**Artificial Neural Network Post Training Qualification**

Create an application using artificial neural network with **any dataset** and **any architecture** based on the necessity of your application.

After that, you must answer the following questions completely:

1. What kind of architecture do you use and describe your reason(s) for choosing the architecture.

I choose a feedforward multilayered neural network architecture for this particular application. A feedforward architecture was chosen because predicting a mathematical function is not a time dependant activity, which is suitable for a feedforward neural network. In this case, the architecture is perfect especially to predict the non-linear relationship between the input (x, y) and the result (sin x + cos y). The architecture has one hidden layer with two input neurons, eight hidden neurons and one output neurons, with a tanh activation function used between the input and hidden neurons. Tanh was chosen here because of its non linearity, which is suitable for predicting this non-linear function. It also spits out values between 1 and -1 which is actually the same as the value that sin and cos will spit out. No activation function is is used between the hidden and the output neuron because using an activation function would actually limit the output value of the system. A Mean Squared Error is also used here as a loss function. This is due to the fact that MSE function hits harder when the value predicted is farther than the actual result, which is extremely suitable for this kind of mathematical predictions.

1. What kind of dataset do you use? Based on your analysis, please describe the features in the dataset.

The dataset I use is a custome made sinx + cosy dataset. The features of the dataset constists of x ranging from 0 to 720 and y ranging from 0 to 720 and the value of sin x + cos y. The input value (x and y) is normalized in the code using MinMaxScaler and the output (z, which is sinx + cos y) is taken as is.

1. Based on your analysis, what kind of data can be chosen as a target? Why do you use it as the target?

From the dataset, it is clear that the target is z (sin x + cos y). This is due to the fact that the dataset is made to predict the value. The data of possible value of x and y is given to the ai alongside its target data. This is a suitable model for the AI to predict the output of the function.

Note:

1. Please don’t use the dataset given at the training! (Choose the other dataset from internet or create it yourself).
2. You can use **any architecture** except for single layer feedforward (**perceptron** or **LMS**).
3. Please answer the questions clearly.