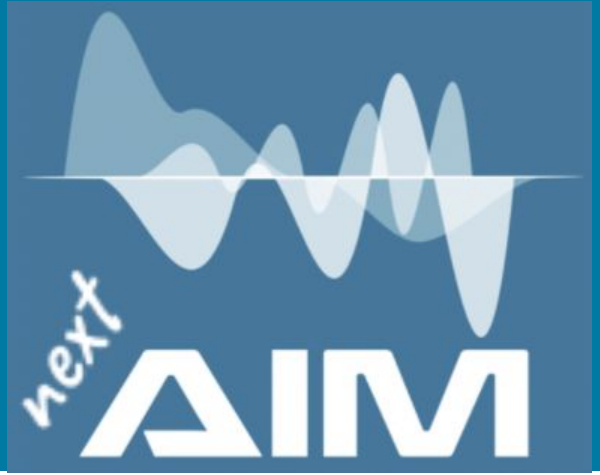
Artificial
Intelligence in
Medicine



ML on imaging data of 10B uptake tracks

Ian Postuma

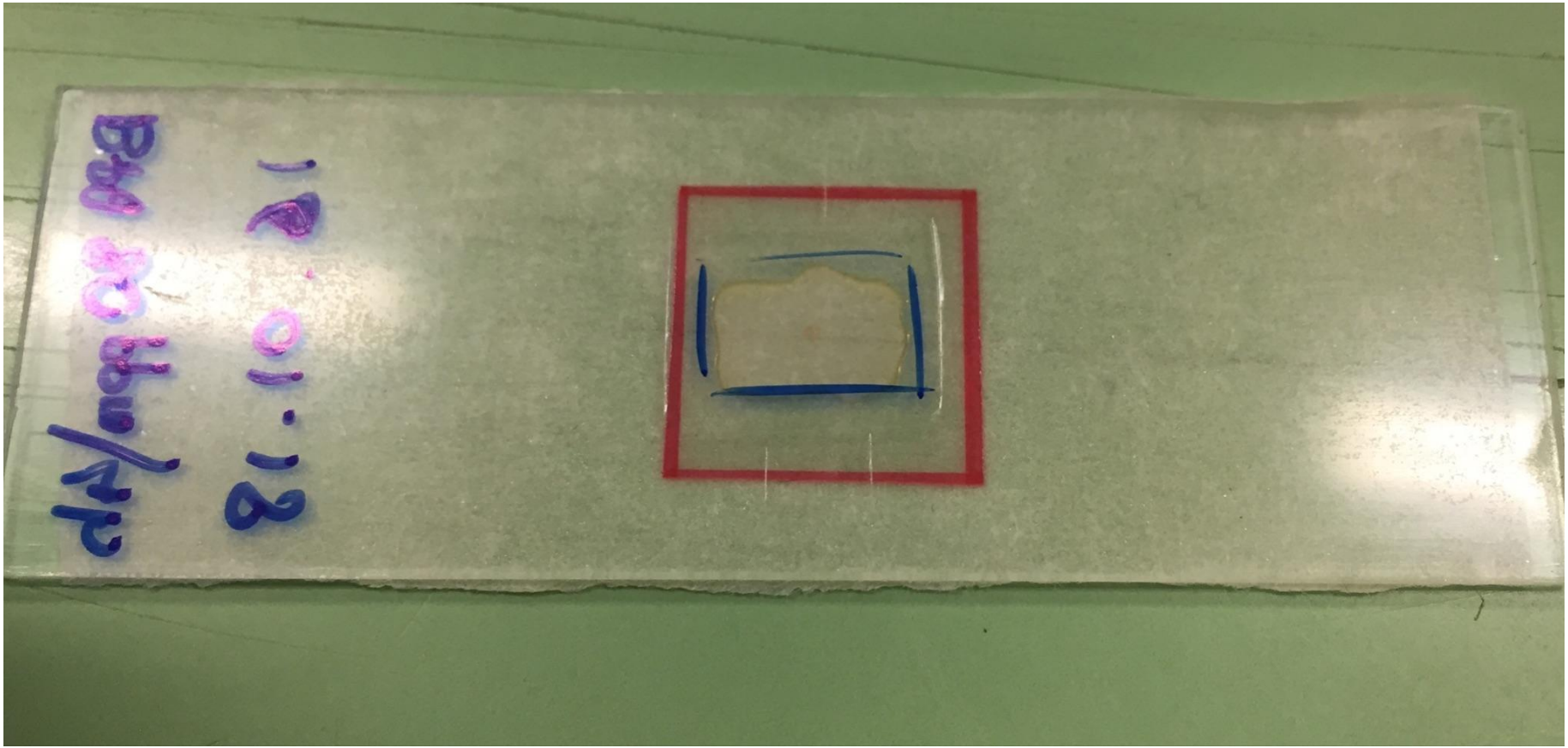
Istituto Nazionale di Fisica Nucleare, Pavia,Italy

