



New!

Project Proposal

Coded Excitation for Diverging Wave Imaging

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Medical ultrasound is used for tissue visualization by radiating it with acoustic energy transmitted by an array of elements. Novel imaging method based on insonification with diverging improves image quality and acquisition time, however, it is limited by data transfer rates and severe computational load.

In addition, modern imaging systems use single-carrier short pulses for transducer excitation, while the usage of more sophisticated signals can be beneficial in terms of SNR, penetration depth and frame rate. Therefore, coded signals are extremely valuable in medical ultrasound imaging although their implementation is challenging due to imaging and not detection nature of ultrasound, its high dynamic range and frequency dependent attenuation.

Recently, diverging waves imaging was implemented using Fourier domain beamforming developed in SAMPL, leading to significant reduction in both sampling and processing rates. In this project we aim to extend this work by developing Fourier-based coded ultrasound for diverging waves imaging. The combination of these novel techniques will pave a way to enhanced SNR, real-time ultrafast ultrasound system.

Performance of the developed method will be tested on a Verasonics (research-oriented) ultrasound system Matlab environment.

Required background: Introduction to Digital Signal Processing (044198)

