

A Logarithmic X-Ray Imaging Model for Baggage Inspection: Simulation and Object Detection

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Abstract

In baggage inspection the aim is to detect automatically threat objects. The progress in automated baggage inspection, however, is modest and very limited. In this work, we present an X-ray imaging model that can separate foreground from background in baggage screening. In our model, rather than a multiplication of foreground and background, we propose the addition of logarithmic images. This allows the use of linear strategies to superimpose images of threat objects onto X-ray images (simulation) and the use of sparse representations in order segment target objects (detection). In our experiments, we simulate new X-ray images of handguns, shuriken and razor blades, in which it is impossible to distinguish simulated and real X-ray images. In addition, we show in our experiments the effective detection of shuriken, razor blades and handguns using the proposed algorithm.