Imaging algorithms for X-ray cargo inspection

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We would like to share our research progress in developing material decomposition algorithms for X-ray cargo inspection systems. Dual-energy X-ray imaging enables material decomposition via exploiting nonlinear attenuation properties of materials. However, such decomposition involves a time-consuming and labor-intensive calibration procedure in general. We have previously developed a fast and efficient calibration method that can also address nonuniform X-ray spectral characteristics across the field-of-view. We have further improved the decomposition accuracy by use of a regularized k-means clustering method. Issues on the object size and the X-ray spectral drift will also be discussed. Finally, outlook of the related technology will be briefly made.

Figure

X-ray material-decomposed image.