The Problem

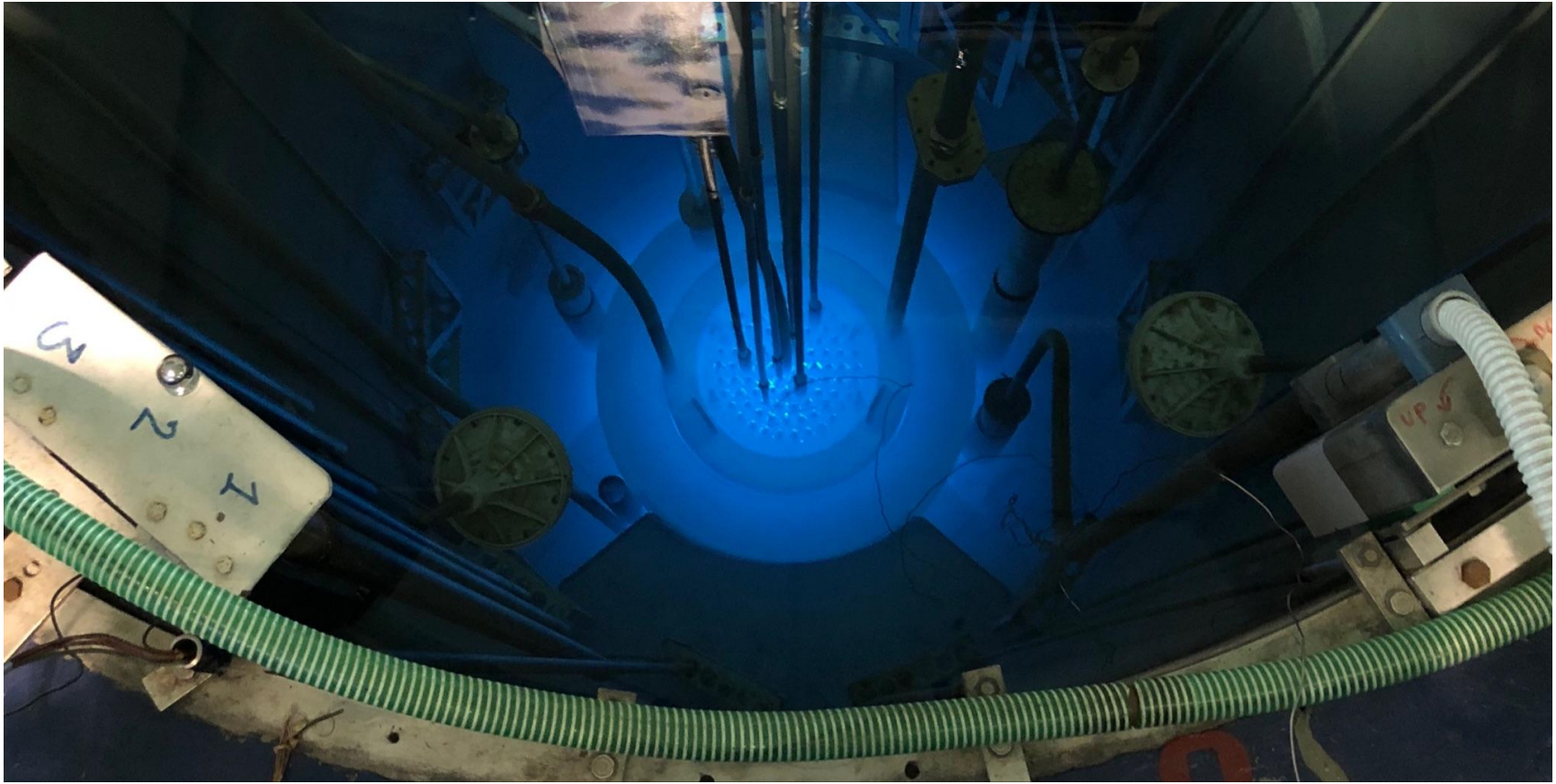
Passive nuclear track detectors (CR39) for ^{10}B uptake measurements

