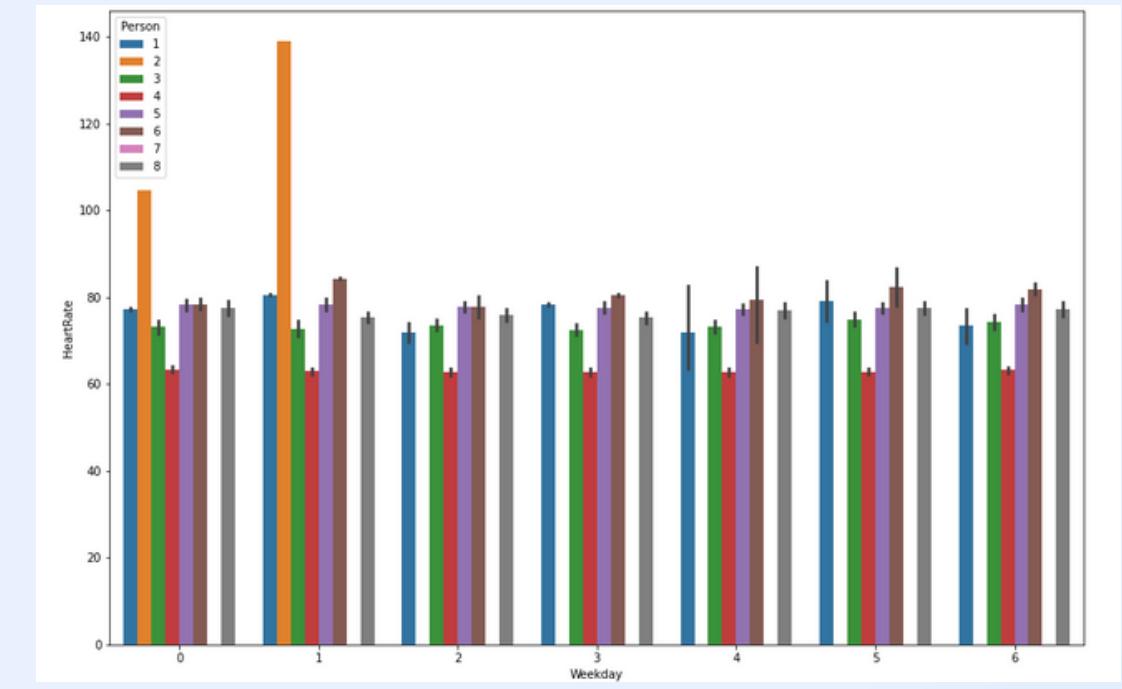
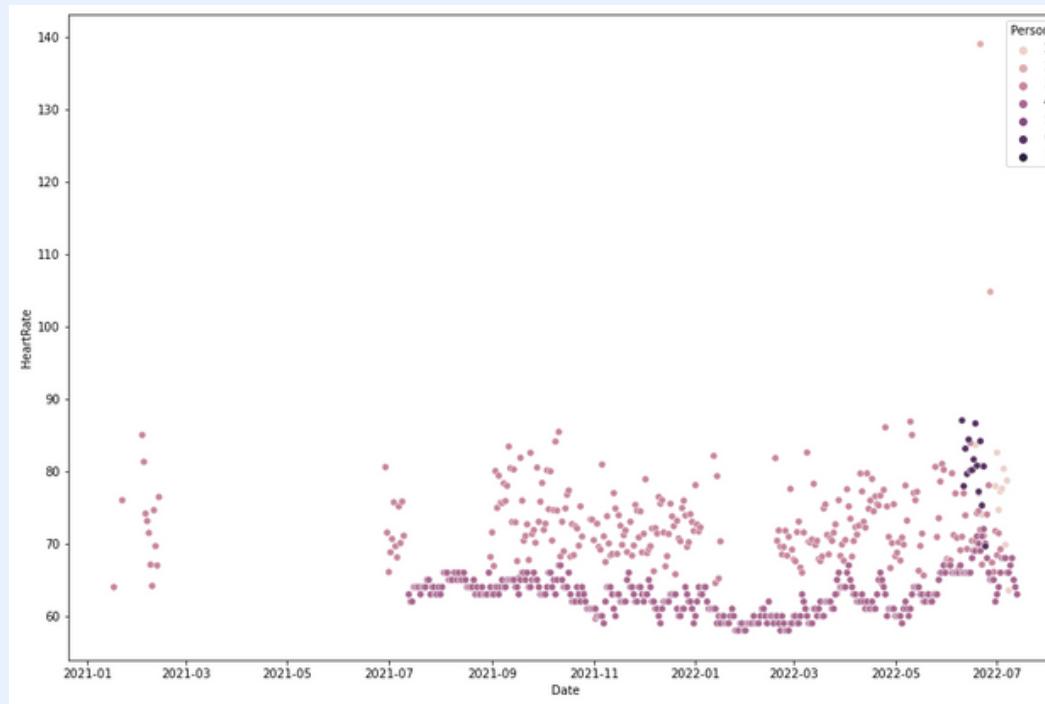
