

Final Thesis or Internship

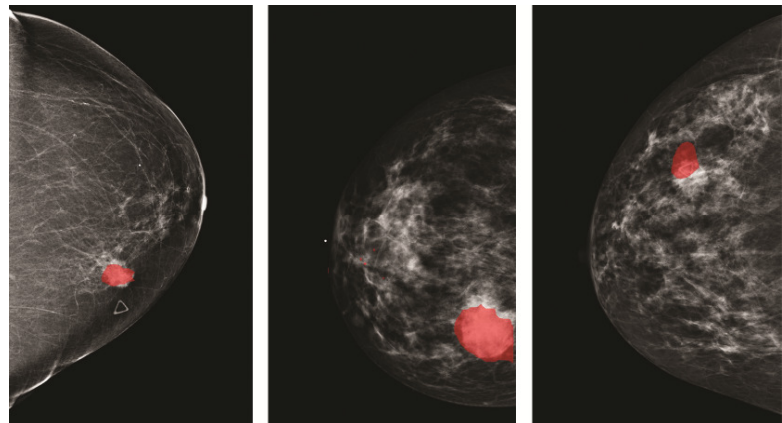
Image Fusion of Ultrasound Computer Tomography Volumes with X-ray mammograms

In cooperation with the Karmanos Cancer Institute (Detroit), a methodology for automatic registration of three-dimensional Ultrasound Computer Tomography (USCT) volumes with two-dimensional projection images of the X-ray mammography is being developed at KIT. The registration allows the localization of suspicious structures within the contrary imaging modality.

USCT is a new imaging device providing three modalities: reflection images, attenuation images and speed of sound images. The combination of ultrasound information with X-ray mammography is expected to contribute to diagnostical accuracy and therefore an earlier detection of breast cancer.

In earlier work, the registration methodology has been developed and evaluated with 15 clinical speed of sound datasets.

During this thesis or internship, the focus lies on extending the registration software to the use of all provided modalities (speed of sound, reflectivity, attenuation). Furthermore it is of interest to combine the quantitative information of these modalities with X-ray mammograms using an image fusion technique.



Task description

- The thesis starts by developing the state of the art and getting familiar with the algorithms used for the registration of datasets.
- The next step will be the extension of the software for the use with all available ultrasound modalities. This includes generalizing the pre-processing of datasets as well as dealing with the specific characteristics of the data.
- The implementation of the extensions has to be done in MATLAB and partly in Java.
- In agreement with Karmanos Cancer Institute, adequate visualization methods should be developed to combine the quantitative information of USCT modalities with X-ray mammograms.
- An important issue is the evaluation with clinical datasets. Datasets will be provided.
- The tasks can be adapted according to the given time frame.

Skills required

Basic knowledge in medical imaging and medical image processing, programming skills in MATLAB and Java.

Contact

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