GEOCHRONOLOGY
Discussions

Open Access

EGU

Interactive comment on "Technical note: AI-Track-tive: automated fission track recognition using computer vision (Artificial Intelligence)" *by* Simon Nachtergaele and Johan De Grave

David M. Chew (Referee)

chewd@tcd.ie

Received and published: 31 October 2020

This review is really about the software - not the manuscript itself. I am recommending major revisions to the software, and a phase of beta testing by a few labs prior to resubmission. This software has the potential to be a game changer in automated track recognition, but the version I tried needs a more work (added functionality and bug fixes).

The other approach to automated fission track mapping (the coincidence mapping approach of Andy Gleadow) uses the complementary nature of the information stored in transmitted versus reflected light images to discriminate fission tracks from non-track

features. This approach uses an AI approach (a deep neural network) to try and recognise semi-tracks, much like how a human operator would assess a track in transmitted light.

However when counting tracks, a human operator does both. They toggle on and off the reflected light image, and focus up and down the track in transmitted light to confirm that it is a true track. It would be great if the AI approach could also incorporate information from the reflected light image, but I appreciate this could be challenging to implement. However as currently stands, there is no possibility in this software of even seeing the reflected light image. This will make life difficult for users who also rely on reflected light for track identification (which I imagine is the vast majority of fission trackers). The ability to toggle on / off the reflected light image is simply 100% essential, as is the ability to scroll through the z stack. So when the user is presented with the grain and the AI-identified tracks, they must be able to press a key (say the space bar) which toggles on / off the reflected light image, and when in transmitted light they must be able to scroll through the z-stack (e.g. with the mouse wheel) with the identified tracks still marked. Otherwise the user simply does not have enough information to identify the tracks manually. From my point of view, these additions are so essential that the software must include them for acceptance of the article.

I also had quite a bit of difficulty getting the software to work. Firstly, on my desktop PC the mouse functionality did not work. I could draw a region of interest (polygon) but I could not see its edges. Neither could I add or remove tracks in the post-processing step using the mouse. I think prior to resubmitting the authors should send the software around a few labs, and ask other FT workers to check for bugs and to make sure that all the required functionality (such as a reflected light toggle, scrolling through the z-stack) is added.

A final question – can the software learn from the user manually adding or deleting tracks?

C3