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https://www.wsj.com/tech/ai/these-ai-cameras-detect-wildfires-before-they-spread-6b6e3229

These Smart Cameras Spot Wildfires Before They Spread

The newest fire spotters boast night vision, never take breaks and work fast—they often beat 911 human callers. Adding them 'has made a hell of a difference.'

By Jim Carlton Follow | *Photographs by Alan Nakkash for WSJ*
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SAN CLEMENTE, Calif.—Perched high above this seaside community, spotters scan for telltale puffs of smoke in all directions—night and day, without breaks.

Meet the AI bots that now serve as digital fire-lookouts and crucial eyes against one of America's fastest-growing threats: catastrophic wildfires like those that torched parts of Los Angeles in January.

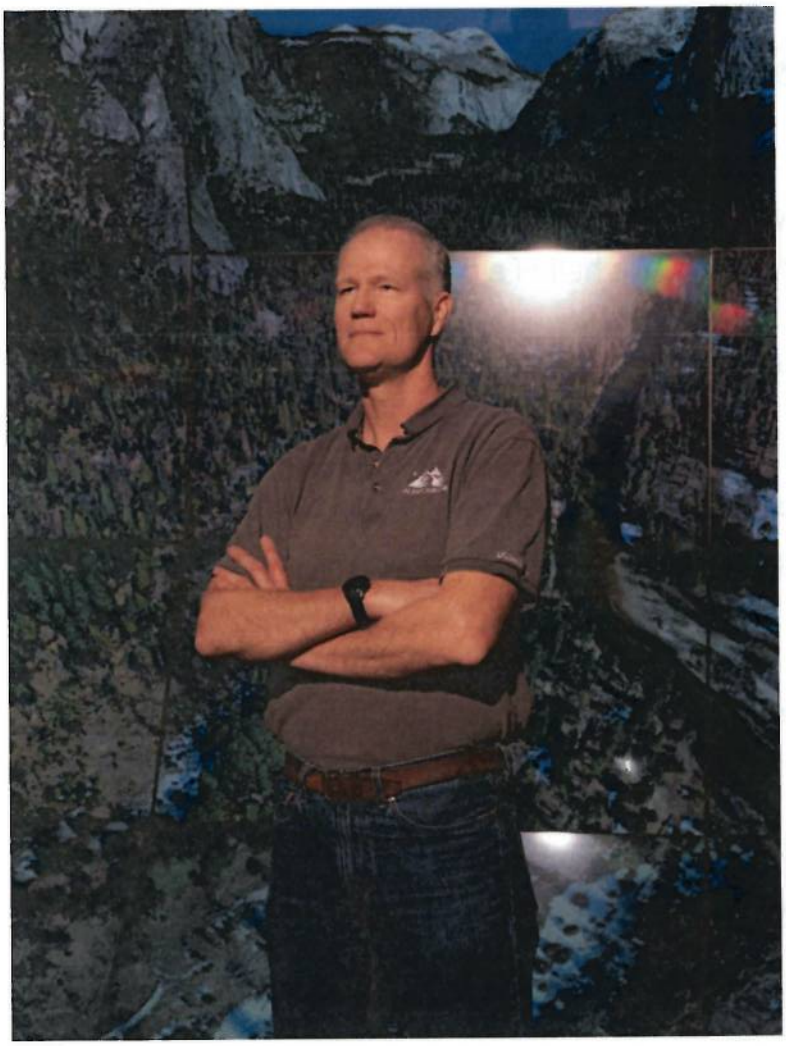
"Getting eyes on these critical events early on is important so you can respond, because your window of opportunity is very small," said Falko Kuester, an engineering professor who helps run a natural-hazard monitoring program called ALERTCalifornia.

Based at the University of California, San Diego, where he teaches, the ALERTCalifornia camera network began adding AI bots in 2023 and they now scan more than 1,150 cameras in nearly every fire-prone region statewide.

The bots have detected over 1,200 confirmed fires so far, beating human 911 callers roughly one-third of the time, with particular usefulness at night, officials say.

