Project Name	**Activity Monitoring**
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Activity Monitoring

The aim of this report is to present the results of a binary classification task performed on accelerometer and gyroscope data collected from two activities: "Open Door" and "Rub Hands". The goal is to train model for binary classification, I used a Support Vector Machine (SVM) model to classify the activities based on the sensor data. The report outlines the data preprocessing steps, model training process, and evaluation of the trained model.

The dataset consists of sensor data collected from accelerometers and gyroscopes, capturing the motion patterns associated with the "Open Door" and "Rub Hands" activities. Each data sample includes readings from both sensors, providing a **3-dimensiona**l array for each activity. Shape of both sensor's data is **(87, 268, 3).**

Using NumPy, the sensor data was read from files and loaded into memory. Since SVM models require **2-dimensional** input data, the **3-dimensional** sensor data was flattened into a 2-dimensional array. The label data corresponding to the activities was also loaded and prepared for model training.

A Support Vector Classifier (SVC) with a linear kernel was chosen for the binary classification task. The combined accelerometer and gyroscope data were used as features, while the activity labels served as the target variable. The SVC model was trained on the training data using the fit() method.

The trained SVC model was evaluated using accuracy. The accuracy score, calculated using the accuracy_score() function from scikit-learn, was found to be approximately **0.622**, indicating that the model correctly classified **62.2%** of the test samples.

The achieved accuracy score of 62.2% suggests moderate performance of the SVM model in classifying the "Open Door" and "Rub Hands" activities based on accelerometer and gyroscope data. Possible factors contributing to the performance include the choice of features, the complexity of the activities, and the inherent limitations of the SVM algorithm. Further experimentation with different feature representations, model architectures, and hyper parameter tuning may lead to improved classification performance.

In conclusion, the SVM model trained on accelerometer and gyroscope data successfully classified the "Open Door" and "Rub Hands" activities with an accuracy of approximately 62.2%. While the model demonstrates moderate performance, there is room for further exploration and optimization to enhance classification accuracy and robustness.