

Smartphone App Opens New World Of Hearing (2011-10-13)

Shelley Kofler, KERA News

Imagine walking into a room with so many loud voices you can't understand any of them. Then you activate your smartphone app and you clearly understand the conversation you want to hear. That technology is already being tested in clinical trials at the University of Texas at Dallas. KERA's Shelley Kofler reports on how it's helping cochlear implant patients hear the world around them.

A university cafeteria is a noisy place. Students are ordering lunch. Cashiers are ringing up bills. Music is playing on a laptop and there are dozens of conversations.



Most of us can screen out the unwanted noise and focus on what we want to hear. But 78-year old John Ayers can't do that. He hears all those sounds at once.

Ayers: I hear 50 to 75 people talking. I don't know what they're saying.

Ayers is deaf. He lost his hearing after he contracted a virus seven years ago and was fitted with cochlear implants which do the work of his damaged ears. Devices attached to his outer ears now gather and transmit sound to implants in his inner ears. But the implants can only collect a limited amount of audio information. In the cafeteria Ayers is bombarded with too much.

Loizou: (Cochlear implant users) are not able to tease the words apart and they really struggle in noisy situations.

Dr. Philip Loizou is an electrical engineer, and the director of the Cochlear Implant Lab at the University of Texas at Dallas. For years he's been trying to improve the hearing of implant users by developing computer programs that will sample sound in a loud environment then screen out the distortion.

But it wasn't practical for implant users to carry a computer as they moved from place to place.

The breakthrough came with palm-sized smartphones, mobile computers you can take anywhere.

Now in the UTD lab Loizou's research assistant, Hussnain Ali is helping to perfect a sophisticated smartphone program.

Ali: I will play you a few sentences on your implant through our processor. You just need to state the words you perceive.

The program is being developed with a \$2.5 million grant from the National Institutes of Health. John Ayers is the star subject in the clinical trials.

Ayers: I am hearing you in the left ear. I am hearing you in the right ear.

Ayers is now wearing a specially-equipped ear loop that connects to the smartphone. As Ali adjusts volume, frequency and other settings Ayers tells him what's working and what isn't.

Researchers at the University of Texas at Dallas are developing smartphone technology that will allow deaf patients with cochlear implants to filter out noise that prevents them from hearing. They hope to adapt that technology to improve the use of hearing aids in the future.

Ayers: I can get the sentence but at first when it comes on, it's not on the left.

Very soon researchers will give the smartphone equipment to Ayers and clinical subjects around the country

to take home and use independently.

Ali: Our goal is to have different settings on this processor so that in your daily life you could maneuver through these settings and find the best, optimal settings for different environments. So if you want gain, if you want noise suppression in it, if you want to have enhancement in higher frequencies it allows you to do that.

With user feedback the researchers hope to improve the program so the system will automatically adjust to new surroundings. Then somewhere in the future Loizou hopes to take what's being developed for some 200,000 cochlear implant patients, and adapt it for the millions who wear hearing aids. Loizou: We envision this will be a proof of concepts for the hearing industry to follow. I think the fun is just getting started.

With this new technology UTD engineers like Loizou and Ali are engineering hope.

Ali: At this stage when we test it on actual patients and we see the outcome right in front of our eyes, the kind of joy we feel on the inside I cannot really tell that. I feel privileged I'm doing something for humanity, for John and for all the users.

Ayers says the new technology means cochlear implant patients will no longer being sitting on the sidelines.

Ayers: It will allow me to be self-sufficient and will allow me to communicate better with my family. It's changing lives and changing people and it spurs you on.

[Related Link: http://utdallas.edu/~loizou/cimplants/tutorial/](http://utdallas.edu/~loizou/cimplants/tutorial/)

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