

# Project 3 Deliverable 1

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## I. INTRODUCTION

The problem for this deliverable was to manipulate the MSR Daily Activity dataset into features that will later be used to create a support vector machine that will classify what action is occurring based on the calculated features. In order to create the features, a histogram is created from each file to separate distance over time data into bins, which will be used by the SVM to classify the data.

## II. RAD FEATURIZATION

Implementing the RAD featurization took a lot of data manipulation to complete. The first step was to isolate each time chunk of 20 coordinates in order to calculate distances and thetas. Next a distance and theta calculator was required to get the d1 - d5 and theta1 - theta5 values that would later be used to make the histogram. The RAD featurization mainly focuses on the 5 extremities and their proximity to the hip center in order to generalize the movement occurring during each activity.

## III. CUSTOM FEATURIZATION

The custom feature I decided to implement was instead of calculating the distances of the star extremities in reference with hip center, I calculated the centroid of all 20 joints in order to find the true center of the person conducting the activities. The distances were then calculated with the centroid as a reference instead of hip center. The 5 extremities are still used since I believe that it will give accurate features to be used in the SVM. Since the theta values do not need a center as a reference, it was left unchanged.

## IV. HISTOGRAM CREATION

After the features were gathered the array of distances and thetas were used to make histograms of 10 bins. 10 total histograms per file were made, 5 for each distance and 5 for each theta. The 10 bins were selected as the default since it gave a decent representation of the movement of a particular joint or angle without over complicating the histogram. The custom RAD featurization did not affect the creation of the histograms but did alter how the data was represented in the histograms despite keeping the star joint layout from the proper RAD featurization.

## REFERENCES

No specific resources used, only some sites to help with calculations or array manipulation