Vigilant windows

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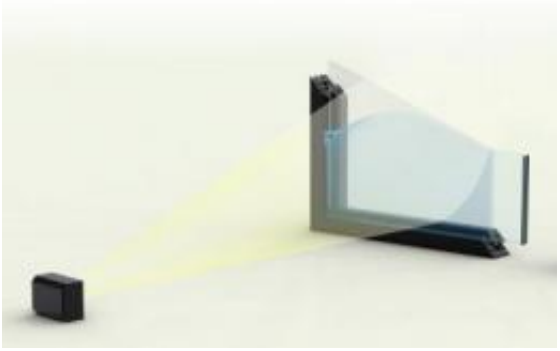

The invisible light of a UV lamp "illuminates" the window panes and generates fluorescent radiation in the coating. This radiation is detected by sensors in the edges of the window. (c) Fraunhofer IAP

Is someone sneaking around in front of the window trying to break in? Windows and doors are now being sensitized to suspicious movements: they can detect whether and how quickly something is moving. If it is a person, the system sounds an alarm.

It is 6 p.m. and the museum is closing down for the night. The building's alarm system is switched on and the security guard does his rounds. A novel motion sensor developed by the Fraunhofer Institutes for Applied Polymer Research IAP in Potsdam-Golm and for Computer Architecture and Software Technology FIRST in Berlin could provide even more security in future, enabling window panes and glass doors to detect movements thanks to a special coating. If anything changes in front of the pane, or someone sneaks up to it, an alarm signal is sent to

the security guard.

"The glass is coated with a fluorescent material," explains IAP group manager Dr. Burkhard Elling. "The coating contains nanoparticles that convert light into fluorescent radiation." The principle is as follows: The invisible light of a UV lamp "illuminates" the window panes and generates fluorescent radiation in the coating. This radiation is channeled to the edges of the window, where it is detected by sensors. Simple applications require only one sensor. Similarly to a light barrier, if someone steps into the light of the lamp less light reaches the coating and less fluorescent radiation is produced. If several sensors are installed on all four sides of the window frame, conclusions can be drawn from the data as to how fast and in what direction an object is moving. Its size, too, can be estimated by the sensors. Is it a small creature such as a bird or is it a person? The threshold for the alarm can be set, so that moving objects the size of birds for instance do not trigger an alarm.

Likewise, the sensors do not react to light from passing cars, as the researchers at FIRST have developed a software application that can interpret different light signals. This enables the system to easily distinguish between the frequency of the UV lamp and the slowly changing light from a passing headlight. The system has further advantages: it does not infringe on anybody's personal rights, as it only detects the change in radiation, and not who triggered it. It is also cost-efficient, because the coating can be sprayed onto the windows by airbrush or glued on as a film. A demonstrator system already exists, and the researchers now plan to optimize the dyes and their concentration in the coating.

Source: Fraunhofer-Gesellschaft (news : web)