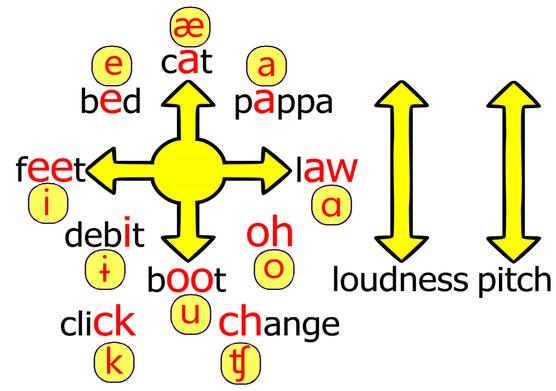
Voice-driven Interaction

Harnessing the capacity of human voice for controlling computer interfaces



Typical speech-based computer interactions are limited to either dictation of text or command-based discrete input, and do not support a more fluid, continuous input that is characteristic of mouse-based interactions.

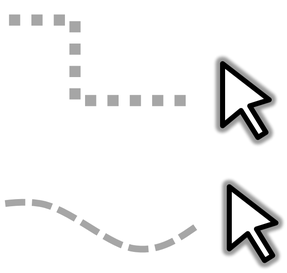
We seek to fill that gap by enabling the user to use non-speech vocalizations (e.g., vowel sounds, changes in loudness and pitch) to fluidly control interface elements, such as the mouse pointer.

Vocal Joystick

- Core technology behind recognition and processing of non-speech vocal input
- Recognizes vowel sounds and changes in loudness and pitch, and moves the mouse pointer in the corresponding direction shown on the upper right figure
- Can be generalized and extended to numerous other controls as shown below

Before Vocal Joystick: *"move mouse right… down… right… stop"*

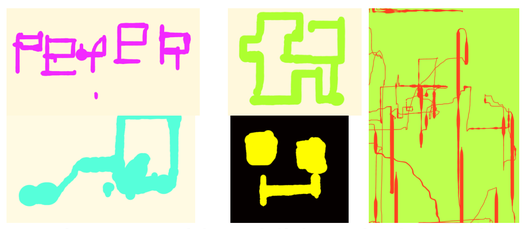
With Vocal Joystick: *"aaaooohhaaa"*



VoiceDraw

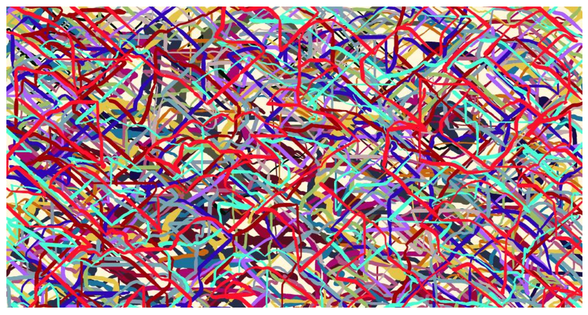
http://www.voicedraw.com

- Hands-free drawing application operated using only voice and speech
- Loudness can control brush stroke thickness or speed



Artwork created by children in few minutes

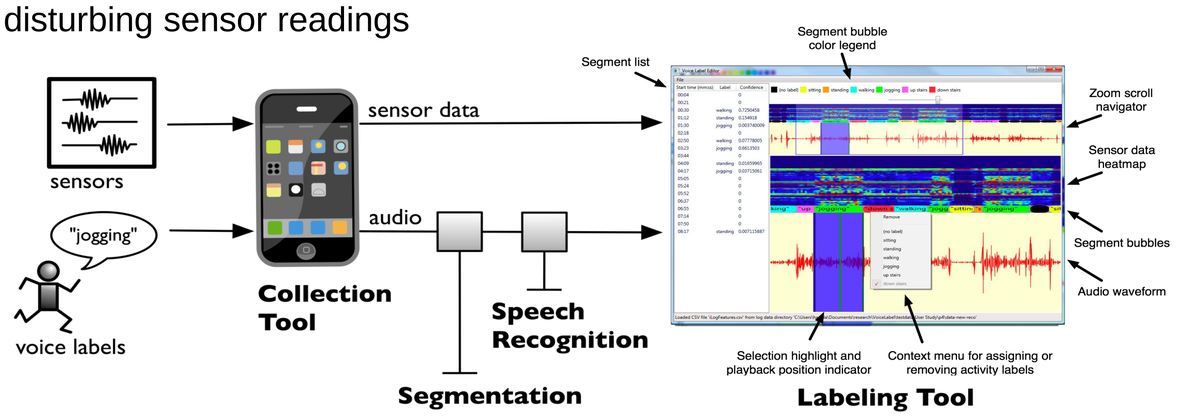
The screenshot of the VoiceDraw program. Artwork created by the first author in about 2.5 hours.



