Melanie:  
  
Also,  since I have begun consulting you on this work, I would be happy to add you as a co-author.  Note that I am  
currently also working with Jim Crutchfield and Geoffrey Fox.  
  
After the past 2 days of seminars, I think I have an idea.  
  
1) From the decision tree I sent earlier, only 8 eigenvectors of the ~100 or so contribute to the classification.  
So there has already been a dimensional reduction.  
  
2) Because I used PCA to generate the eigenvectors, they can be more or less expected to be independent  
and mostly uncorrelated.  
  
3) So I think what I may then do is, first, classify the training data and save the decision tree.  
  
4)  Then, for each of the 8 eigenvectors, find the max and min of the expansion coefficients in the data.  
  
5) Then, generate a bunch of random numbers between the max and min for the expansion coefficients of  
 each eigenvector. So you would get a set of random numbers: [rn1, rn2,…,rn8]  
  
6) Now classify this random feature vector using the found decision tree to get a target label, 0 or 1.  
  
7) Repeat 6) a huge number of times to get a probability density function for the probability of a 1 label,  
 given values of the actual 8 expansion coefficients.  
  
8) Now use the real new feature vector in question, together with the found pdf, to assign a probability.  
  
I assume this procedure is more or less what a generative model does?  
  
John