

Subject

Development of methods for assessing tissue cancer changes based on ultrasound signals

Supervisors, contact, place of research

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Project Description

Automatic initial detection of abnormalities in tissue structures is becoming increasingly important with widespread access to medical diagnostic devices [1]. As part of the work, research will be carried out on the optimization of existing algorithms and the development of new methods for semi-automatic and automatic detection of the degree of neoplastic changes in breast cancer, which may contribute in further stages to supporting and augmenting medical diagnostics [2]. The research will be based on the analysis of signals derived from

- numerical simulations of acoustic wave propagation
- ultrasonic measurement data (2D and 3D) from phantoms simulating tissues with neoplasm tumors and
- ultrasonic measurement data (2D and 3D) from patients during chemotherapy courses.

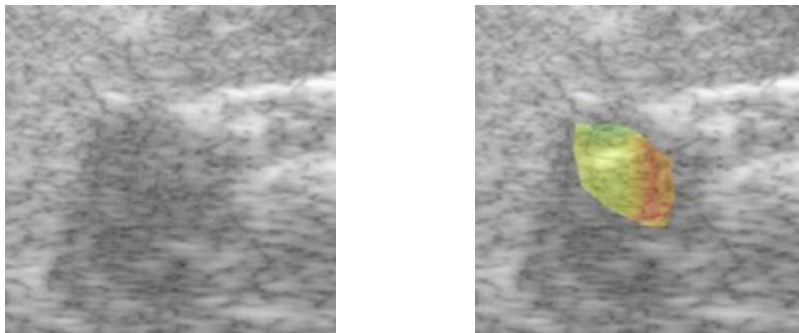


Fig. 1 Example of reconstruction of ultrasound data from a cancerous breast area (left) with a parameter characterizing the number of tumor cells in the lesion area (right)

Requirements: knowledge of the MATLAB environment. Knowledge of other environments for data analysis (R, Mathematica, etc ...), basics of ultrasound is welcome.

Bibliography

1. Butterfly IQ - ultrasound ultra simplified, <https://www.butterflynetwork.com>
2. Sood, R., Rositch, A. F., Shakoor, D., Ambinder, E., Pool, K.-L., Pollack, E., ... Harvey, S. C. (2019). Ultrasound for Breast Cancer Detection Globally: A Systematic Review and Meta-Analysis. *Journal of Global Oncology*, (5), 1–17. <https://doi.org/10.1200/JGO.19.00127>

updated: May 2, 2020