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Targeting and Tracking biological cells in microscopy time lapse videos be deep learnng algorithms

Wednesday 1 January 2025 09:25 (5 minutes)

Targeting a large number of biological cells or even substructures of cells at an ion microbeam requires a robust detection algorithm that is able to differentiate and track cells in their various states from low contrast micrographs. A similar requirement exists for an automated, individual cell identification, characterisation and tracking in order to follow up cellular reactions after irradiation by ionizing radiation or after treatment by any other cell manipulating treatment. It will allow new qualities of research in radiobiology and other fields where the reaction of cells on hazard or any kind of manipulating treatment is studied on the cell level. We propose to develop and use deep learning algortihms for cell classification, identification and cell tracking in time lapse micrographs. First results on the way to automated cell classification and identification by faster RCNN algorithms have already been obtained (S. Rudigkeit et al, submitted).

List of Committees:

Please describe your expertise/areas in which you would like to contribute / advise.

radiobiology, cell biology, ion-soliod state interaction, ion beam irradiaiton and analysis, positron annihilation lifetime spectroscopy

Do you consent to the data usage and public abstract data posting in the ErUM-Data Community Information Exchange?

Yes

In ErUM-Data, what kind of data are you dealing with?

Microscope images from phase contrast, flouorescence microscopy and super resoluton microscopy

What is your expertise in computing and / or software development?

some developments in CNN and RCNN algortihms to be applied on cell identification, classification and tracking in microscope images and time lapse videos

What is your field and role?

Prof. G. Dollinger: Head of institute "applied physics and measuremnet technology"
Prof. J. Reindl: Junior professor biomedical radiation physics

Your ErUM - Committee is

KFSI - Komitee für Forschung mit nuklearen Sonden und Ionenstrahlen

Please describe areas in which you can contribute to "data handling" teaching.

Application of deep learning algortithms to radiobiology and cell biology

My current most burning research question, I like to find partners for, is:

Targeting and Tracking biological cells in microscopy time lapse videos be deep learnng algorithms

Please describe areas in which you would like to improve your knowledge / skills.

optimesd deep learning algorithms for cell identification, classification and tracking in microscope images and time lapse videos

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