i.e. counting black dots on a microscopic image

Sample + CR39

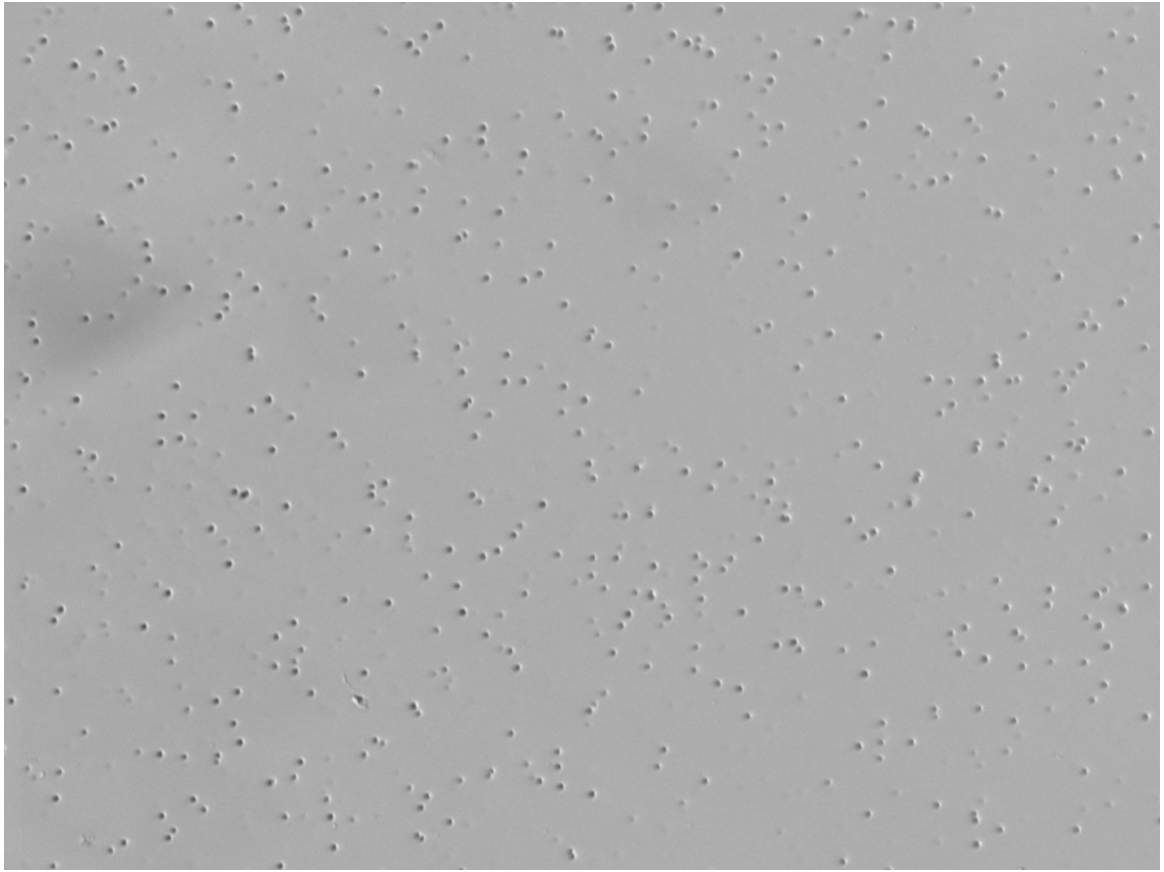


Nuclear Research Reactor @ LENA (UniPV)



