Frequency domain beamforming in ultrasound imaging (Technion)

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Most ultrasound imaging systems use multiple transducer elements to transmit and receive acoustic pulses. Beamforming of the signals detected by the individual elements of the array increases the signal-to-noise ratio and is performed in the digital domain, implying that the analog signals detected at the receiver elements are first sampled. Current methods either only reduce the processing rate while the sampling rate remains unchanged or are unable to capture a speckle pattern which is of high importance in medical imaging. The presented technology is a novel method that significantly reduces (up to 16 fold reduction) the sampling and consequently the processing rates without compromising the quality of an image. This method is applicable to both medical and nondestructive testing ultrasound applications and other narrowband based techniques like sonar can benefit from this method.

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