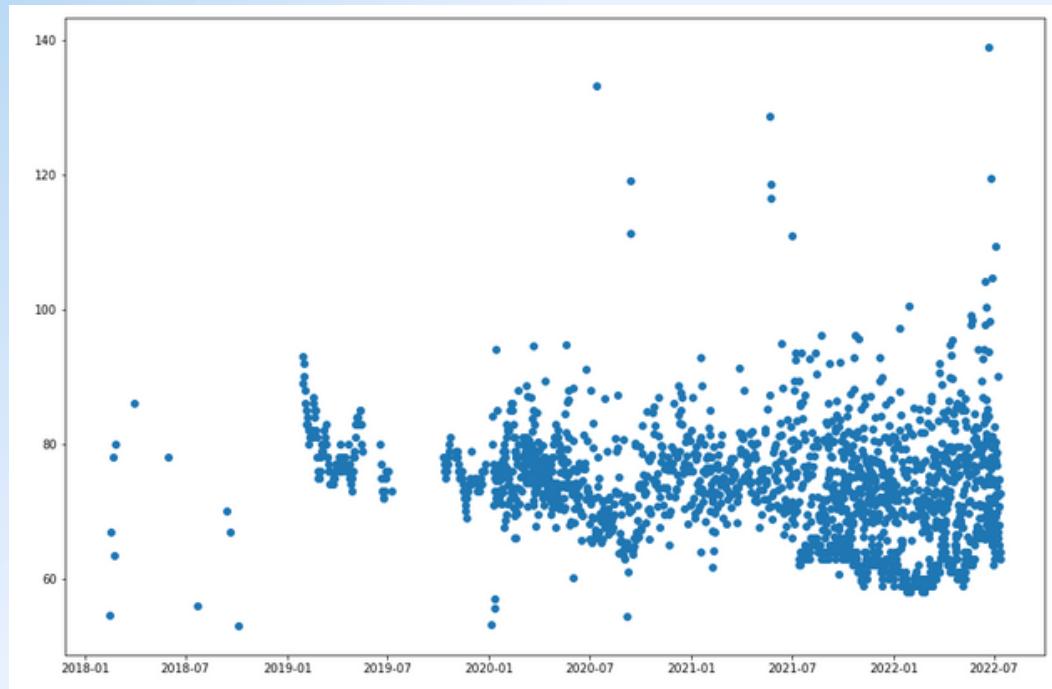
# Pasos



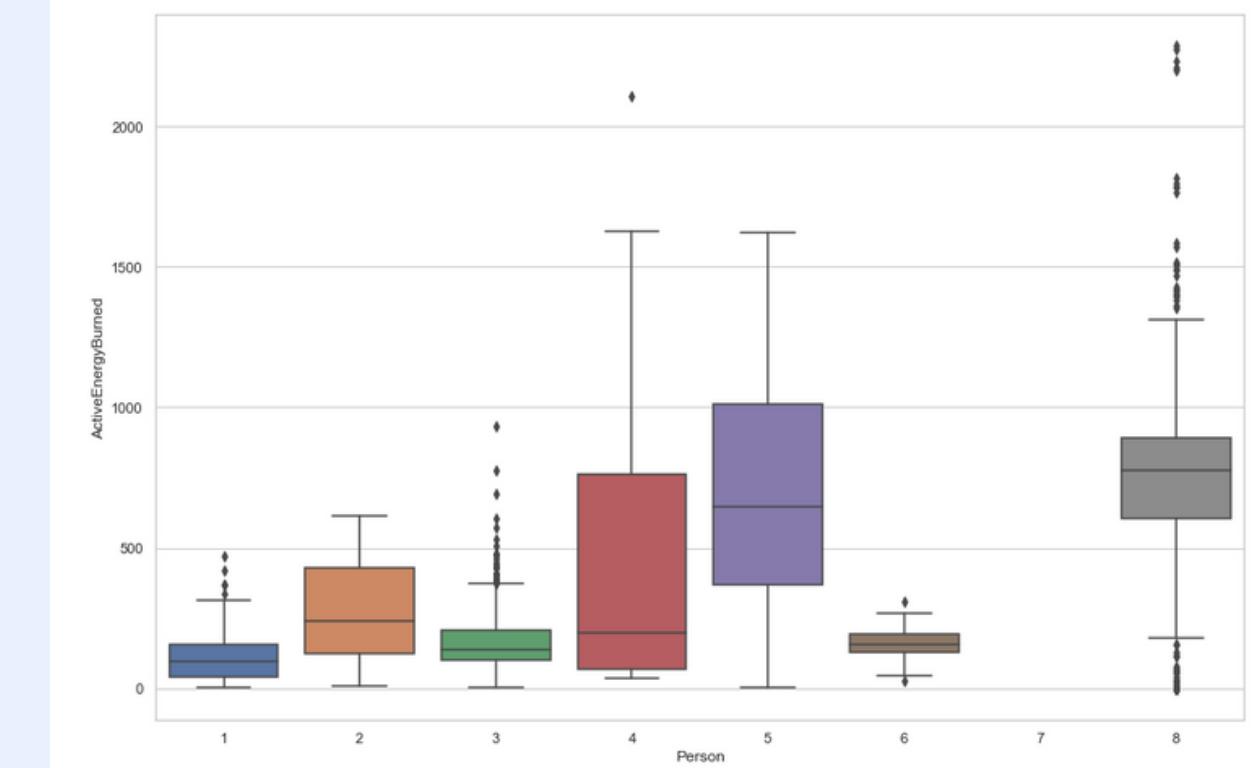
