Down with Sound:  
The Story of Silent Speech

Abstract

Speech has always been the most natural and spontaneous modality for communication between human beings, however it has certain drawbacks

- Speech recognition performance is very sensitive to background noise
- The speech signal propagates in air, which can cause interference with other processes
- Victims of certain illnesses are unable to speak normally
- Those who do not share a common language are unable to communicate

We present the concept of a “silent speech interface” using non-acoustic sensors to augment or completely replace the acoustic speech signal. Users of such a device will articulate normally but do not produce sound with their vocal chords. Applications in medicine and in telecommunications are presented, as well as experimental speech recognition results on a silent speech interface incorporating an ultrasound probe to capture tongue movement and a video camera for the lips. Perspectives for improving silent speech recognition performances in the context of a real time 3D model of the tongue are discussed.

Professor Bruce Denby holds a BS from Caltech, MS from Rutgers University, and PhD from the University of California at Santa Barbara, all in Physics. Since 1995 he has been full professor of electrical engineering in France, currently at the Pierre and Marie Curie University in Paris. His research interests are in speech, signal, and image processing, and in wireless communications.