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Question: Explain in your own words using supporting examples what b...

Explain in your own words using supporting examples what backpropagation algorithm is and how it is useful in neural network.

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Expert Answer



Tonymon Varghese answered this
42 answers

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Back Propagation

- Backpropagation is a systematic method for training multiple layer NNs.
- The standard backpropagation algorithm is as follows:
 - 1) Build a network with a chosen number of input, hidden and output units.
 - 2) Initialize all the weights to low random values.
 - 3) Choose a single training pair at random.
 - 4) Copy the input pattern to the input layer.
 - 5) Cycle the network so that the activations from the inputs generate the activations in the hidden and output layers.
 - 6) Calculate the error derivative between the output activation and target output.
 - 7) Backpropagate the summed products of the weights and errors in the output layer in order to calculate the error in the hidden units.

Classification by Back propagation

- Back propagation : A neural network learning algorithm
- Started by Psychologists and neurobiologists to develop and test computational analogues of neurons.
- A neural network : A set of connected input/output units where each connection has a weight associated with it.
- During the learning phase , the network learns by adjusting the weights so as to be able to predict the correct class label of the input tuples.

Back propagation neural networks

- BP training method means a multilayer perceptron, feed forward neural network trained by BP with one or more hidden layers.

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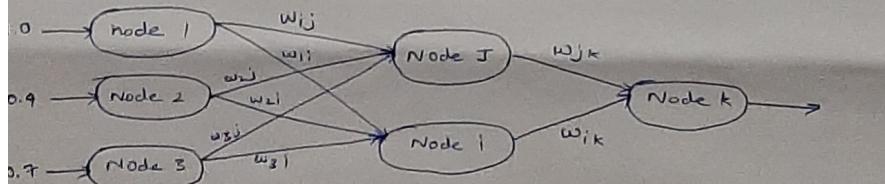
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• As usual, the aim

- To train the net to achieve balance between the ability to respond correctly to the input patterns that are used for training.
- The ability to give reasonable good responses to input that is similar, but not identical, to that used in training.

Example



w_{1j}	w_{1i}	w_{2j}	w_{2i}	w_{3j}	w_{3i}	w_{jk}	w_{ik}
0.20	0.10	0.30	-0.10	-0.10	0.20	0.10	0.50

- One instance 1, 0.4, 0.7 with actual value 0.65 in the dataset.
- Compute the network output value : Output = 0.582 and then the error $0.65 - 0.582 = 0.068$ For this instance.
- One propagates error 0.068 from output node k backwards in the network , updating the networks.

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Provide your own Swift source code examples for each one of these concepts.

A: [See answer](#)

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