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Material Discrimination Using Dual Energy X-ray Beam for Cargo Inspection system

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ABSTRACT

Generally, the x-ray cargo inspection systems are used to smuggled and dangerous goods detection inside of the container. When scanning with dual energy x-ray beams, different materials can be identified by comparing the attenuations of the transmitted dual energy x-ray beam. In this paper, we present a method to improve detection efficiency by using dual-energy x-ray. we use a new logarithmic curve for material discrimination rather than the conventional curves such as banana curve, alpha curve, R curve, and H-L curve. It is because the logarithmic curve has a better linearity in shape so as to make it easy. For each material, probability distribution along the curve is estimated with jig material images acquired by our dual energy system. The distribution is used as a weight of each material for material discrimination. We measured seven materials for different thicknesses using the dual x-ray energy of 6MeV and 9MeV. Experimental results show that our method based on the proposed weights gives accurate material discrimination. We will test the various combinations of materials in our test-bed for detection of each materials. In addition we will continue to study on improving detection efficiency for overlapped objects based on experimental data.

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REFERENCE

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