

QUANTUM TECHNOLOGIES, METAMATERIALS, AND THE FUTURE OF CB SENSING

Emergent Explosive Threats For Use With Threat Anomaly Detection (thread)

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Rapid analysis of an area to identify where to sample with a high fidelity instrument is imperative when attempting to understand where potential chemical threats are on surfaces. In an area with an unknown threat, it is important to maintain a protective posture. Being able to identify the specific areas to sample will aid in reducing the time it takes to adequately sample a large area and help point the user to smaller areas of interest. There may be one or more areas on a surface that require sampling to fully understand the potential threats that may be present. We have shown that using a threat anomaly detection (ThreAD) algorithm developed by DEVCOM CBC provides a methodology to find areas of interest via anomaly detection.

This work outlines the method behind the algorithm and discusses potential use-cases. One such use-case is with hyperspectral reflectance data in which we show explosives are shown as anomalous in real-time on surfaces. Additionally, this work delves into the clustering and separability of potential threats from surfaces but also separates reagents from products of emerging explosive threats. This method of anomaly detection may prove useful as a GO/NO-GO identifier for potential threats, as a pointer for high fidelity instruments to sample, or as a data filter to quickly identify which spectra require further analysis.

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