

Proposed Research Outline

Title: Error Analysis and Optimization in Speaker Verification/Identification Systems.

Outline: Recent years has seen a rapid growth in the number of people using the the telephone to inquire about their account balance and conduct monetary transactions at their banks, credit card companies, brokerage houses, etc.. There has also been a rapid growth in the number of people using mobile telecommunication systems like calling cards and cellular phones. Hence effective and consistent user verification techniques are required by banks, credit card companies, phone companies and many other agencies. Although text records, such as PIN number, social security number, zip code or mother's maiden name, are used for traditional verification, they are easy to be impersonated. Using client's voice features to verify the customer's identity seems more promising in terms of reliability and convenience. However, due to the large variability of the human voice, current, automatic, text-independent speaker verification systems are far from practicable because of their low preciseness and robustness.

In this collaborative project, we will pursue research in the area of error analysis and optimization of an automatic, text-independent, speaker verification system that has been developed at AUM systems. In particular, we will explore stochastic models for the human voice and apply operations research techniques to optimize the False Acceptance and the False Rejection error rate of the system. Initial work on this project will focus on acceptance-rejection criterias using speaker independent decision thresholds. Speaker-specific decision thresholds will also be explored when the project proceeds. Depending on the availability of time, we may also explore text-dependent, speaker verification systems.