6600 Intelligent Systems
Riley Densley
A01227345

Back Propagation Errors

The problem expressed by Rumelhart, Hinton, and Williams boils down to making hidden layers learn. They talk about how a neural network is set up and how one can simply change the weights and biases on the first layer and get the input they want. Changing things this way is very limiting. Because you are only changing one layer you are missing out on the power of the hidden layers. The issue is teaching these hidden layers how to produce the correct weights and biases to get the correct answers. Their approach is the generalized delta rule. This is needed because, although there is a simple guaranteed learning rule for all problems that can be solved without hidden layers, there is no such rule for problems that need hidden layers.

One thing I liked about this paper was the way they explained the simulation results. They started out by explaining what results they were looking for and why they were important. Then they explained their results in comparison to other simulations. For example they talked about Symmetry Breaking. This is where the whole system doesn't learn anything because all of the weights are the same. Since back propagation is dependent on the weight, if all the weights are the same they will change the same amount. For a solution that required different weights, this net will not produce a correct system. They counter this problem by starting each weight with a random value.

I really liked this paper in its entirety. One thing that I wish there was more of was their thought process. For specific solutions how did they get to it. Why did they try one thing over the other. If they would have put in more of their trial and errors when coming up with solutions I would have like that. To see how they thought and brainstormed to come up with these solutions.

What inspired me was the rigor that they had when testing out their solution. They put it through many tests and each test they repeated many times to see and compare results. It just weighed on me the value they had to testing and changing and pushing their idea to its limit to help others on the same path.