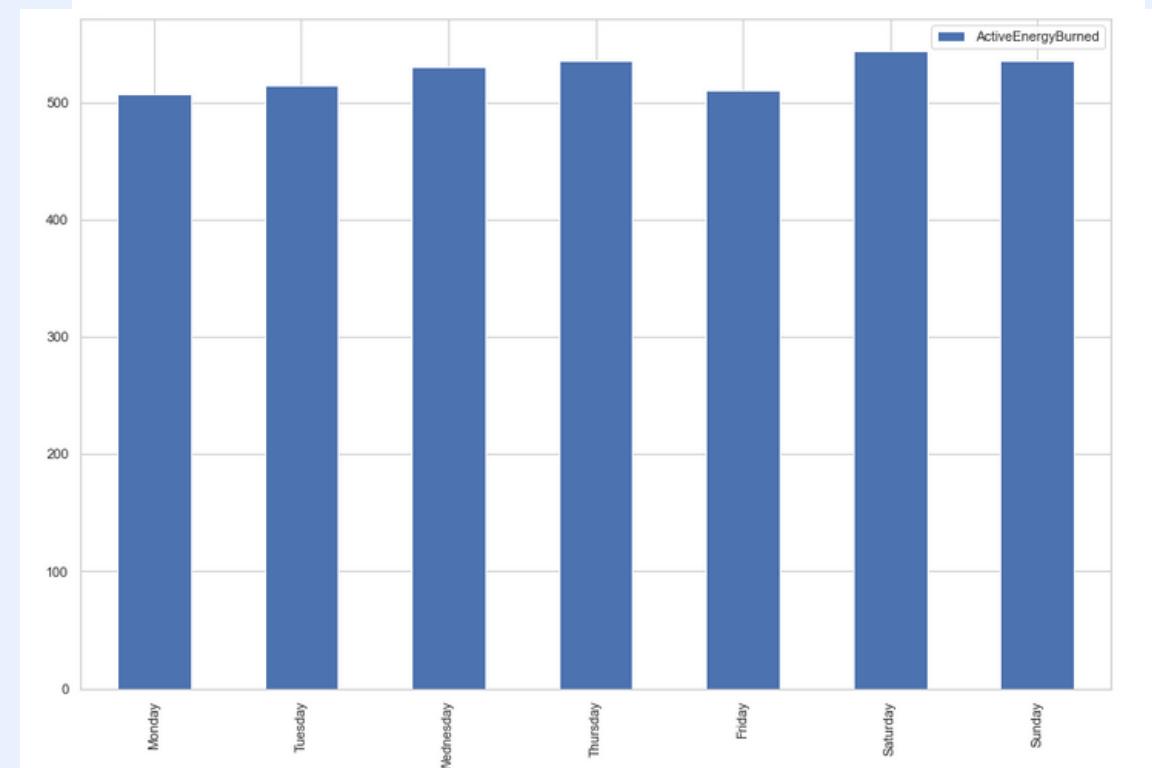
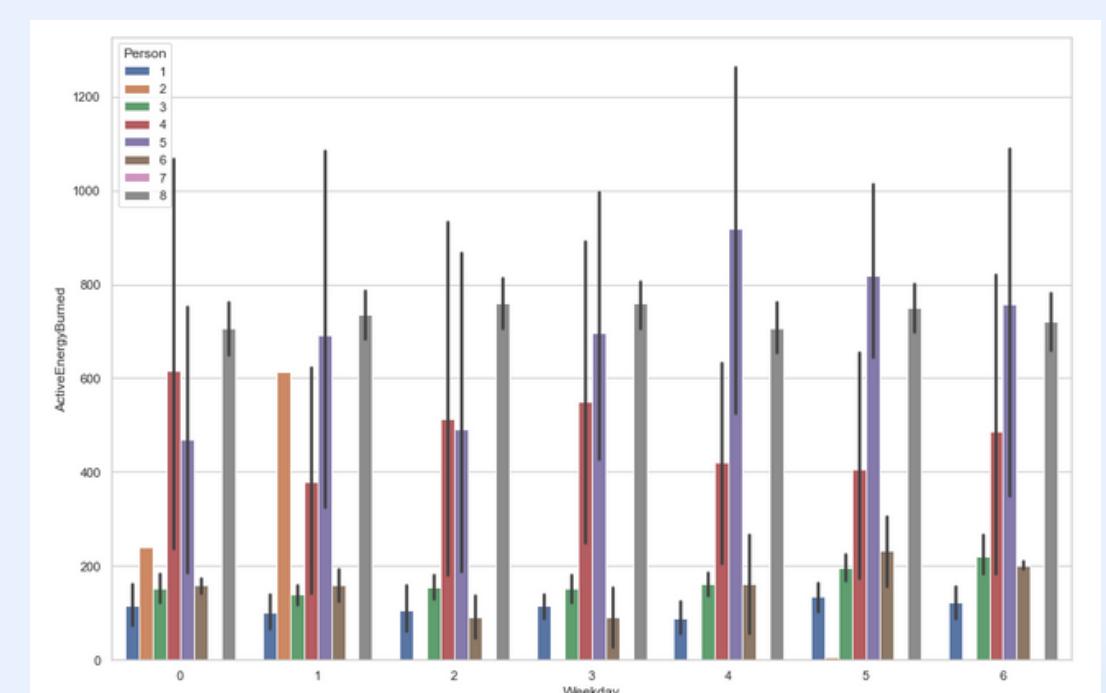