Sample chemical etching

The Image



The Database

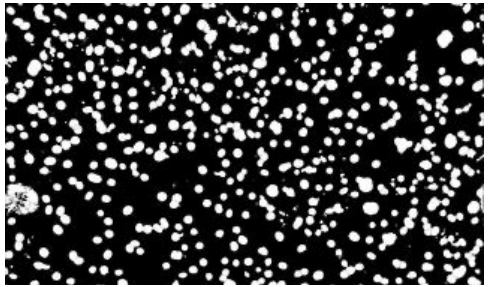
240 images with a range of tracks per picture going from 0 to 800

approximately **30.000 tracks** (SW aided and **hand made**)

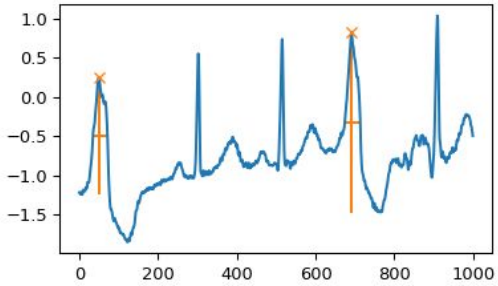
1 object category detection

non convolutional neural network methods

Thresholding

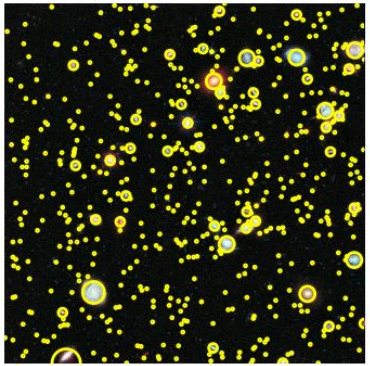


3D peak search

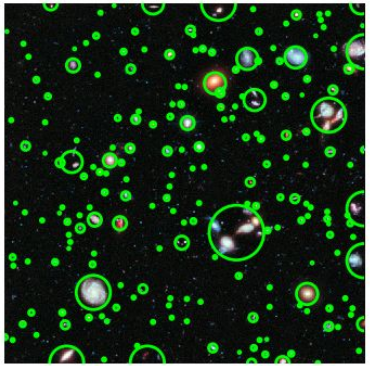


Blob detection

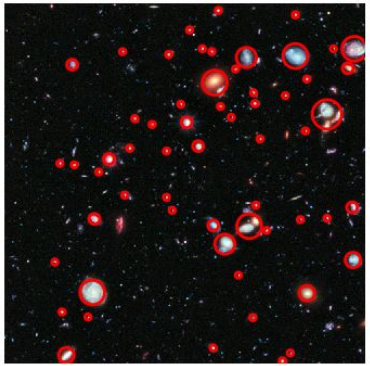
Laplacian of Gaussian



Difference of Gaussian



Determinant of Hessian



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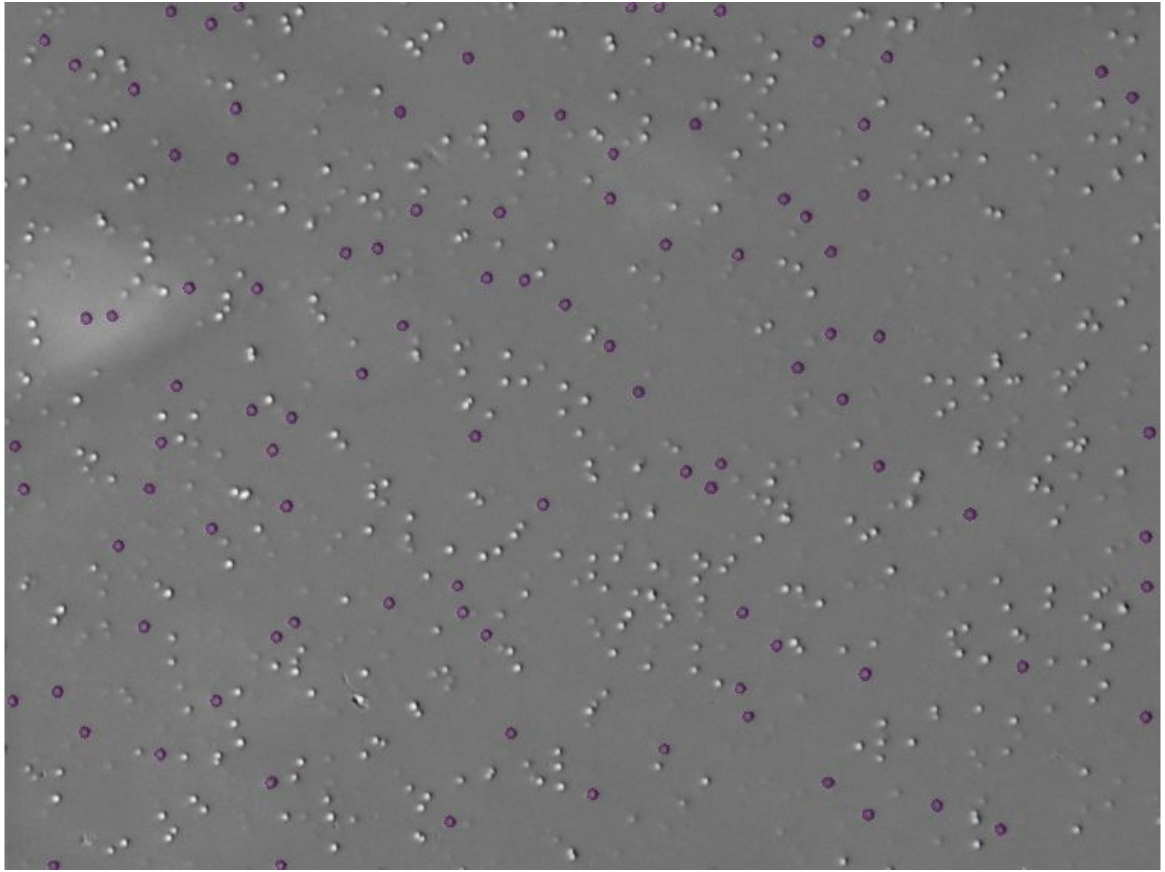
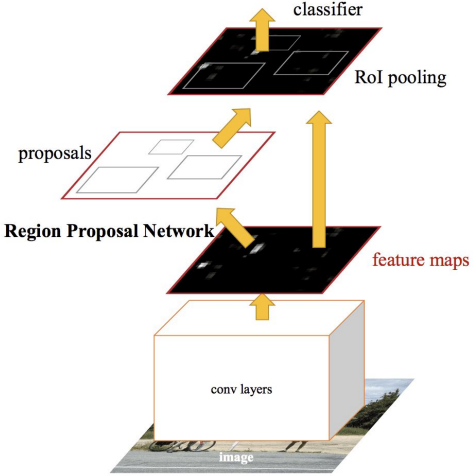


