



## Algorithm for Selective Enhancement of Speech Signals

[View U.S. Patent No. 9,706,314 in PDF format.](#)

**WARF: P100334US01**

Inventors: Rick Jenison, Keith Kluender, Joshua Alexander

**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a system and method for selectively enhancing audio signals to make speech sounds more distinguishable.**

### Overview

Hearing impairment rarely extends across the entire frequency range of hearing. Commonly, hearing loss is most severe at higher frequencies, although listeners can have selective losses at frequencies across the spectrum. At least two components of sensorineural hearing loss reduce listeners' access to speech information. The first is a loss of sensitivity, which results in an attenuation of speech that may be corrected by making the signal louder and reducing noise. The second component is a loss of selectivity, which results in blurring of spectral detail, or distortion. Unfortunately, amplification of speech or contrast enhancement may not improve selectivity, and may even impede listeners' ability to understand speech sounds.

The National Council on Aging reports that untreated hearing loss of any degree has significant consequences on people's social lives, emotional health, mental health and physical well-being. Advancements in hearing aid performance have the potential to improve quality of life for more than 10 percent of the American population. A need exists for improved methods for speech processing and recognition.

### The Invention

UW-Madison researchers have developed an audio signal enhancement system and method for speech processing, recognition and/or enhancement. Unlike traditional systems, this algorithm recognizes that contrast enhancement, when applied to non-pathological or unimpaired regions of the frequency spectrum, can actually impede a listener's ability to understand the underlying speech. The system's contrast enhancement algorithm and selective control mechanism provide a method to selectively manipulate or augment portions of an audio signal and allow other portions to be unenhanced or enhanced differently. As a result, this system can be used to preserve the ability of a listener to process the unenhanced or differently-enhanced portions of the audio signal.

The enhancement process is accomplished by dividing an input auditory signal into a plurality of spectral channels, and either performing or not performing enhancement on established subsets of the channels. Then the enhanced and unenhanced signals are combined to form a selectively enhanced output auditory signal.

### Applications

- Digital hearing aid devices
- Speech recognition systems

We use cookies on this site to enhance your experience and improve our marketing efforts. By continuing to browse without changing your browser settings to block or delete cookies, you agree to the storing of cookies and related technologies on your device. [See our privacy policy.](#)

• Reduces distortion

• Selectively applies enhancement to frequencies affecting hearing

OK



**WARF**  
Wisconsin Alumni Research Foundation

| [info@warf.org](mailto:info@warf.org) | 608.960.9850

- Yields prolonged battery life through faster processing

## Additional Information

### For More Information About the Inventors

- [Rick Jenison](#)

### Related Technologies

- [For more information about a method to enhance auditory signals through spectral enhancement, see WARF reference number P98210US.](#)

### Publications

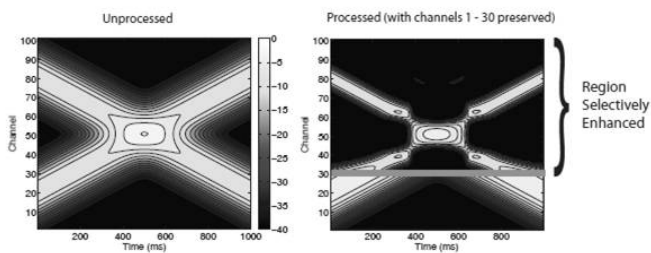
- [Alexander J.M., Jenison R.L. and Kluender K.R. 2011. Real-Time Contrast Enhancement to Improve Speech Recognition. PLoS ONE 6, e24630.](#)

### Tech Fields

- [Medical Devices : Accessibility](#)

For current licensing status, please contact Jeanine Burmania at [jeanine@warf.org](mailto:jeanine@warf.org) or 608-960-9846

## Figures



We use cookies on this site to enhance your experience and improve our marketing efforts. By continuing to browse without changing your browser settings to block or delete cookies, you agree to the storing of cookies and related technologies on your device. [See our privacy policy.](#)

OK

