

Q2. A neuron is an information processing unit. It consists of: inputs associated with weights, sum of inputs and an activation function

Q1. An ANN is a layered graphical model containing neurons and weighted connections, resembling the excitatory properties of the human brain. Weights of the ANN are changed after presenting it training examples from an environment, where weights are changed based on the training procedure used. Artificial neurons also are biased, just like real ones, adding a constant level of activation before being activated by a (nonlinear) activation function. Depending on the training procedure, both weights, topology or even activation functions may be learned.

Q5. In multi layer ff networks the error is only available in the last layer. Therefore the error is propagated back through the network using the backpropagation algorithm. In order to do so the local gradient has to be calculated. Update of the weight: $w+1 = w + n * x * \text{gradient}$ where the input x is the output of the previous layer. The local gradient is calculated differently depending if the neuron is in the output layer or in the hidden layer. Output layer: $\text{gradient} = \phi'(x) * (y - d)$ Hidden Layer: $\text{gradient} = \phi_{ij}'(x) * \sum(w_i * \text{local gradient}_i)$

Q3. apply input data to input layer and initialize small values weights minimize error according to difference between desired signal and output signal assign the test vector the class that has smallest error