Contribution ID: **29**   Type: **Poster plus Minioral**

PGNAA Spectral Classification of Metal with Density Estimations

For environmental, sustainable economic and political reasons, recycling processes are becoming increasingly important, aiming at a much higher use of secondary raw materials. Currently, for the copper and aluminum industries, no method for the non-destructive online analysis of heterogeneous materials are available. The Promt Gamma Neutron Activation Analysis (PGNAA) has the potential to overcome this challenge. A difficulty when using PGNAA for real-time classification arises from the small amount of noisy data, due to short-term measurements. In this case, classical evaluation methods using detailed peak by peak analysis fail. Therefore, we propose to view spectral data as probability distributions. Then, we can classify material using maximum log-likelihood with respect to kernel density estimation and use discrete sampling to optimize hyperparameters. For measurements of pure aluminum alloys we achieve near perfect classification of aluminum alloys under 0.25 second.

Minioral

Yes

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No

Are you a student?

No

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Session Classification: Mini Oral - III

Track Classification: Deep Learning and Machine Learning