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1. Choice of paper: An Introduction to ROC analysis (Tom Fawcett)

2. GitHub repository: https://github.com/xinliu10/Sta663-Final-Project

3. Headings:
   - Introduction
   - Algorithm
     o ROC points
     o Area under curve (AUC)
   - Data description
     o Simulated Data
     o Real Data (eg. Case-control study of voice measurements with Parkinson disease
   - Code optimization
   - Result
     o Performance on simulated and real data sets
     o Performance (in terms of time) after optimization
   - Discussion

4. Abstract of project:

Receiver operating characteristics (ROC) graph is widely used in evaluating performance of classifiers because it is conceptually intuitive and it is a more complete metric for measuring performance. It is also robust to skewed class distribution and unequal classification error costs when many other comparison metrics fail. The ranking or scoring classifier approach in computing ROC curve is computationally intensive. A more efficient and careful method is described in the paper. In this project, the method of generating ROC points and the algorithm of computing area under curve (AUC) will be implemented in Python and a function will be written to generate ROC curve and to computed AUC for any given test data set with predicted class labels and true class labels. Possible optimization of the python codes will be considered to speed up runtime and will be tested against un-optimized codes.