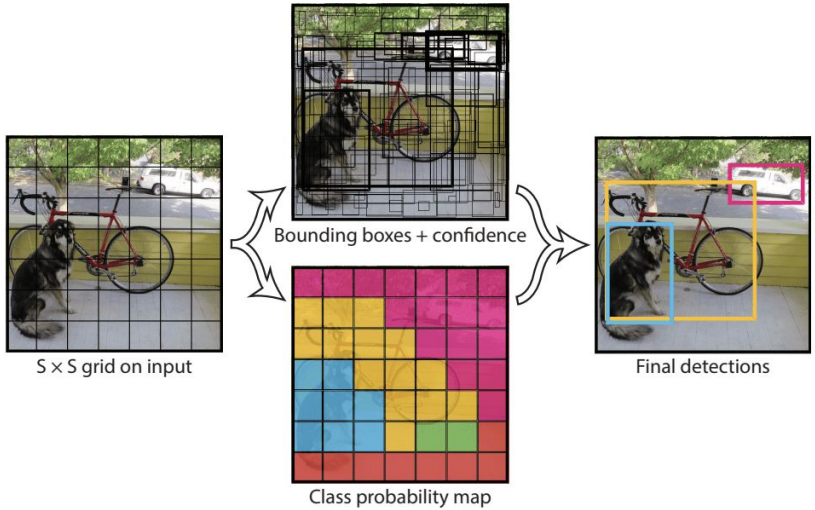
Pre-trained convolutional neural network approach

Keras RCNN



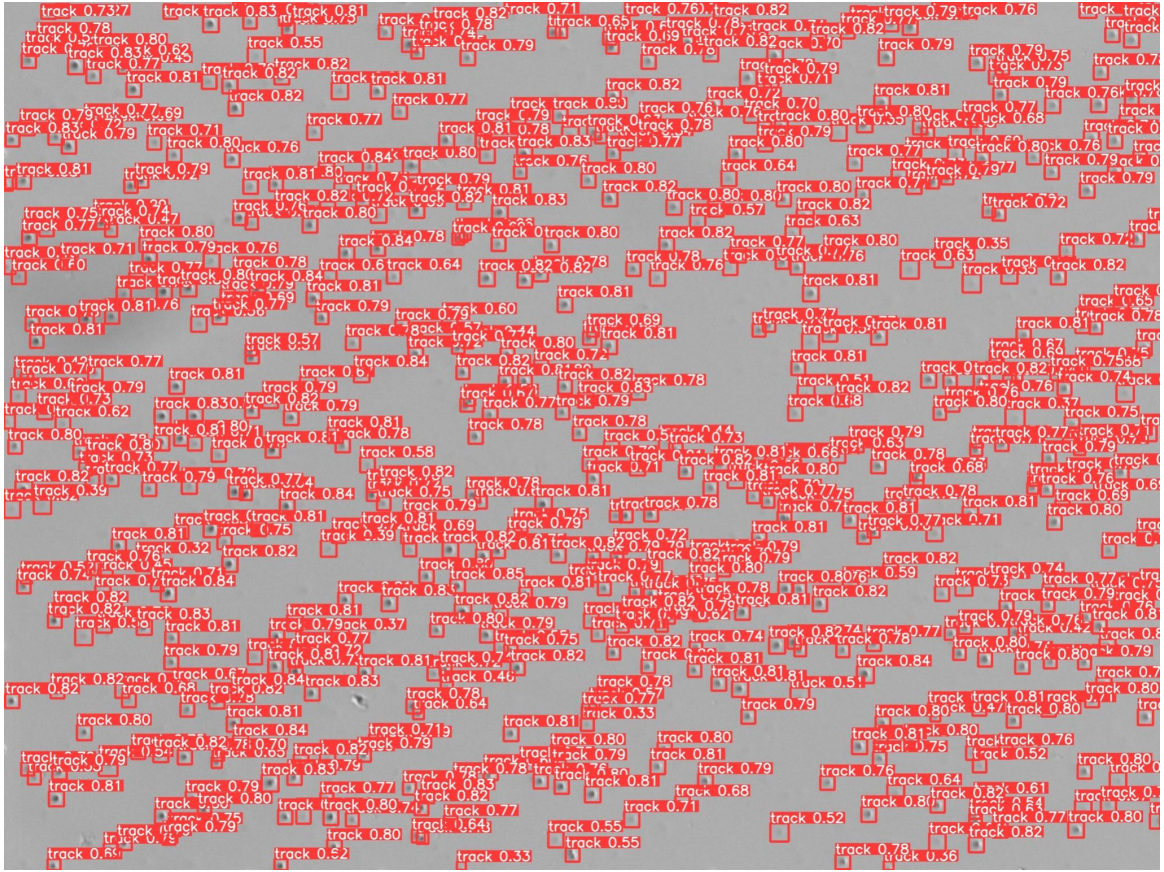
"Faster R-CNN: Towards Real-Time Object Detection With Region Proposal Networks." arxiv

