Research News

New smartwatch app alerts deaf and hard-of-hearing users to common home-related sounds

Prototype used machine learning to classify sounds in real time

Researchers have developed a smartwatch app for deaf and hard-of-hearing people.
Credit and Larger Version (/discoveries/disc_images.jsp?cntn_id=301616&org=NSF)

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Smartwatches offer people a private method for getting notifications about their surroundings -- such as a phone call, health alerts or an upcoming package delivery.

Now University of Washington researchers have developed SoundWatch (/cgi-bin/good-bye?https://makeabilitylab.cs.washington.edu/project/soundwatch/), a smartwatch app for deaf and hard-of-hearing people who want to be aware of nearby sounds. When the smartwatch picks up a sound the user is interested in -- examples include a siren, a microwave beeping or a bird chirping -- SoundWatch will identify it and send the user a friendly buzz along with information about the sound.

The U.S. National Science Foundation <https://www.nsf.gov/awardsearch/showAward?AWD_ID=1763199&HistoricalAwards=false> -funded team recently presented these findings (/cgi-bin/good-bye?https://www.youtube.com/watch?v=1UK_Gb1yeUs) at the ACM (Association for Computing Machinery) conference on computing and accessibility.

"This technology provides people with a way to experience sounds that require an action -- such as getting food from the microwave when it beeps," said lead author Dhruv Jain, a UW (/cgi-bin/good-bye?https://www.washington.edu/news/2020/10/28/SoundWatch-alerts-dDeaf-and-hard-of-hearing-users-to-

researcher in the Paul G. Allen School of Computer Science & Engineering.

Jain was born hard of hearing. "I use the watch prototype to notice birds chirping and waterfall sounds when I am hiking. It makes me feel present in nature. My hope is that other deaf and hard-of-hearing people who are interested in sounds will also find SoundWatch helpful."

The team started this project by designing a system called HomeSound for deaf and hard-of-hearing people who wanted to know what was going on around their homes.

"I used to sleep through the fire alarm," said Jain.

The researchers tested HomeSound in the Seattle-area homes of six deaf or hard-of-hearing participants for three weeks. Participants were instructed to go about their lives as normal and complete weekly surveys.

Based on feedback, a prototype used machine learning to classify sounds in real time. The researchers created a dataset of over 31 hours of 19 common home-related sounds, such as a dog bark or a cat meow, a baby crying or a knock on the door.

-- NSF Public Affairs, researchnews@nsf.gov (mailto:researchnews@nsf.gov)