

CS 678 MLP BPTT homework

Assume a recurrent MLP with 1 input, 2 hidden nodes and one output, where the two hidden nodes also feed back to themselves after one time step (an Elman net structure). Assume initial weights of -1 going into the hidden layer from the input, and $+1$ going from the hidden layer to the output, and $.6$ going from the hidden layer back to itself (you may ignore bias weights). Assume a learning rate of 1. a) Show the unfolded (abstract) net for $k=2$. b) Write down the sequence of equations (with all proper values) and calculate what the output of the network is after two input iterations (No learning yet, just the output). The input at time 1 is $.8$, and at time 2 the input is $.4$. Assume the initial activation of the context nodes is 0. c) Write down the sequence of equations (with all proper values) for learning and calculate the weight updates assuming we are doing BPTT with $k=2$ given the 2 inputs above, and with the target output for the $.4$ input being $.9$.