# ML Model

We need to predict the amount of water flow (in percentage) sent through the motor. We are building an ML model which takes Humidity and Temperature as input and predicts the water flow. We can consider it as the brain of our system.

We have tried different models and picked the best model based on metrics. We have trained the ML model on a sensor dataset. To reduce the overhead of computation on the Board, we have performed the training phase of the ML models on the Cloud. And use the optimal parameters in the Board.

# ML Architecture

1. Neural Network

We trained a neural network containing One input layer, hidden layer one consisting of 8 neurons with activation as ReLu, Hidden layer two consisting of 2 neurons with activation as ReLu, and a final output layer with activation Sigmoid. We have used epoch=1000 with loss function as Mean square Error and Optimizer as Adam.

1. Random Forest

We have used the ensemble learning technique to predict the water flow. For this, we have used 10 estimators with Gini Index as the split criterion.

1. Decision Tree

We have used a decision tree with entropy as a split criterion.

1. Linear Regression

We have trained a simple linear regression on the dataset.

1. Support Vector Regression

We have used SV Regressor with Rbf Kernel to train our model

# Evaluation

For evaluation of our ML models, we have used Root Mean Square Error ( RMSE )

Formula

We have split the dataset into training sets and validation set to perform the evaluation.

We have seen that Random Forest produces the least RMSE value on the validation set from the observation. So we have chosen Random Forest as our working model in our system.