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Cloud-Based, AI Deep Learning Enabled Handheld Raman for Mixture Analysis

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Introduction

Handheld Raman spectrometers have been widely used for material identification across multiple industries due to their high molecular specificity and portable size. Without the need for sample preparation, Raman analysis is noninvasive, and can be conducted outside of the lab for on-site real time monitoring. However, as the diversity and complexity of substances increase, there's a growing need for effective analysis, processing and classification of complex compound mixtures in real time.

Unfortunately, most handheld Raman spectrometers are limited by their individual Raman library and chemometrics data analysis capabilities. Instead of leveraging just the capabilities of an individual device, today, the analysis needs to extend to a central intelligence hub that will assist in the rapid diagnosis and interpretation of complex substance mixtures.

CloudMinds XI™ portable Raman device leverages a cloud-based platform that uses AI deep learning algorithms for a more sophisticated analysis of both individual components and mixtures. The cloud database and intuitive smartphone interface of the device allows teams to share sample data remotely across multiple devices, via a shared spectra library or a central cloud database. This shared data via a cloud platform, and CloudMinds deep learning algorithms, provide increased accuracy and speed for the identification of individual components and mixtures of two or three compounds.

smartphone, which supports voice calls, emails, GPS location tracking, and image capture by camera. Using this smartphone design, XI™ can connect to the cloud platform via cellular link, Bluetooth or Wi-Fi.

XI™ can operate as both a standalone unit and a cloud connected device so users can operate the Raman device anytime and anywhere, with or without a cloud connection. The device is fully automated with an intuitive interface that facilitates searches with the factory and user-customized libraries, that can be on either the standalone unit or the cloud platform.

The cloud platform provides the infrastructure to manage and connect all Cloud Raman devices for information sharing and real-time updates. This platform also allows field operators to be connected to a central intelligent center for real-time assistance with data analysis. In addition, the cloud-based data platform enables spectral library expansion with ensured security. Overall, XI™ is the best solution for many field applications, such as onsite drugs detection, pharmaceutical raw material ID, counterfeit detection, and food safety.

Smart Cloud AI Raman Spectrometer

The CloudMinds XI™ is a smartphone-based handheld Raman spectrometer with 785nm laser excitation that leverages the power of cloud AI technology for increased speed and accuracy in data analysis. The handheld Raman unit is built using the CloudMinds Data A1 Android

Figure 1. XI™ Smart Raman Spectrometer Connected to CloudMinds Cloud AI Technology

Cloud-Based, AI Deep Learning Enabled Handheld Raman for Mixture Analysis

CloudMinds XI™ is the world's first cloud-based, AI deep learning enabled handheld Raman spectrometer. Being integrated with a smartphone, its operation is fully automated with an intuitive android app suitable even for novice users. XI™ can operate as both a standalone and a cloud connected device via 4G/Bluetooth/Wi-Fi. The cloud infrastructure allows managing and connecting all Cloud Raman devices for data sharing and real-time updates. XI™ is the first handheld Raman adopting AI Deep learning for data analysis with faster speed and higher accuracy even for complex mixtures.

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