ECE 592 course work

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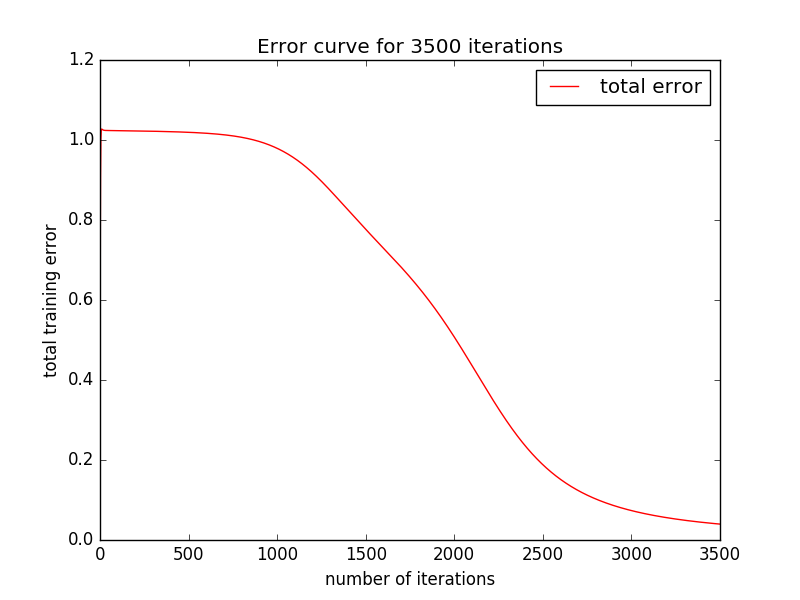
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Part 1 Backpropagation

*1) Set up your network in a 2-input, 4-hidden and 1-output configuration. Apply the XOR training set. Initialize weights to random values in the range -0.5 to +0.5 and set the learning rate to 0.2 with momentum at 0.0.*

*a) Define your XOR problem using a binary representation. Draw a graph of total error against number of epochs. On average, how many epochs does it take to reach a total error of less than 0.05? You should perform many trials to get your results, although you don’t need to plot them all.*

Graph:

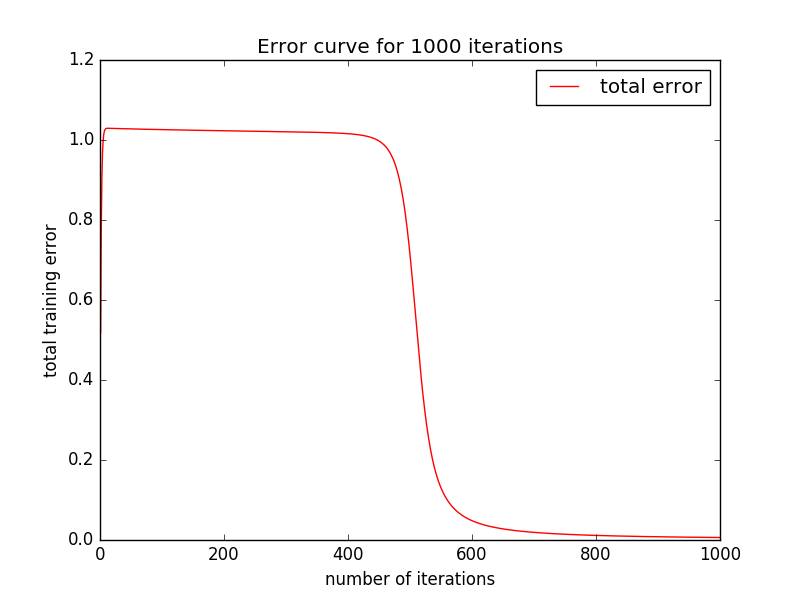


I perform 15 training sessions and found out that On average It takes (6225+6340+3833+4320+5425+3373+4411+5025+3989+7245+4829+4214+5122+3694+3977)/15 = 4801 iterations to reach error less than 0.05

*b) This time use a bipolar representation. Again, graph your results to show the total error varying against number of epochs. On average, how many epochs to reach a total error of less than 0.05?*

*c) Now set the momentum to 0.9. What does the graph look like now and how fast can 0.05 be reached?*

Graph for Binary representations :



I perform 15 training sessions and the average epochs to reach error less than 0.05 is(585+363+355+411+529+369+529+514+492+550+996+586+446+766+565)/15 = 537 iterations