

Analysis of Detection Concealed Objects Based on Multispectral and Hyperspectral Signatures

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Abstract : Development of highly efficient security systems is one of the most urgent topics for science and engineering. There are many kinds of threats and many methods of prevention. It is very important to detect a threat as early as possible in order to neutralize it. One of the very challenging problems is detection of dangerous objects hidden under human's clothing. This problem is particularly important for safety of airport passengers. In order to develop methods and algorithms to detect hidden objects it is necessary to determine the thermal signatures of such objects of interest. The laboratory measurements were conducted to determine the thermal signatures of dangerous tools hidden under various clothes in different ambient conditions. Cameras used for measurements were working in spectral range 0.6-12.5 μm . An infrared imaging Fourier transform spectroradiometer was also used, working in spectral range 7.7-11.7 μm . Analysis of registered thermograms and hyperspectral datacubes has yielded the thermal signatures for two types of guns, two types of knives and home-made explosive bombs. The determined thermal signatures will be used in the development of method and algorithms of image analysis implemented in proposed monitoring systems.

Keywords : hyperspectral detection, multispectral detection, image processing, monitoring systems

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