

Materials identification, classification and threat detection using nonlinear analysis of X-ray diffraction data

Value Proposition

Airport and transportation security require that a high volume of luggage and packages be assessed for their potential as explosive threats. While existing X-ray diffraction (XRD) technology is capable of accurately determining the material composition of a sample, it can be extremely time consuming due to the required number of photons received at the detectors for a high-quality signal.

Technology

This technology enables material classification and automated explosive threat detection with low-quality XRD data achievable with airport and transportation scanners. Using a database of lab-quality XRD measurements of explosive and non-explosive materials commonly screened for, this technology compares the sample under test using physically significant classification features that are robust to noise and lack of training data.

Advantages

This innovation improves the robustness of material classification to noise and low-resolution data

Publications

- [Camen Royse, Scott Wolter, and Joel A. Greenberg "Emergence and distinction of classes in XRD data via machine learning", Proc. SPIE 10999, Anomaly Detection and Imaging with X-Rays \(ADIX\) IV, 109990D \(14 May 2019\)](#)

Duke

LICENSING & VENTURES

Duke File (IDF)

T-006666

Inventor(s)

- Greenberg, Joel
- Gehm, Michael
- Royse, Camen

Links

- [From the lab of Dr. Joel Greenberg](#)

College

Pratt School of Engineering

For more information please contact

Koi, Bethany
919-681-7552
bethany.koi@duke.edu