Final project proposal

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For my final project, I plan on working on spam filtering- that is, determining whether a given email is legitimate or spam. I plan on implement spam filtering using machine learning with decision trees, using training/test data from one of the various spam datasets on the Internet.[1] Decision trees are trees that can categorize an input using Boolean expressions evaluating the inputs' features. A decision tree can be trained using a recursive algorithm that determines which feature best categorizes the training data and creates nodes accordingly. Russell and Norvig describe decision trees and the learning algorithm in Chapter 18, while Chakraborty and Mondal[2] also describe the decision tree algorithm and give an overview of features that can be used for email filtering (domain name, sensual words, etc.).

My hope is that my spam filter can be reasonably precise in classifying emails as spam (say, >90%). Chakraborty and Mondal get experimental results in the 80-90% range, which strikes me as rather bad, but the other papers I found seemed to mostly achieve over 90% precision. I hope I can achieve these higher results, but 80% seems like a good minimum benchmark that is much better than random chance.

[1] For example, https://archive.ics.uci.edu/ml/datasets/Spambase, http://untroubled.org/spam/

[2] Chakraborty, Sarit, and Bikromadittya Mondal. "Spam mail filtering technique using different decision tree classifiers through data mining approach-A comparative performance analysis." *International Journal of Computer Applications* 47.16 (2012).