PROJECTS FOR PROSPECTIVE RESEARCH STUDENTS - 2017

a. Unsupervised representation learning and modeling

Deriving representations from raw audio waveforms without any labeled data is an active area of research and one that is getting increasing amounts of attention in the field recently. The representations derived can be used for a classification or a clustering task. The research in this field would involve deep learning, machine learning and statistical modeling.

b. Understanding the multi-lingual brain

Speech and language form one of the most fundamental tasks performed by humans. However, the understanding of the brain functions involved in this task are quite limited. In this project, we plan to analyze the brain activations involved in listening and speaking of native language as well as foreign language speech. This interdisciplinary work would contain neuroscience, signal processing and some machine learning.

c. Speaker and language characterization

The separation of factors in a given acoustic signal like spoken content, speaker, language as well as the recording condition is a key area of research for speech analytics and biometrics. This project would attempt to tease apart several factors and their interplay using deep learning, big data and machine learning algorithms.

d. Noise Robust Audio Processing in Humans and Machines.

Humans have remarkable capability of functioning well in noisy and multi-taker conditions. However, current speech and audio technology falls apart when exposed to multi-talker audio or noisy conditions. In this project, the main goal is the development of algorithms that are key to improving robustness in speech applications like speech recognition, speaker and language recognition. The skills involved are signal processing, deep learning and statistical modeling.

For additional questions and clarifications, please contact Sriram Ganapathy <sriram@ee.iisc.ernet.in>