An easy-to-use platform is a gateway to AI in microscopy

April 23 2021

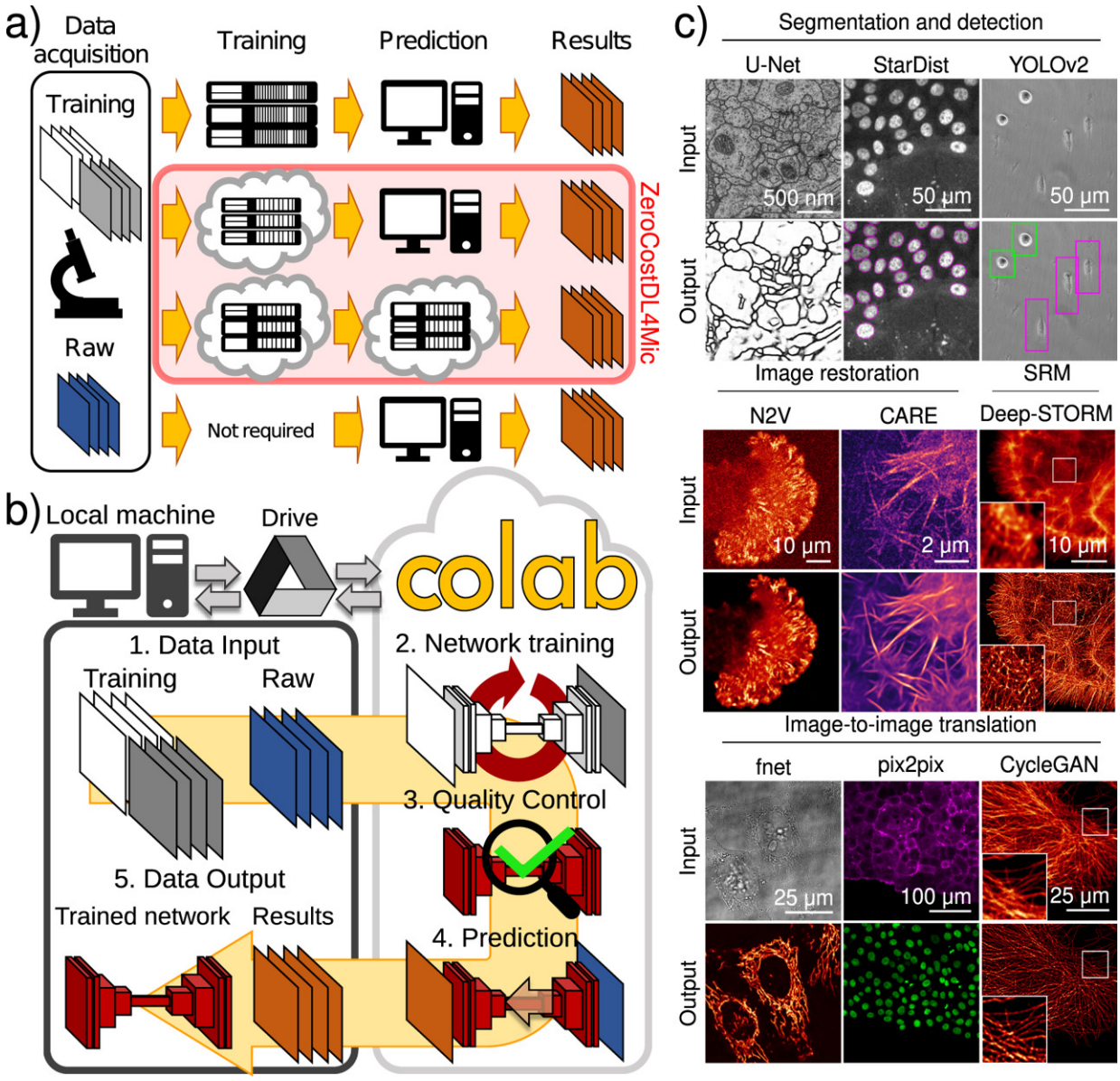

Fig. 1: Using DL for microscopy. Credit: *Nature Communications* (2021). DOI: 10.1038/s41467-021-22518-0

A new, freely available platform helps non-experts use artificial intelligence to analyze microscopy images. The platform has been developed at Åbo Akademi University in Finland and Instituto Gulbenkian de Ciência, Portugal, and will be of big help in research and diagnostics using modern day microscopes.

Software using artificial intelligence, AI, is revolutionizing how microscopy images are analyzed. For instance, AI can be used to detect features in images (i.e., tumors in biopsy samples) or improve the quality of images by removing unwanted noise. However, non-experts continue to find AI technologies difficult to use.

In the article "Democratizing deep learning for microscopy with ZeroCostDL4Mic," published in *Nature Communications* on 15 April 2021, researchers describe a platform called ZeroCostDL4Mic, which makes these AI technologies accessible to everyone.

"The key novelty is that ZeroCostDL4Mic runs in the cloud for free and does not require users to have any coding experience or advanced computational skills. Effectively, it runs on any computer that has a web browser," says Guillaume Jacquemet, Senior Researcher in Cell Biology at Åbo Akademi University.

Over the last 400 years, microscopes have allowed mankind to observe objects that are otherwise too small to be seen with the naked eye. Today, microscopy is a leading technology used worldwide to perform not only research but also diagnostics.

Modern microscopes are directly connected to digital cameras, leading to the acquisition of hundreds to thousands of images per sample. These images need to be processed on a computer to gain meaningful data, which is a huge undertaking.

To help with the number of images, Jacquemet and his colleagues have used AI to train a machine to do the work. In practice, ZeroCostDL4Mic is a collection of self-explanatory notebooks for Google Colab, featuring an easy-to-use graphical user interface.

"We believe that ZeroCostDL4Mic will acts as 'a gateway drug' for AI, luring users to explore these new technologies that will transform biomedical research and diagnostics in the decades to come," says Jacquemet.

The development of the ZeroCostDL4Mic platform was coordinated by Guillaume Jacquemet's (Åbo Akademi University, Turku, Finland) and Ricardo Henriques' laboratories (Instituto Gulbenkian de Ciência, Oeiras, Portugal). It involved a large international consortium encompassing 12 laboratories, spread across nine countries and two continents.

ZeroCostDL4Mic is freely available online.

More information: Lucas von Chamier et al. Democratising deep learning for microscopy with ZeroCostDL4Mic, *Nature Communications* (2021). DOI: 10.1038/s41467-021-22518-0

Provided by Abo Akademi University