Noise cancelling device halves noise pollution through open windows

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Nanyang Technological University, Singapore researchers have developed a device that can reduce noise pollution entering buildings even while windows are wide open. Developed to be mounted onto window grilles, the device could reduce up to 50 percent of noise coming from nearby environments such as busy roads, train tracks or from construction activities.

The device uses "active noise control" technology—found in many high-end headphones that cancels external noise—that is adapted to work in a large open area. The benefits are two-fold: Windows can be left open for fresh air without disturbance from external noise pollution, and the device reduces the need for air conditioning to keep the interiors of buildings and homes cool.

Professor Gan Wooon Seow, Director for NTU’s Centre for Infocomm Technology (Nictars) led the research team. “Compared to noise cancellation headsets, what we have achieved is far more technologically challenging. As we needed to control the noise in a large open area, instead of just around the ear.”

Using sound to remove noise

Currently, at the prototype stage, the device uses 5 watts of power, similar to a small portable Bluetooth speaker. Several units are placed together to form a grid-like array on a window grille to reduce external noise.

The device uses a special sound-emitting mechanism that works like a speaker and is housed up to a processing unit. Equipped with a microphone, it can detect noise even before it reaches the window and counteracts the attributes of the incoming noise in real-time.

Open Window Noise Cancellation Technology

The research team conducted the tests using a soundproof chamber at the university’s labs that houses a mock room with windows and doors, resembling a typical room in a home. Various recorded sounds from construction sites, jet engines and trains were used as noise sources during the tests.

They are now developing the technology further by improving its noise-cancellation efficiency, and making the device smaller and more cost-effective to produce. Prof Gan said, “We are currently finding ways to improve the technology further so that it can be used not only at window grilles with large openings, but also provide a cost-effective solution that can be easily installed and replaced. Ultimately, we aim to integrate this technology into window grilles that can help mitigate urban noise pollution conveniently.”

The researchers are also working with government agencies in Singapore to further improve the technology to make it viable for commercial and residential applications.

Provided by Nanyang Technological University