Report on Assignment 3

CSE 472: Machine Learning Sessional

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Why may the validation help to determine appropriate number of nodes in the hidden layer

If we depend solely on the training set to determine the appropriate parameters, we may encounter overfitting. Using validation set for determining the appropriate number of nodes ensures that the parameters will work well on unseen data. So, we have trained our algorithm on training data but tested it's performance on a different data set (*validation set*) and thus determined the appropriate number of nodes in the hidden layer.

Ensuring efficient implementation of backpropagation algorithm

I have implemented vectorized forms of the equations. It makes the implementation simpler and more intuitive. I have coded in C++ with my own matrix library which may not reflect the efficiency but langauges like Matlab, Octave which have efficient matrix library support, will reflect the implementaion efficiency more clearly. Also I have avoided calculating same thing more than once whenever possible.

Comparison of ANN and Decision Tree

- Artificial neural network's perfomance depends greatly on the parameters like hidden layer neurone count, learning rate, batch size for update etc. Decision tree is simpler in this sense.
- With right parameters, artificial neural network usually performs better than decision tree.
- Decision tree is easier to understand and code.
- Decision tree has a higher chance of overfitting.
- Artificial neural network can be used more easily for reinforcement learning than decision tree.
- The test time depends on the structure of the tree in case of decision tree.