

Sight Unseen

YOU RESEARCHERS ARE LIFTING THE CURTAIN ON HIGH-TECH VOYEURISM AND 'THE UNIVERSE OF THINGS.'

By Chip Minty



Concept image of hidden camera detection by Shutterstock.

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IF IT'S EVER CROSSED YOUR mind that there could be hidden cameras watching and recording your every move, you're not alone.

Anyone who's ever watched a James Bond movie might attribute hidden cameras to the innovations of the clandestine underworld rather than mainstream

society, but there is nothing exotic about these devices.

Miniature cameras are part of what is known as "The Universe of Things"—a world of gadgets ranging from door cameras to home smart speakers and thermostats connected to the internet by wireless technology. Data gathered by such devices

is uploaded to the Cloud, raising privacy concerns.

Wireless cameras, especially, are cheap, easy to use, and widely available. Obscured within vents, smoke detectors, electrical sockets or behind tiny holes in the wall, these devices are battery-operated, motion-activated and connected to the internet.

One out of every four people say they have found a camera at their vacation rental, and 5% say they've found cameras inside their houses, according to a widely published 2023 survey by investment property exchange service IPX1031.

Privacy protection is an area of special interest for University of Oklahoma Assistant Professor of Computer Science and Engineering Song Fang. He and his team of graduate students are fighting back by developing a gadget that's worthy of a modern-day 007 movie with the help of a \$500,000 grant from the National Science Foundation.

"Unauthorized recording is a very serious problem, especially targeting women and children," Fang says. "We know the problem is particularly serious in some countries."

Fang points to a 2021 report from Human Rights Watch, which documents a level of high-tech voyeurism that has reached epidemic proportions in South Korea, where more than 30,000 cases of surreptitious filming were reported from 2013 to 2018. As the property exchange service survey suggests, there is also valid concern in the U.S., where growing numbers of arrests and lawsuits are related to unauthorized recording incidents at rented vacation homes across the country.

Fang says the unauthorized use of cameras and audio recorders has been around for a while. Device detection technology is available, but it only lets users know if a hidden device is present. What current technology does not provide is the device's location, forcing victims to play a painstaking game of hide and seek.

"That's not good enough," Fang says. "Say there's a hidden device in your room, but you don't know where it is. You go to the owner of the house, but they say you're mistaken. They might say they didn't install it, and they may suggest the device is at a neighbor's house. You have no evidence to argue otherwise. So, our goal is to show people exactly where to find the hidden devices so they'll have direct evidence."

Fang says the technologies he and his team are developing will become an app that users can download and install on their smartphones. While the team only began developing the technology a year ago, the foundation of their system is already in place, and they are now working



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Top to bottom: Song Fang shows a video of wireless cameras being detected using an app his team is developing. Fang works with a member of his graduate research team on the code behind the hidden device detection project.



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on refinements that will make their app easy for anyone to use.

The app's functionality is relatively simple, Fang says. Cameras and recorders are equipped with motion detectors that activate when a person walks within range. Once the camera or audio recorder is on, they immediately begin recording and transmitting information through wireless connections to the internet. Fang's technology picks up the wireless signals and notifies the app's user. But that's just the first step in the process, he says.

Next, the app will be able to home in on a hidden device's location by using its wireless signal as a beacon. The whole process might only take a couple of minutes, Fang says.


Although development is still underway, Fang and his team have already begun to

patent their technology and plan to market the product once it's finished.

Yan He, a graduate student in Fang's lab, is among team members testing the technology and creating an algorithm.

Surveillance detection has been He's primary area of focus since beginning his graduate work three years ago, and this project is a key element in his journey toward a Ph.D. in computer science. A prototype of the technology is complete, and He is preparing a paper about the project for publication next year.

Publications and patents aside, He says ending invasive, high-tech voyeurism is the mission of the team's work.

"Our motivation is to help the public." 

Chip Minty is a Norman-based writer and the principal of Minty Communications, LLC.