Reuters Neural Network Classification

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This report evaluates the performance of a Neural Network with predicting the topics of a Reuters article based solely on the contents of the article, mainly it’s body paragraph. The classifier used for this experiment was a Neural Network, specifically a sequential neural network model provided by the Keras deep learning library.

The classifier used as a Sequential neural network, with a total amount of input nodes of 250, hidden nodes of 100, with the number of output nodes just being the length of all the topics, with a capped amount of 200. For the neural network, the parameters I specified was a loss function of binary crossentropy, an optimizer of Aadamax, and the metrics being accuaracy. With these parameters defined, the neural network is able to acquire knowledge by training by using k-folding, yielding a x and y training set in addition to a x and y test set. The x and y training sets are then passed into the neural network with a specified number of 150 rounds of training per train along with a batch size of 128.

For my experiment, I test the how well a neural network using cross validation is able to predict the topics of specific topics based solely on the article’s body paragraph. For this experiment, I used the data repository for Reuters articles which are found at <http://kdd.ics.uci.edu/databases/reuters21578/reuters21578.html>. To determine how accurate the neural network is in predicting these articles, I use the Confusion Matrix and Mathew’s Correlation Coefficient. To calculate this, I keep a running tally of each articles number of True Positives, True Negatives, False Positives, and False Negatives while k-folding through the dataset parsed from the Reuters data repository. For any future experiments, all that is needed is to simply re-run the program, but do not that this program is built to parse sgm files (although I never tested it on others).

**Results**

*Note: Graph has filtered repetitive MCC values due to graphing difficulties with such a large amount of topics*

***Conclusion***

Looking at my results, it seems my neural network was great at predicting which articles, based upon their body paragraphs, were talking about the topic earn. The neural network also seems to a fairly good job at predicting all topics from ‘acq’ to ‘ship’. Also, the neural network might as well be guessing since isn’t very good at predicting for any topic after ‘ship’. Thinking about it now, it seems that many topics topics MCC values were becoming zero because of how quickly the neural network was overfitting. Fortunately, it does seem that earn, acq, and other topics did well since they parameters set up were able to peak in time such that they didn’t overshoot their respective peeks. Also, due to performance issues, the number of words used to calculate a topic was capped at 250 and may be playing a role in why such a good portion of topics are failing to record either a positive or negative MCC value.