Electrical Engineering Seminar Series &
Dallas Chapter of IEEE Signal Processing Society Present

Measuring, Modeling, and Using Speech Production Information

Prof. Shrikanth Narayanan
University of Southern California
Distinguished Lecturer of IEEE Signal Processing Society

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The human speech signal results from a complex orchestration of cognitive, biological, physical and social processes and carries crucial information about not only communication intent but also underlying affect and emotions. It co-occurs with visual gestures of the face, head, hand and the body. Automatically processing and decoding speech and spoken language hence is a vastly challenging and, inherently, an interdisciplinary endeavor. One line of work in this realm aims to utilize direct information about human speech and gesture articulation to inform technology development. The challenges faced here are two-fold: obtaining accurate speech production data and finding ways for modeling and using such data. Both are challenging engineering problems, and will be considered in this talk.

One longstanding challenge in speech production has been the ability to examine real-time changes in the shaping of the vocal tract; a goal that has been furthered by imaging techniques such as ultrasound, movement tracking and magnetic resonance imaging. The spatial and temporal resolution afforded by these techniques, however, has limited the scope of the investigations that could be carried out. In this talk, we will focus on recent advances that allow us to perform near real-time investigations on the dynamics of vocal tract shaping during speech. We will use examples from recent and ongoing research at USC to highlight some of the methods and outcomes of processing such data, especially toward facilitating speech analysis and modeling. [Work supported by NIH, ONR, and NSF].

Shrikanth (Shri) Narayanan is the Andrew J. Viterbi Professor of Engineering at the University of Southern California (USC), where he holds appointments as Professor of Electrical Engineering, Computer Science, Linguistics and Psychology. Prior to USC he was with AT&T Bell Labs and AT&T Research. His research focuses on human-centered information processing and communication technologies. Shri Narayanan is an Editor for the Computer Speech and Language Journal and an Associate Editor for the IEEE Transactions on Multimedia, IEEE Transactions on Affective Computing and the Journal of the Acoustical Society of America. He is a Fellow of the Acoustical Society of America, IEEE, and the American Association for the Advancement of Science (AAAS). He is a recipient of several awards including Best Paper awards from the IEEE Signal Processing Society in 2005 (with Alex Potamianos) and in 2009 (with Chul Min Lee).

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