

Methodology for Neural Network Development

1. Data collection
2. Data normalisation
3. Neural network design
4. Neural network training
5. Testing

Step 1: Data Collection

In order to develop a prediction system using ANN, the related dataset will be collected as the training datasets for the ANN. Below is a sample of datasets for Iris Class prediction.

Sepal length	Sepal width	Petal length	Petal width	Iris Class
5.7	4.4	1.5	0.4	Iris-setosa
5.4	3.9	1.3	0.4	Iris-setosa
6.1	2.8	4.7	1.2	Iris-versicolor
6.4	2.9	4.3	1.3	Iris-versicolor
6.1	3	4.9	1.8	Iris-virginica
6.4	2.8	5.6	2.1	Iris-virginica

Attributes	Minimum	Maximum
Sepal length	4.3	7.9
Sepal width	2	4.4
Petal length	1	6.9
Petal width	0.1	2.5

Step 2: Data Normalisation

The normalisation will ensure the dataset have standard range eg. In this problem we want to make sure the range is between 0 to 1 (0,1)

$$v' = \frac{v - \min A}{\max A - \min A} (\text{new_max } A - \text{new_min } A) + \text{new_min } A$$

Eg:

$$\text{Normalised value}(v') = \frac{v-4.3}{7.9-4.3} (1 - 0) + 0$$

Step 3: ANN Design

The main design elements are the input node and the output node. In our problems 4 attributes will be used to determine the Iris Class. There for the input nodes will consist of 4 nodes representing the 4 attributes. The Iris class is the only result we want and it will become the only output node.

Refer to your lecturer

Step 4: ANN Training

The training will make the ANN learn the pattern based on the datasets where a specific set of 4 input will determine its Iris class. This also ensure the ANN able to predict previously unknown input set and able to produce predicted output.

Eg. When we input :-

5.7	4.4	1.5	0.4
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It should give the output of 0.

The training start with the setting a random weight on each connection weight in the network. Next a training algorithms will be used to change all the weights until the network able to output the value we require. A back-propagation algorithm will be used in this tutorial.

Refer to your lecturer

Step 5: ANN Testing (Will be done during lab session)