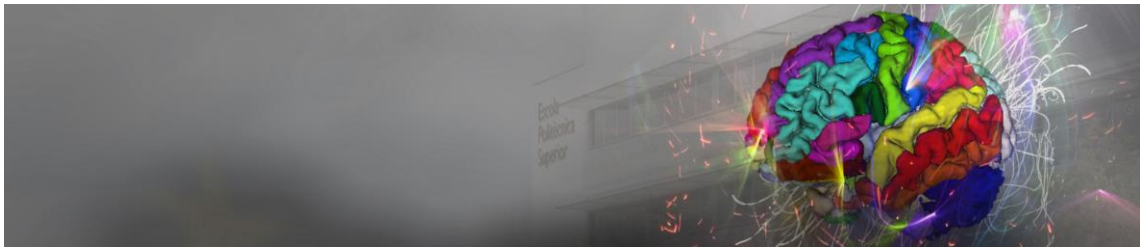
# Computer Aided Diagnosis

Image Segmentation
(Active Shapes Models)



# Introduction

Segmentation is an essential part of many computer vision systems and medical applications, which aim is the partition of an image into a set of non-overlapped regions whose union is the entire image. However, in medical imaging, segmentation refers also to object detection, which aims to separate one object/structure from the remaining structures of the image.

In this coursework the main goal is to develop from scratch an Active Shape Models algorithm for segmenting an object. The aim is to first build the statistical model and then fit it to an unknown image. The algorithm should be developed in Python/Matlab. A skeleton of an application is available in Python.

Two different datasets will be used during the coursework, one with hand images and another one in the medical domain. The former will allow a better visualisation of the statistical models and a correct implementation of the segmentation algorithm, while the latter allows to see a medical application where active shapes models can be successfully applied.

# Objectives

**A)** Information search. Team work.

**B)** To understand the segmentation algorithm. To design, analyse and implement the algorithm in python/matlab.

**C)** To test the algorithm at least with the provided datasets. To study the problems and possible improvements. Evaluate the results using the same image for testing but different number of images for training. Show good and bad examples of results.

**D)** Documentation.

# Coursework: 3 sessions (6 hours)

**A)** Coursework with the following sections:

1) Introduction and problem definition.
2) Algorithm analysis.
3) Design and implementation of the proposed solution.
4) Experimental section and results analysis (qualitative/ quantitative analysis, speed, etc).
5) Organization and development of the coursework (tasks, time estimations and real dedication).
6) Conclusions.

**B)** Matlab code with comments.

# Coursework Evaluation:

**A)** During the labs.

**B)** After the coursework.

**DEADLINE:** It will be the one indicated in the moodle submission link. Late submission will be penalised.