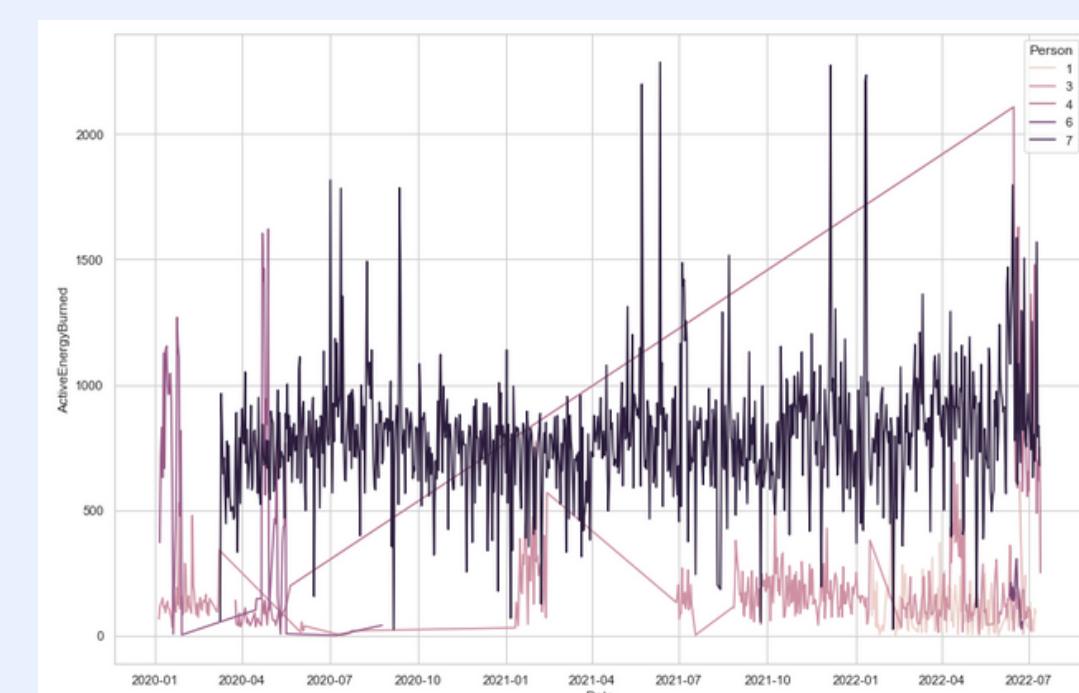
