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Characterizing nanoparticles using a hyperspectral imaging system

Researchers at Purdue University have developed a novel method for characterizing nanoparticles by leveraging hyperspectral imaging (HSI) and machine learning (ML). This method provides a more comprehensive characterization of nanomaterials and nanoparticles than conventional technologies. The approach focuses on enhancing image quality within HSI data and the method's ML capabilities significantly reduce classification complexity while improving overall accuracy. Traditionally, HSI's application to nanoparticle analysis is extremely limited. Data is often lost to noise and overlapping information. With an overall 99.9% accuracy when classifying nanoparticles in large samples, this novel method developed at Purdue instead holds great promise for enabling HSI for rapid, label-free classification in nanoscale materials and biomedical research applications.

Technology Validation:

Under optimal parameter conditions, the method's classification accuracy for a single nanoparticle type approached 99.9%. In the case of classifying multiple particle types, on average, 93% of targeted particles were correctly classified, resulting in an overall accuracy of 99.9%.

Advantages:

-Improved accuracy in nanoparticle classification of up to 99.9%

-Refined characterization of biological particles

-Enhances HSI, an established technique which is minimally invasive with high throughput in quantitative nanoparticle analysis

-Non-contact, non-invasive, and label-free

Applications:

-Analysis of nanoparticle-based technologies

-Nanoparticle based research and particle classification

Technology ID

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Category

Materials Science & Nanotechnology/Nanomaterial Characterization & Imaging Tools

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-Drug delivery

-Biomedical research

-Characterization of minerals, metals, and materials

Publications:

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