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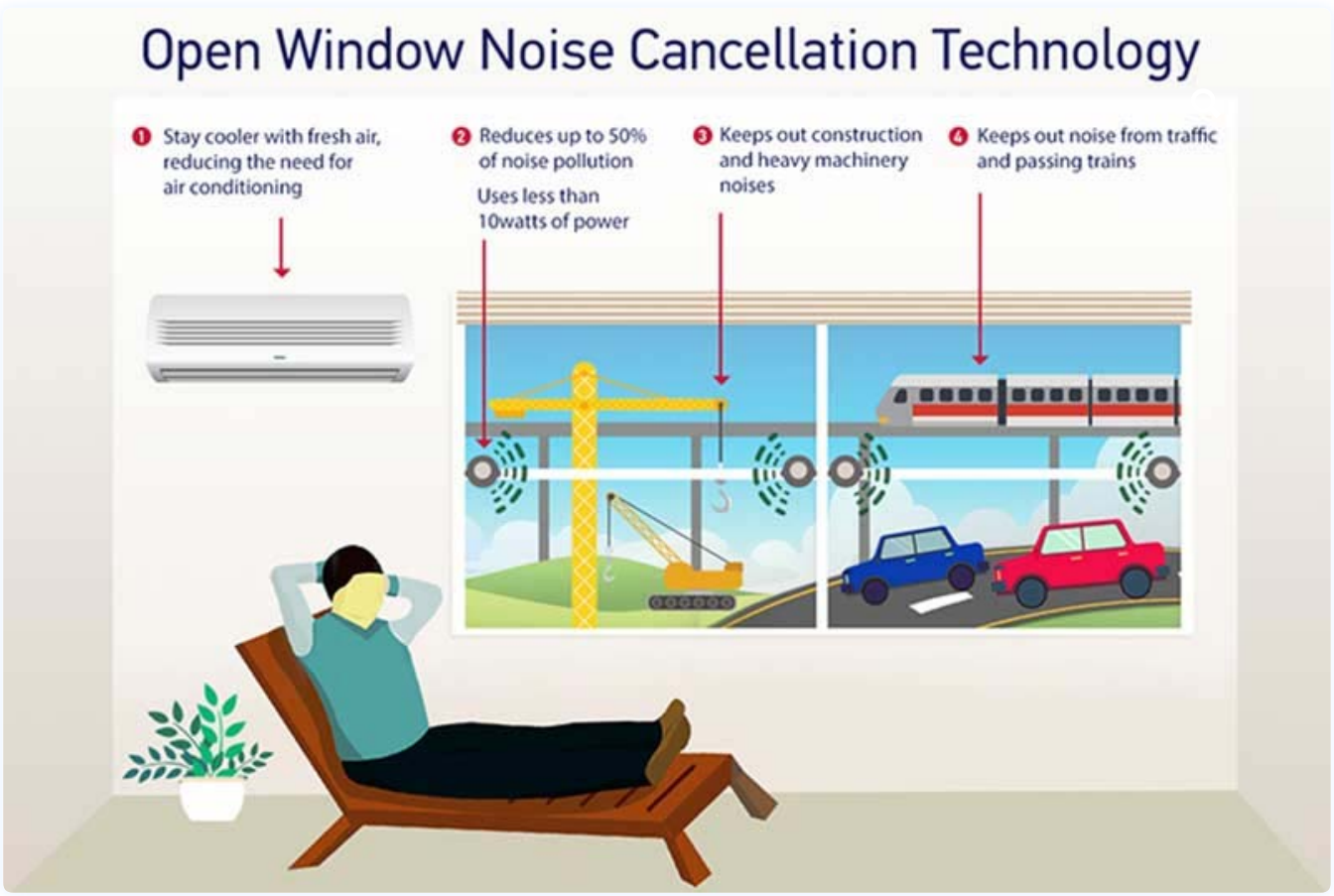

Credit: Nanyang Technological University, Singapore

NTU researchers develop technology to reduce noise pollution through open windows

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

Researchers at the Nanyang Technological University, Singapore (NTU Singapore) have developed a device that can reduce noise pollution entering buildings even while windows are wide open. The device is designed to be mounted onto window grilles and it can reduce up to 50 per cent of noise coming from nearby environments such as busy roads, train tracks or from construction activities.

According to NTU's press release this noise cancellation technology is an example of research innovations that NTU is encouraging under its Smart Campus initiative, which aims to improve quality of life for society through the development of new sustainable and technological solutions and by trialling them on its campus first.

The technology allows windows to be left open for fresh air without disturbance from external noise pollution, thereby reducing the need for air-conditioning to keep the interiors of buildings and homes cool.

The device, which is currently at the prototype stage, adapts 'active noise control' technology, found in many high-end headphones that cancels external noise, to work in a large open area. Controlling the noise in a large open area is much more challenging than doing it just around the ear.

Currently at the prototype stage, the device uses 8 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 which works like a speaker and is connected up to a processing unit. It is equipped with a microphone to detect noise even before it reaches the window. The attributes of the incoming noise are computed in real-time.

The device then emits a countering sound or "anti-noise" that has the same waveform characteristics of the invading noise but with the difference that it is inverted or "flipped".

The research team conducted 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.

The researchers are working to improving the noise cancellation efficiency of the device and making it smaller, and more cost-effective to produce.

Professor Gan Woon Seng, Director for NTU's Centre for Infocomm Technology (INFINITUS), who led the research 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.

The project was jointly developed with the University of Southampton in the United Kingdom, and Tottori University in Japan. It is supported by Singapore's Ministry of National Development and the National Research Foundation in the Prime Minister's Office, under the 'Land and Liveability National Innovation Challenge' (L2 NIC) Research Programme. The initiative seeks to leverage R&D to develop innovative technological solutions to increase Singapore's land capacity for its long-term development needs and provide tech-based options for future generations.

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