NAME: ASMITA SHELKE

**ASSIGNMENT NO 2**

There are two datasets provided, the waveforms.csv contain 65 instances of rotational acceleration (RA), rotational velocity (RV), linear acceleration (LA). Whereas the times.csv contain the time values time linear (TL) and time rotational (TR).

After performing the step 2 of the problem statement, we get 65 instances of graph. For instance, 7, it is visible that the fluctuations of the three graphs are similar to each other, i.e. when there is a rise in linear acceleration graph, we can observe a rise for rotational velocity and rotational acceleration as well.

Chart, line chart

Description automatically generated

Fig 1. Instance 7

When we compare instance 52, we can observe that the fluctuations in the graph are different. When there is a decrease in the linear acceleration graph, the rotational velocity is constant whereas rotational acceleration shows a increase in the graph. This means all the three graphs are acting differently for instance 52.

Chart, line chart

Description automatically generated

We have calculated three features (min, mean and max) for linear acceleration, rotational acceleration, and rotational velocity. This gives us total of nine features.

Now we must determine the three best features out of these 9. Since the min values (MLA, MRA, MRV) of each feature is 0, we can just ignore it.

Since the average (ALA, ARA, ARV) contains mean of all the instances, the data will be approximate, and not distinct. Hence it cannot be used as a feature to distinguish from each other.

Three features which are important are PRA, PLA, PRV. These features give us the maximum values. Hence in a dataset, we will understand the maximum values for each feature.

Graphical user interface

Description automatically generated

Graphical user interface, application

Description automatically generated

Graphical user interface, chart

Description automatically generated

|  |  |
| --- | --- |
| Feature | Instance Number of top 5 largest feature values |
| PLA | 8,9,11,19,20 |
| PRV | 8,9,11,34,60 |
| PRA | 8,9,11,19,20 |

The table above shows the best three features, and the instance number of top 5 largest feature values. Now to select the two most useful features, we compare the instances of the three features. Since the instance values for PLA and PRA are same, these features can be used to determine the instances with largest feature values.

Chart, scatter chart

Description automatically generated

Above is a scatter plot for rotational acceleration vs linear acceleration. The five points are the extreme values.