Human Activity Recognition using Deep Learning

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1 Introduction

Human Activity Recognition (HAR) is the problem of classifying sequences of accelerometer data into pre-defined activities. In this assignment you will use deep learning to solve the problem of activity classification. The main challenge of this assignment is getting the raw data in correct format (format which **PyTorch** understands).
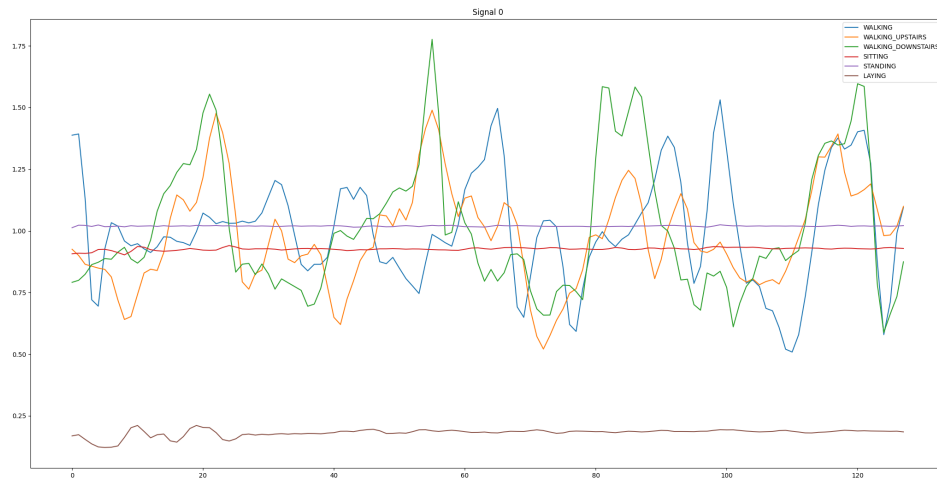

Figure 1: Signal 0 for all activities

2 Dataset

The data was collected from 30 subjects performing one of the six standard activities while wearing a waist-mounted smartphone which recorded the movement data. The six activities were as follows:

1. Walking

2. Walking upstairs

3. Walking downstairs

4. Sitting

5. Standing

6. Laying

Movement data consists of x, y, z accelerometer data (linear acceleration) and gyroscopic data (angular velocity). Dataset (https://archive.ics.uci.edu/ml/machine-learning-databases/00240/UCI%20HAR%20Dataset.zip)

3 Tasks

In order to pass this assignment you have to complete **all of the following** tasks:

1. Implement a **custom data-set class**.

2. **Visualize all 9 signals** for a random sample from each category.

3. Implement **TensorBoard** support.

4. Implement and train a **1 dimensional convolutional neural network (CNN)**, report the classification accuracy on the test set.

5. Compute **confusion matrix** on the test set.