Implementation of synthetic aperture imaging on a hand-held device - DTU Orbit (05/11/2019)

Implementation of synthetic aperture imaging on a hand-held device

This paper presents several implementations of Synthetic Aperture Sequential Beamforming (SASB) on commercially available hand-held devices. The implementations include real-time wireless reception of ultrasound radio frequency signals and GPU processing for B-mode imaging. The proposed implementation demonstrates that SASB can be executed in-time for real-time ultrasound imaging. The wireless communication between probe and processing device satisfies the required bandwidth for real-time data transfer with current 802.11ac technology. The implementation is evaluated using four different hand-held devices all with different chipsets and a BK Medical UltraView 800 ultrasound scanner emulating a wireless probe. The wireless transmission is benchmarked using an imaging setup consisting of 269 scan lines x 1472 complex samples (1.58 MB pr. frame, 16 frames per second). The measured data throughput reached an average of 28.8 MB/s using a LG G2 mobile device, which is more than the required data throughput of 25.3 MB/s. Benchmarking the processing performance for B-mode imaging showed a total processing time of 18.9 ms (53 frames/s), which is less than the acquisition time (62.5 ms).

General information
Publication status: Published
Organisations: Department of Electrical Engineering, Biomedical Engineering, Center for Fast Ultrasound Imaging, Alexandra Institute, BK Medical ApS
Contributors: Hemmsen, M. C., Kjeldsen, T., Larsen, L., Kjær, C., Tomov, B. G., Mosegaard, J., Jensen, J. A.
Pages: 2177-2180
Publication date: 2014

Host publication information
Title of host publication: Proceedings of 2014 IEEE International Ultrasonics Symposium
Publisher: IEEE
ISBN (Print): 978-1-4799-7049-0
Electronic versions: preprint.pdf
DOIs: 10.1109/ULTSYM.2014.0542
Source: PublicationPreSubmission
Source ID: 99356664
Research output: Chapter in Book/Report/Conference proceeding › Article in proceedings – Annual report year: 2014 › Research › peer-review