YOLOV library



"You Only Look Once: Unified, Real-Time Object Detection" arxiv

The Image



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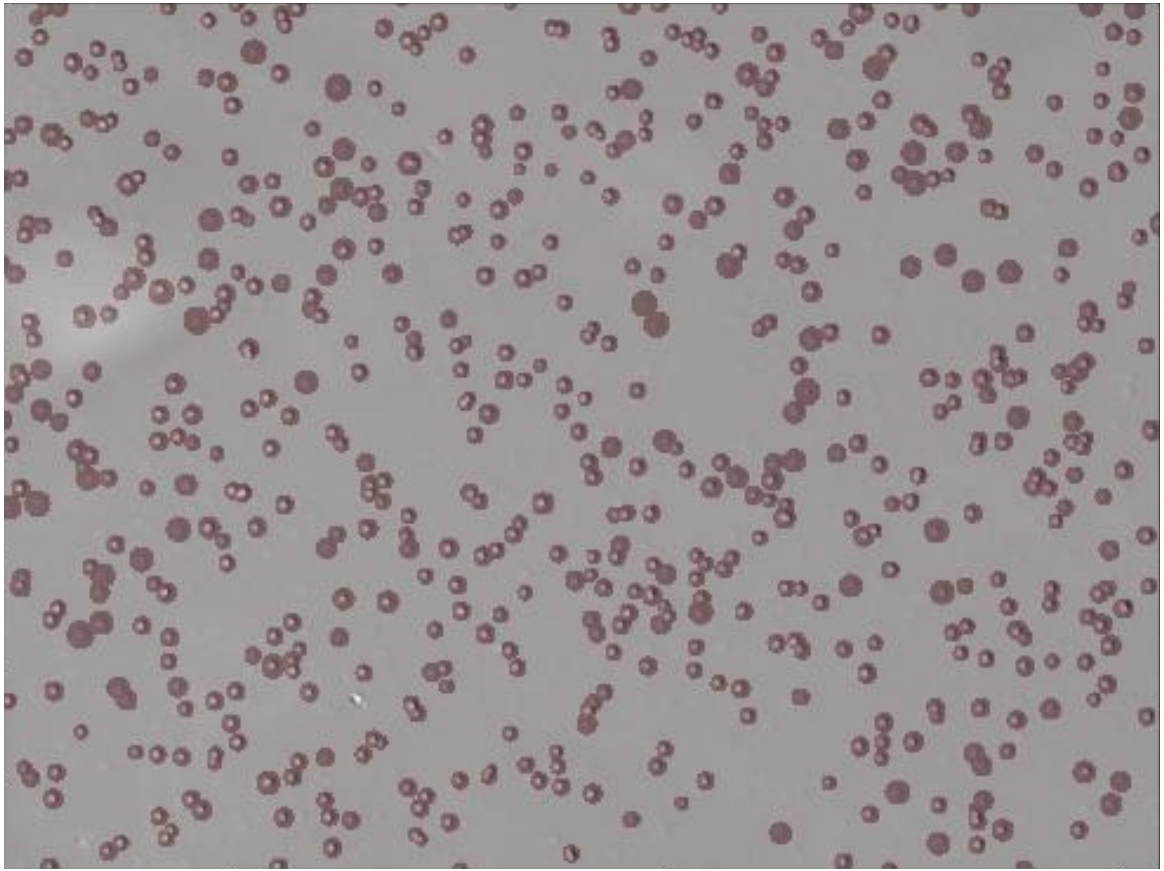

Next goals

We are **evaluating the accuracy** of the tested techniques

ongoing **thesis**

We are going to evaluate the performance of this technique on **data coming from other laboratories** (Argentina)

We will evaluate **Mask-RCNN** to separate cells from tracks

Time for questions!

ian.postuma@pv.infn.it