

KEYNOTE SPEAKERS

Wednesday, September 18, 2002

The Evolution of Speech: A Comparative Approach

Abstract:

Speech and language are highly complex, human-specific behaviors that presumably required the evolution of some novel abilities on the part of our ancestors. One key to delineating those novel abilities is an understanding of vocal communication in other species. In this talk, I will summarize some recent findings on vocal communication in nonhuman animals:

- Formant frequencies are produced and perceived by other vertebrates and may have an ancient phylogenetic history.
- Most mammal species studied thus far appear to vastly underutilize the phonetic potential provided by their peripheral vocal apparatus.
- The descent of the human larynx, while of undeniable importance in speech production, has now been documented in other vertebrate species, and can be plausibly interpreted as a way of elongating the vocal tract to exaggerate the vocalizer's size. This suggests that the descended larynx in humans for similar purposes may have preceded speech considerably, and does not offer an infallible marker of language in extinct hominids.
- Regarding vocal imitation and the hierarchical organization of sound segments into larger wholes, we find these capacities in many vertebrates, though less highly developed in nonhuman primates than in other groups (birds and whales) that are quite distantly related to humans. I conclude a persistent tendency to focus exclusively on differences between humans and animals has obscured important commonalities among species. I suggest that our unique linguistic talents rest on a foundation of capabilities shared with other mammals and vertebrates. A deeper appreciation of these shared abilities is necessary for an understanding of what is (or is not) special about humans.

Biography:



Tecumseh Fitch studies the evolution of cognition in animals and man, focusing on the evolution of communication. Originally trained in ethology and evolutionary biology, he has more recently applied his graduate training in speech science to animal vocal communication. He is interested in all aspects of vocal communication in terrestrial vertebrates, particularly aspects of vocal production that bear on questions of meaning and "honesty" in animal communication systems, including human language. Fitch joined the faculty at Harvard as a Lecturer in Biology and Psychology in 1999, where he teaches Cognitive Neuroscience and Perception, and continues his research on humans and various vertebrates (including alligators, birds and monkeys). Starting fall 2002 he will be a Fellow at the European Institute for Advanced Studies, in Berlin. (Email: tec@wjh.harvard.edu)

Thursday, September 19, 2002

Talking to Machines (Statistically Speaking)

Abstract:

Statistical methods have long been the dominant approach in speech recognition and probabilistic modelling in ASR is now a mature technology. The use of statistical methods in other areas of spoken dialogue is however more recent and much less mature. The aim of this talk is to review the whole spoken dialogue system from a statistical modelling perspective. The complete system is first presented as a partially observable Markov decision process. The various sub-components are then exposed by introducing appropriate hidden variables. Samples of existing work are then presented within this framework, including dialogue control and optimisation, semantic interpretation, goal detection, natural language generation and synthesis.

Biography:



Steve Young received a BA in Electrical Sciences from Cambridge University in 1973 and a PhD in Speech Processing in 1978. He held lectureships at both Manchester and Cambridge Universities before being elected to the Chair of Information Engineering at Cambridge University in 1994. He was a co-founder and Technical Director of Entropic Ltd from 1995 until 1999 when the company was taken over by Microsoft. After short period as an Architect at Microsoft, he returned full-time to the University in January 2001.

Steve's research interests include speech recognition, language modeling, and multi-media applications. He is the original developer of the HTK Toolkit for building hidden Markov model-based recognition systems and he was a co-developer of the HTK Large Vocabulary Speech Recognition System. He has written and edited books on software engineering and speech processing, and he has published as author and co-author, more than 150 papers in these areas. He is a former Chairman of both the UK Institute of Acoustics Speech Group and of the IEE Speech and Language Professional group, and he is European Editor of Computer Speech and Language. He is a Fellow of the Institute of Electrical Engineers and a Fellow of the Institute of Acoustics. (E-mail: sjy@eng.cam.ac.uk)