# Machine Learning Project Report

This report details the process of analyzing, preprocessing, training, and evaluating a machine learning model for Human Activity Recognition using sensor data.

## Data Analysis

The dataset was examined for missing values, duplicate records, and class distribution. A correlation heatmap was generated to analyze feature relationships.

## Preprocessing

Features were standardized using StandardScaler, and the target variable was label encoded. Duplicates were removed to ensure data integrity.

## Model Training

Two models were trained: Logistic Regression and Random Forest. Hyperparameter tuning was performed using Randomized Search, selecting the best-performing model.

## Model Evaluation

The best model achieved high accuracy. A confusion matrix and classification report were generated to assess performance.

## Conclusion

This project successfully built a machine learning model for activity recognition. Future improvements could include additional feature engineering and deep learning models.