Project 3 Part 1

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I. Introduction

Given a data set containing 16 human activities, preformed by 10 human subjects, activity done twice: this data set contains both color depth and skeleton data. For this project the skeleton data will be used. The skeleton data is in rows containing 5 values: frame id, joint id, joint position x, joint position y, and joint position z. This data will be used to construct a human representations based on the Relative Angles and Distances (RAD) of star skeleton. RAD consists of the joint's distance from the center of the skeleton as well the angles between each joint.

II. RAD features

The joints chosen for the RAD are 8 (right hand), 4 (head), 12 (left hand), 16 (right foot), and 20 (left foot). For every frame, those joints were added to a table corresponding to each frame. Then Each joint's distance from joint 1 (center) of the current frame was calculated along with the angles between them: 8-4, 4-12, 12-20, 20-16, and 16-8. Those calculations were then appended to their respected lists to be used for the histogram later on.

III. Custom features

The joints chosen for the custom part are 5 (right shoulder), 3 (center shoulder), 9 (left shoulder), 14 (right knee), and 18 (left knee). For every frame, those joints were added to a table corresponding to each frame. Then Each joint's distance from joint 1 (center) of the current frame was calculated along with the angles between them: 5-3, 3-9, 9-18, 18-14, and 14-5. Those calculations were then appended to their respected lists to be used for the histogram later on.

IV. Histogram Creation

After calculating the distances and angles for each joint, it was then checked for any NAN values it remove any errors, then was plugged into numpy.histogram() in order to get the histogram of that distance/angle; used the default number of bins (10) for consistency. The histogram was spilt up into two parts: array of heights for the bins and array of bin edges, the bin heights were just needed for the assignment. Next step was to normalize the histogram, take the array of heights for the bins and divide it by the number of frames.