



# Towards homogeneous mammography imaging

Project Management and Software Development  
for Medical Applications

## General Info

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## Project Abstract

In this project we focus on multi-vendor mammography images, targeting to reduce the heterogeneity across different brands. To do so, we will use a rich multi-vendor dataset, and we will explore various image processing and machine learning techniques.

## Background and Motivation

Mammography is a common imaging technique for breast cancer detection. These X-Ray images depict breast tissues allowing the radiologists to capture abnormalities and guide patient care. There are multiple vendors on the market proposing mammography systems, each of them having some specific characteristics. This results in a quite heterogeneous output in practice. It often creates a challenge for computer aided detection algorithms, leading sometimes to suboptimal performances.

In this work we will focus on the analysis of images coming from mammographs of different vendors to capture the features that may be useful in determining the vendor, hence, crucial in reducing the heterogeneity of classifiers performances.

## Student's Tasks Description

The project is a great opportunity to work with clinically relevant medical data and get a good understanding of industry challenges. The first part of the project will focus on imaging analysis with python tools (scikit-image, opencv, simpleitk) to perform broad analysis of open multi-vendor

dataset. The insights of the analysis will be used to build an image processing pipeline targeting to homogenize the dataset. The imaging pipeline can be based on traditional image processing as well as on machine learning techniques.

## Technical Prerequisites

A good candidate should be experienced with python coding, and the use of various python libraries. Knowledge of image processing techniques and tools is preferred but not mandatory. Experience in machine learning is nice to have. Experience with tools and libraries such as matplotlib, seaborn, plotly could be helpful.

## References

- [1] <https://doi.org/10.3389/fradi.2021.796078>
- [2] <https://doi.org/10.5878/45vm-t798>
- [3] <https://www.rsna.org/rsnai/ai-image-challenge/screening-mammography-breast-cancer-detection-ai-challenge>

Please send the completed proposal to [tianyu.song@tum.de](mailto:tianyu.song@tum.de), [shervin.dehghani@tum.de](mailto:shervin.dehghani@tum.de) and [felix.tristram@tum.de](mailto:felix.tristram@tum.de). Please note that this proposal will be evaluated by the BMC coordinators and will be assigned to a student only in case of acceptance.