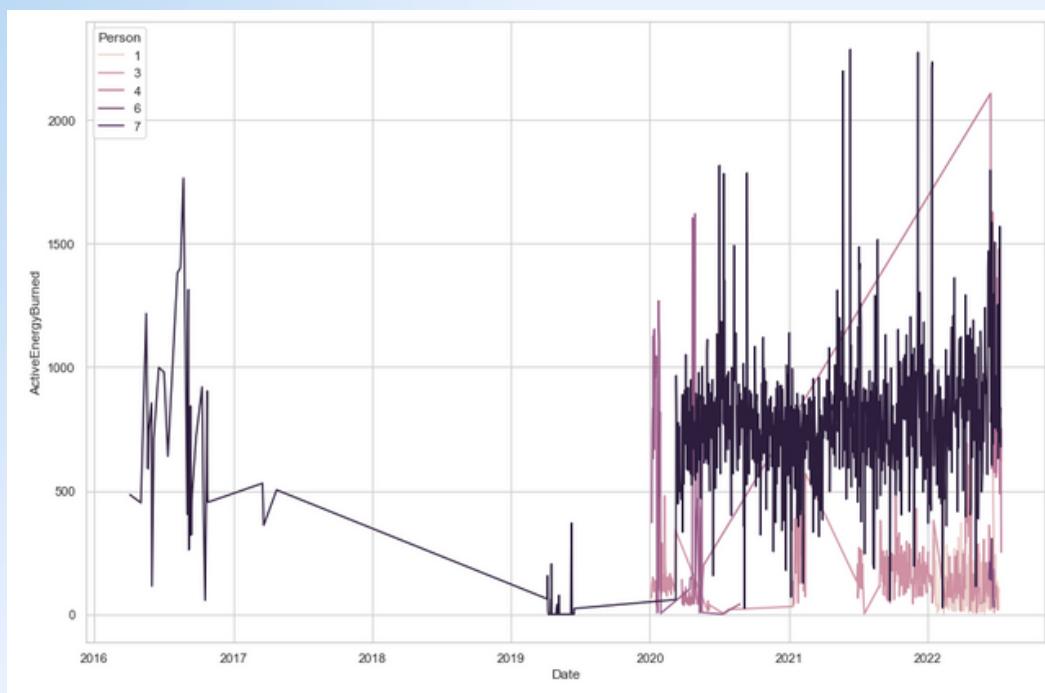
# Sueño



# Ritmo cardiaco



# Calorias



# Gracias

