

Goal: Creating tools for visual feedback from various vocal exercises. For example, improving accent, singing, pronunciation of certain phonemes like R, L, S, Sh, especially in cases where the person's audial feedback is impaired.

Examples: A person suffering from lack of musical hearing (or memory) may practice producing musical notes more precisely. A person with impaired hearing may practice pronunciation. Those with difficulties of pronouncing foreign phonemes may learn to pronounce these sounds correctly. (i.e. the differences between S/Sh or R/L are difficult to produce by Chinese speaker)

The result: A set of applications (for PC and mobile platforms) or learning games, which would display results of real-time voice analysis and thus allow to adjust one's voice in real time and memorize the correct position and tension of vocal chords, tongue, lips etc. The technology behind these tools is based on sophisticated comparison of incoming audio streams to standard sound patterns and evaluation of the magnitude and direction of deviation forming a vector.

Differences from existing systems: Virtually all of comparable tools are based on the «listen and repeat» method and are useless for people with hearing impairment. Singing tutor programs have little to none visual feedback. The few existing tools for improving pronunciation (of English only) are based on speech recognition techniques and are accent-dependent.

These tools are absolutely useless for persons with hearing impairment as they don't evaluate the deviation from standard. Also, they are ineffective for Chinese or Japanese speakers, which don't perceive the differences between S and Sh or R and L.

Method of operation: The incoming audio stream undergoes a sophisticated comparison with the standard sound. The results of this comparison are:
finding matching parts of the sounds,
evaluating the rate of similarity between corresponding parts,
evaluating the ratio of matching parts' duration to whole stream duration,
calculating the difference vector.

Uses: Treatment of speech disorders.
Practice of speech by persons with partial or total hearing loss.
Improving musical hearing and memory.
Accent correction.
Learning tonal languages — Chinese/Japanese.

Audience: Students at various language courses,
Amateur singers,
Associations of the Deaf. (more than 1 million members in the US)
A 2005 poll shows that over 1.5 million Chinese are willing to pay 5-10 dollars every month for access to unlimited English practicing resource.

State of the project: The algorithms and their implementation in code have been tested. The code can be ported to various platforms such as tablets, smartphones etc. A SDK for mobile platforms has to be built to allow distribution among companies in the field.