

# Diagnosing malignancy of breast masses using Machine Learning

## **Theme09 - Introduction to Machine Learning**

Performing an exploratory data analysis, creating a model using machine learning algorithms and creating a Java Wrapper around the model

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October 5, 2022

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## Abstract

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## List of Abbreviations

**EDA**    Exploratory Data Analysis  
**FNA**    Fine Needle Aspirate

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# 1 Introduction

Diagnosing if breast masses/lumps are benign or malignant, and thus if they are breast cancer, was done by full biopsies, which are invasive surgical procedures. An alternative method is to take fine needle aspirate (FNA) fluid samples and then have the acting physician try to determine the diagnosis by looking with a microscope at the cell nuclei. The problem with this, and why they thus mainly performed full biopsies, was that this gave mixed results because it was highly subjective and depended a lot on the skill of the physician. But because diagnosing the breast masses by taking FNAs and examining them is much less invasive than the full biopsies it was desired to make this process faster and improve the correctness and objectivity of the diagnosis process. To achieve this goal microscopic images were digitized of the FNA samples and processed into features, machine learning techniques were then used to create a diagnostic model.

## 1.1 Goal

## 1.2 Research Question

Can breast mass malignancy be assessed with  $>95\%$  accuracy, using visual features of nuclei boundaries computed from fine needle aspirate images?

## 1.3 Theory

??

## 2 Materials and Methods

Link: [GitHub Repository of Part 1: Analysis](#)

Link: [GitHub Repository of Part 2: Java Wrapper](#)

### 2.1 Materials

??

### 2.2 Existing Methods

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### 2.3 Developed Methods

??



## **3 Results**

### **3.1 Data acquisition and preprocessing**

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### **3.2 Validation and performance**

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### **3.3 Research findings**

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## **4 Discussion and Conclusion**

### **4.1 Discussion**

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### **4.2 General conclusion and perspective**

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## 6 Appendices

### Appendix A: ‘???’