

# Research Statement

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I'm an undergraduate in Mathematical Engineering and eager to continue my academic journey pursuing a master's degree in Computational Science and Computational Learning at Politecnico di Milano.

The biggest research opportunities I have taken part in came from NECST-Camp. My current research topic is radiomic features extraction from medical images. In my former project, I developed a python script to run PyRadiomics on the LIDC-IDRI dataset containing 1018 cases of lung cancer. The dataset was composed of thoracic computed tomography scan and masks, stored in `.dicom` and `.xml` respectively. These were needed to be converted into a format suitable by PyRadiomics. The main part of the project was the conversion and the reconstruction of the masks from the `.xml` file. Then PyRadiomics was implemented and the features were saved on a `.csv` file.

Currently, I'm working on an automatic tool for mammography segmentation and classification. The workflow of this framework is composed of two phases: firstly we have used a Connected U-Net for the segmentation task, then we have extracted the radiomic features using PyRadiomics and trained a statistical classifier. For the classification task we used a logistic regression model aimed at predicting if a mass is benign or malignant using only the informations provided by the extraction process. Furthermore, we plan to investigate the relationship between the accuracy of the mask and the extracted features. We're interested in seeing if an imprecise segmentation (which is a common case for the automatic segmentation process for mammography images) has a great impact on the calculated features.

For the future, I would like to drive my academic path towards numerical analysis and high performance computing. My goal is to ensure that my academic path includes both a part related to mathematical modeling and an approach to data analysis focused on its synergy with numerical aspects and scientific computing.