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FOR RELEASE ON NOVEMBER 20, 2014

STAR Analytical Services Receives Grant from NIH for a 'Conversation-Support Device'

STAR Analytical Services announces the award of a 3-year $1,500,000 grant from the National Institutes of Health to develop an assistive conversation system for hearing-impaired listeners, including many aging baby-boomers, who have difficulty understanding and participating in conversations in noisy environments. The proposed project will extend STAR's previous work on novel techniques to suppress distracting sounds and enhance conversational speech. The resulting appliance will enable listeners to create an *immersive virtual acoustic reality.* In 2010, STAR received a small Business Innovation Research (SBIR) award from NIDCD, an institute of NIH, to improve the lives of people with communication disorders. This new grant extends that project into phase two.

People often struggle to deal with complex acoustic environments in which some acoustic sources contain information they need to comprehend, and other sound sources are distracting annoyances that interfere with comprehension. Current commercial assistive listening devices are largely limited to hearing aids, which notoriously amplify all acoustic sources, and headsets, which selectively amplify a single source available in electronic form while passively or actively isolating listeners from their environment.

   The current project will develop an audio device that suppresses distractions and enhances important information-bearing signals, but does not isolate listeners from their acoustic environment. It will generate a virtual sound field they can listen to—a virtual acoustic environment in which they can, at will, suppress any sounds they want to ignore and enhance other sounds they need to comprehend.

This innovative research, conducted by Senior Research Fellow Dr. Richard Goldhor, Chief Scientist Dr. Joel MacAuslan, and UMass-Dartmouth Professor Karen Payton and their team, will improve on algorithms for audio analysis and develop the device. To hear a demonstration of this processing, with a stirring speech and a "fascinating" discussion of the

mathematical techniques, review the samples here:
http://staranalyticalservices.com/audio/JFK_Sample_Output_1.wav

"The goal of the design," says MacAuslan, "is to automate much of the complexity of acoustic source separation, to make it simple for a user to control the system through an app and to deliver an improved conversation capability. The app will be simple to set up, simple to integrate with other personal devices, and most importantly, simple to suppress irrelevant background sounds." Other examples of the utility of this approach include making it simple to attend to sources of interest, such as conversation partners; simple to accommodate novel sources: e.g., a waiter coming to a table in a restaurant; simple to hear important information, even from unexpected sources; and simple to amplify only certain sources, such as nearby ones.

STAR has expertise in enabling technologies that detangle mixed sounds coming from independent acoustic sources. For instance, by placing a microphone near a known source, a listener can indicate whether this is a sound to be firmly suppressed, such as air conditioning during a baby's vocalizing, or to be enhanced, such as a conversation partner's voice.

The SBIR program supports research and development of products and services by small business concerns which show strong potential for commercialization. For further information, see http://www.nidcd.nih.gov/

ABOUT STAR Analytical Services

STAR Analytical Services works with information intensive industries that require specialized mathematical and analytical expertise to for innovative projects. STAR provides expertise in mathematical modeling, image and signal processing, and algorithm development, creating the path to a solution for the most complex needs including: analyzing large volume data, creating a solution model & testing mechanism, and delivering a repeatable process for ongoing data analysis

Working hand-in-hand with business problem owners, STAR helps accelerate the solution process in industries ranging from aerospace, mapping, and surveillance to manufacturing, printing and neurosurgery. The company has particular expertise in complex systems, those with strongly interacting parts; in image and audio signal processing, and in knowledge-based (objective) speech and vocalization analysis. For more information: http://www.STARanalyticalservices.com

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