A Gunshot Detection through Air Quality Sensors

Air-quality sensors detect particle spikes from gunshots, integrating with other systems to triangulate location without compromising privacy.

To mitigate gun-related crimes jeopardizing school safety, researchers at Purdue University developed an innovation that utilizes air quality sensors to detect an increase in air particles following a gunshot. This invention can be combined with other gunshot detection sensors (including acoustic sensors, camera sensors, and infrared sensors) to reduce false alarms. This invention offers additional functions such as monitoring indoor air quality indices or providing smoking detection with high accuracy. Also, by deploying a set of the researchers' sensors, the location of a gunshot can be triangulated. Finally, unlike existing solutions, this innovation does not pose a risk of breaching privacy.

Technology Validation:

Shockwaves from ballistic impacts and muzzle blasts create pressure waves in the air. Air quality sensors observe movement in the articles caused by shockwaves inside its container. Inventors detected an increase in the number of 10 micron particles. In experimental testing, the PM10 (concentration of 10 micron particles) increased 5.1 times after a bullet was fired at 141 feet from the air quality sensor.

Advantages:

-Integrable with other gunshot detection systems

-Does not compromise privacy

-Offers multiple functions

-Reduces false alarms

Applications:

-School safety

Technology ID

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Category

Artificial Intelligence & Machine Learning/Computer Vision & Image Recognition

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View online

-Gun crime safety/prevention

-Public safety

-Law enforcement

Publications:

Wei Dai, R. Zhang and D. Kafle, "Analyzing Mass School Shootings in the U.S. from 2019 to 2024 with Machine Learning," 2024 IEEE International Conference on Big Data (BigData), Washington, DC, USA, 2024, pp. 2724-2732, doi: 10.1109/BigData62323.2024.10825683.

Wei Dai, Y. P. Singh and R. Zhang, "Multi-agent Simulation for Mass School Shootings," 2024 IEEE International Conference on Big Data (BigData), Washington, DC, USA, 2024, pp. 2714-2723, doi: 10.1109/BigData62323.2024.10825825.

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