Super Resolution of Ultrasound Doppler Imaging

Doppler ultrasound is a non-invasive and safe modality that is used for the estimation of blood velocities by transmitting high-frequency sound waves (ultrasound) and analyzing the signals reflected from circulating red blood cells. Doppler scans help diagnose many conditions, including: heart valve defects and congenital heart disease, artery occlusions and aneurysms.

In order to allow the medical doctor to navigate and choose the region in which the blood velocity is to be estimated, a B-mode image of the tissue is generated first. Only then, a velocity map of the blood is imaged on top (See image above). Nowadays, 2 interleaved transmission sequences are used, one for Doppler and one for B-mode imaging, which results in degraded B-mode image and corrupted velocity estimation. In this project, we will perform the two imaging, B-mode and Doppler, **simultaneously** by using only Doppler transmission and applying super resolution on the received signal in order to yield a high resolution B-mode image. The project will be performed using Matlab and state of the art research oriented ultrasound system.

*Required background:* Matlab, Introduction to Digital Signal Processing (044198)

For further details, please contact: Regev Cohen regev.cohen@campus.technion.ac.il