At 2 a.m. on Dec. 4, for instance, AI-equipped cameras spotted fire in a bone-dry Orange County canyon as nearby residents slept. The system alerted a human-staffed command center at UC San Diego, which verified and notified the Orange County Fire Authority. Engines and helicopters arrived in time to keep the blaze to under a quarter acre, preventing potential devastation to the thousands of homes just beyond the ridge. It was the county's first time AI detected a wildfire that no human had called in, officials said.

"The whole key in firefighting is quick and robust response," said Brian Fennessy, the agency's chief. "In whole, adding these cameras has made a hell of a difference."



Prof. Falko Kuester in 'The Wave' augmented reality room located at the Jacobs School of Engineering at UC San Diego.

An 'Aha' moment

The technology arrives as wildfires intensify amid warming temperatures, prolonged droughts and development in vulnerable areas. During the recent L.A. fires, the bots joined human spotters in detecting early blazes, serving as extra eyes.

"People are looking at the wildfire risk and saying, 'How do I cover it?' " said Sonia Kastner, co-founder and CEO of Pano AI, a San Francisco startup that has sold or leased cameras with its own AI technology across 10 states plus Australia and Canada.

This technology emerged in California after scientists from UC San Diego and elsewhere collaborated to set up mounted-camera networks, which emergency officials could monitor for fires, mudslides and other natural disasters. Funded partly by utilities and the California Department of Forestry and Fire Protection, or Cal Fire, the cameras first appeared after San Diego's 2003 firestorm, and expanded as wildfire threats grew.

As AI advanced, researchers realized they could train bots to analyze the reams of camera-video footage for anomalies that can signal fire: thicker haze in one area, smoke rising in another.

Cameras like the ones used atop the San Clemente ridgeline trail often beat human 911-callers at spotting fires.

Cal Fire helped test new AI-trained cameras at a handful of its 21 emergency-command centers in 2023, but soon deployed them to all after the bots began quickly spotting fires—including one near the wine-country town of Sonoma that was rapidly extinguished as a result, said Phillip SeLegue, the agency's staff chief of intelligence.

"AI is not going to put the fire out," he said, "but the successes are the fires you don't read about in the newspaper."

A 'better feeling'

In L.A. County, teams have installed four Pano AI cameras to monitor the upscale Palos Verdes Peninsula, and the cameras have been first to spot several fires, including one in brush in neighboring Torrance, officials there said.

"They give our residents and the city staff a much better feeling that someone is always watching," said Mayor David Bradley of Rancho Palos Verdes. His city spends $140,000 yearly for five-year camera leases.

Bradley said some peninsula residents worried about intrusiveness, but Pano AI officials say their software automatically blurs identifying information such as faces and license plates.

Another concern: Early similar technology generated false alerts. But ALERTCalifornia is designed so humans make final decisions on firefighter deployments, Kuester said. When an AI bot detects smoke, a notification appears on command-center screens and can arrive via text or email.

Fire Captain Thanh Nguyen observing camera feeds from his iPad in San Clemente, Calif.

"There's always gonna be a person there who says, these are the steps we need to take," said Kuester, standing before a live-camera feed of multiple forests at a UC San Diego lab one recent day. "The AI will never be like, 'Send three engines.' "

Firefighter unions generally support AI cameras, but worry about other AI uses, like pilotless helicopter drones being developed for water drops. That could endanger human-piloted

aircraft that fight fires, said Tim Edwards, president of Cal Fire Local 2881, the union representing the agency's firefighters.

"If you get too many aircraft in an area that is not controlled, you have accidents," Edwards said.

Many of the cameras monitor populated areas where threats to people and property are high. In Colorado, Xcel Energy contracted with Pano AI for 21 camera sites in 2023, another 21 in 2024, and plans 93 more this year, mostly in the Rocky Mountains around Denver, said Anne Sherwood, the utility's area vice president for wildfire mitigation.

Last June, Pano AI cameras spotted smoke after lightning struck in a mountain above suburban Denver. The cameras triangulated exact coordinates, allowing responders to send more than two dozen firefighters while two helicopters began an aerial attack, said Arvind Satyam, Pano AI's co-founder and chief commercial officer.

They dropped 56 buckets of water over nine hours, keeping the blaze at bay until crews could contain it. With strong winds and 90-degree temperatures that day, "this could have been a disaster scenario," Satyam said.

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