



Supplement of

AI-Track-tive: open-source software for automated recognition and counting of surface semi-tracks using computer vision (artificial intelligence)

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AI-Track-tive offline

* How to install?

- download AI-Track-tive project on <https://github.com/SimonNachtergaele>
- follow instructions for Windows, Mac-OS or Linux
- open .exe file or run Python code in Python code editor

* Determines track density in apatite/mica (tutorial available)

- load .weights file (DNN for apatite) from **option A or B**
- load .weights file (DNN for mica) obtained in **option A or B**
- load Yolov3 configuration file (.cfg)
- select reflected light and transmitted light images of apatite and/or ED
- select Region Of Interest: square, custom polygon or circle
- manual check of the automatic track identification results

* Live fission track recognition (tutorial available)

* Etch pit diameter (D_{par}) measurement (tutorial available)

Option A: Use our Deep Neural Networks

- free to download on <https://github.com/SimonNachtergaele>

Option B: Make your own Deep Neural Network

* Create training dataset using Labelimg

- download Labelimg on <https://github.com/tzutalin/labelimg>
- annotate tracks in 50 apatite images
- annotate tracks in 50 external detector images

* Execute Jupyter notebook in Google Colab

- download Jupyter notebook (.ipynb) on <https://github.com/SimonNachtergaele>
- connect to Google Colab
- iterate
- download .weights file from Google Drive

Graphical User Interface (GUI)

Insert all the necessary information below

Enter the location of the deep neural network for apatite. For yolov3 DNN's, this is a file ending on .weights
E:\Machine learning FT\AI-Track-tive\ApNikonGent3000t50im.weights

Enter the location of the deep neural network for mica. For yolov3 DNN's, this is a file ending on .weights
E:\Machine learning FT\AI-Track-tive\MicaNikonGent2000t50im.weights

Enter the location of the configuration file from the neural network. For yolov3 DNN's, this is a file ending on .cfg
E:\Machine learning FT\AI-Track-tive\yolov3_testing.cfg

Enter the output directory below
E:\Machine learning FT\AI-Track-tive\OUTPUT

How wide is your image in pixels? (use dots and no commas as a decimal separator)
1608.0

How wide is your image in micrometer? (use dots and no commas as a decimal separator)
117.5

What is your screen resolution? (e.g. 1200x900)
1920x1080

Click here if you want to save the above information

count tracks and review manually

perform dpar measurement

let the apatite DNN find tracks on my live screen

make (yolov3) .txt files by annotating the tracks

show instruction windows

Continue



AI-track-tive v1.9

Enter the name for your sample/grain:

Select the type of sample:

apatite + external detector (EDM)

only external detector (EDM)

only apatite (LA-ICP-MS based FT dating)

Specify your region of interest:

square of 100µm on 100µm

custom polygon

Enter the coordinates for your custom polygon here:
e.g. (0,0,680,0,680,680,0,680)

circular

Circle diameter in µm: (max 100µm)

Select the microscopy images:

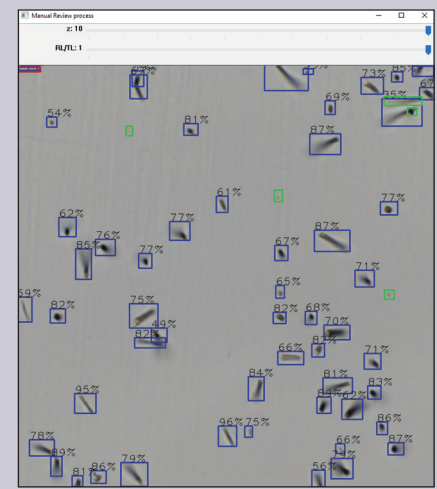
Select 1 apatite transmitted light image (or 2 for z-stack)

Select 1 apatite reflected light image

Select 1 mica transmitted light image (or 2 for z-stack)

Select 1 mica reflected light image

Continue



Insert DNN and other info

Select images

Review the results