

## **4.3 Machine Learning**

Machine Learning is a subset of Artificial Intelligence. It is an implementation of algorithms that improve their efficiency on their own with less human intervention.

### **4.3.1 Data preprocessing**

To [https://docs.google.com/document/d/1Kt9QjGE952RY4W9UPiYZZcyBM7qQ\\_X1xGbMLU3Lj-bk/edit](https://docs.google.com/document/d/1Kt9QjGE952RY4W9UPiYZZcyBM7qQ_X1xGbMLU3Lj-bk/edit) calculate predict the values of users at any distance from the device, we preprocess all the coordinates by calculating the slope and distance using x and y coordinates and rounding off those values to an arc in diagrammatic form.

### **4.3.2 Classification and Regression**

Before going to classification and regression we first estimated our neural network models using Keras tuner. Then for classification, we used the estimated number of nodes and layers where our validation accuracy was 100%. The same was the accuracy of the testing data. For linear regression, we also used the estimated number of nodes and layers where we got our validation loss of 0.051. Also, our loss for testing data was 0.056. After predicting all the value coordinates we re-preprocessed our values to the original scale.

### **4.3.3 Data loading**

For loading our data we used the pandas library for importing our data file. From that dataset, we extracted elbow, wrist and shoulder coordinates.

### **4.3.4 Data splitting**

For testing and training, we split our data into two parts where 80% of the data was for training data and 20% was for testing data. Also, we assigned some amount of validation data out of training data while searching our appropriate model.