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Title:Image denoising of CW THz images by use of non-local mean

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Abstract:THz radiation has the ability to penetrate a wide range of materials which are opaque to visible and near infrared light. The improvement of imaging quality is of significance to an imaging system, especially for imaging systems using an array detector because the detector cells are usually less sensitive. Digital image processing is a very effective solution to the enhancement of image quality. Non-local mean (NLM) was applied to THz images obtained from several different kinds of imaging systems, such as transmission-mode scanning system, reflection-mode scanning system, transmission- mode array imaging system and reflection-mode array imaging system. The control parameters were altered and compared to get the best performance, and the denoised results were compared with the mean filtering results. The experimental results show that NLM can effectively remove the noises and improve the image quality, especially for images obtained from array imaging systems which are seriously influenced by noise. NLM is superior to mean filter in both denoising efficiency and edge-preserving capability.

Number of references:12

Main heading: Imaging systems

Controlled terms:Image quality - Ultrasonic devices

Uncontrolled terms:Array detectors - Control parameters - De-noising - Detector cell - Edge preserving - Effective solution - Enhancement of image quality - Imaging quality - Mean filter - Non-local means - Nonlocal - Scanning systems - Terahertz imaging - THz radiation - Transmission mode - Visible and near infrared

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