1. Dataset

**Dataset:** Physical Activity Prediction Dataset

**Link:** <https://www.kaggle.com/datasets/diegosilvadefrana/fisical-activity-dataset/data>

**Explanation:** this dataset is collected by the wearable devices and the data is about the body situation when people doing different activities. It comprised data from 18 different physical activities (such as walking, cycling, playing soccer, etc.) performed by 9 subjects wearing 3 inertial measurement units and a heart rate monitor.

**Reasons of choosing this dataset:** This dataset is interesting because it can help us to know the body conditions when doing sports. Also, the dataset contains some concepts like ‘magnetometer’, ‘gyroscope’ which are hard to understand. These concepts should be showed by data visualization to make people understand and receive more quickly and deeply.

|  |  |
| --- | --- |
| **Column Name** | **Description** |
| activityID | Type of activity |
| heart\_rate | Heartbeats per minute |
| hand temperature (°C) | Temperature tested near hand |
| hand acceleration X ±16g | Measureing hands acceleration in all directions |
| hand acceleration Y ±16g |
| hand acceleration Z ±16g |
| hand gyroscope X | Detecting angular speed |
| hand gyroscope Y |
| hand gyroscope Z |
| hand magnetometer X | Testing magnetic field direction and strength |
| hand magnetometer Y |
| hand magnetometer Z |
| chest temperature (°C) | Temperature tested near chest |
| chest acceleration X ±16g | Measureing chest acceleration in all directions |
| chest acceleration Y ±16g |
| chest acceleration Z ±16g |
| chest gyroscope X | Detecting angular speed |
| chest gyroscope Y |
| chest gyroscope Z |
| chest magnetometer X | Testing magnetic field direction and strength |
| chest magnetometer Y |
| chest magnetometer Z |
| ankle temperature (°C) | Temperature tested near ankle |
| ankle acceleration X ±16g | Measureing ankle acceleration in all directions |
| ankle acceleration Y ±16g |
| ankle acceleration Z ±16g |
| ankle gyroscope X | Measureing chest acceleration in all directions |
| ankle gyroscope Y |
| ankle gyroscope Z |
| ankle magnetometer X | Testing magnetic field direction and strength |
| ankle magnetometer Y |
| ankle magnetometer Z |
| PeopleId | Id of people be tested |

2. Purpose of Visualization

In this project, by observing the heartbeat and body temperature of different sports, we can understand the range of healthy heartbeat and body temperature through a large amount of data. In this way, we can better monitor our physical condition. For example, when our physical condition is poor, we can stop exercising in time to ensure our health.

Also，acceleration, magnetometer and gyroscope can show the movement but the data itself is not very intuitive and we cannot know the range or the normal values.

3. Visualization

Explicitly state the visual encodings(aka data encodings)  
Explain briefly your finding about the visualization. Connect the findings to answer your queries.

1. Basic information about the data set

图表, 条形图

描述已自动生成

In this dataset, there are 13 the activities and the data is not very balanced and the activity people do most is transient activity and the least one is rope jumping.

2. the information of heart rate and temperature

图表, 箱线图

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When people running and rope jumping, their heart rates are quickest, always more than 160 times/min. when lying and sitting the rates are slowest, always less than 80 times/min.

For example, for heart rates of running people, the upper quartile and the lower quartile of running is about 140 and 170. Less than 100 means it is abnormal and more than 180 may cause some attention. If the heart rate is more than 200, people should stop running immediately.

图表, 瀑布图

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图表, 条形图

描述已自动生成For the average of temperature in different positions, always the highest temperature is from chest and the lowest is from hand. The temperature of hand is always 2-4 degrees less than that of chest which is very close to the true temperature of people.

Measuring hand temperature is easiest with these devices. Therefore, when the hand temperature exceeds about 35 degrees during exercise, the body temperature may be higher and an alarm may be required to cause the user to stop exercising.

3. gyroscope, magnetometer, acceleration

3.1 acceleration

图表, 散点图

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图表

描述已自动生成

From the scatter and line plots, we can know the acceleration in different positions and directions.

图表

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For example, in X-axis, always the ankle acceleration is more than 0 and the ankle acceleration is less than 0. The chest acceleration is much less than the other two positions.

3.2 magnetometer

图表, 散点图

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图表

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3.3 gyroscope

图表, 散点图

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图表

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