Artwork created by a "voice painter" with quadriplegia in less than three hours using the VoiceDraw program.

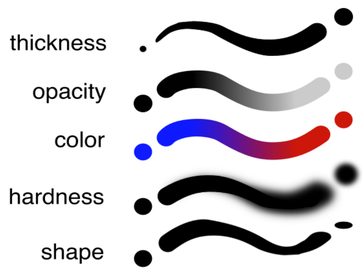
VoiceLabel

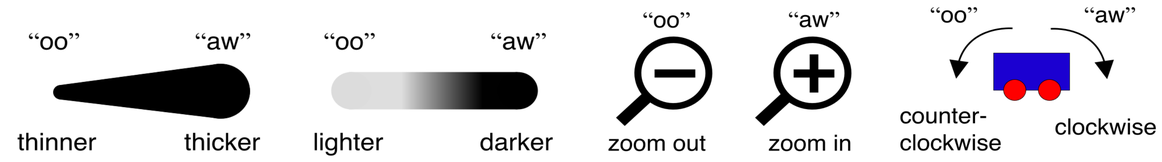
- Using speech to label mobile sensor data for activity recognition applications
- Using filled pauses (e.g., "uhhh") to mark the beginning of label segments
- Enables hands-free labeling without disturbing sensor readings



VoicePen

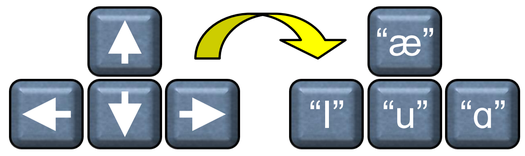
- Augmenting digital stylus input with non-speech vocalization for simultaneous control of multiple parameters
- Vowel pair used as 1-D slider, increasing or decreasing some continuous value
- Novice users were able to control brush thickness, brush opacity, document zoom level, and object rotation simultaneous to pen input

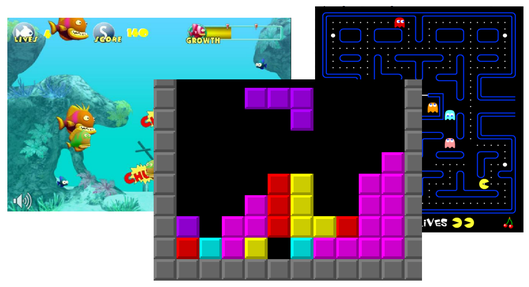




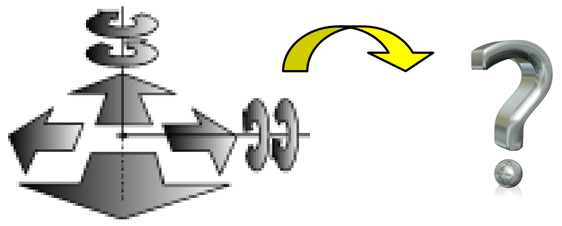
VoiceGames

- Controlling existing computer games using only voice only
- Challenge: need to support quick transitions, fast timing, fluid movements
- What are good mappings for more complex games? New types of games?





Arcade & casual games



First person perspective games

Virtual reality

Flight simulator

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