

Artificial intelligence enables autonomous microscopy workflows

V. Schweikhard¹

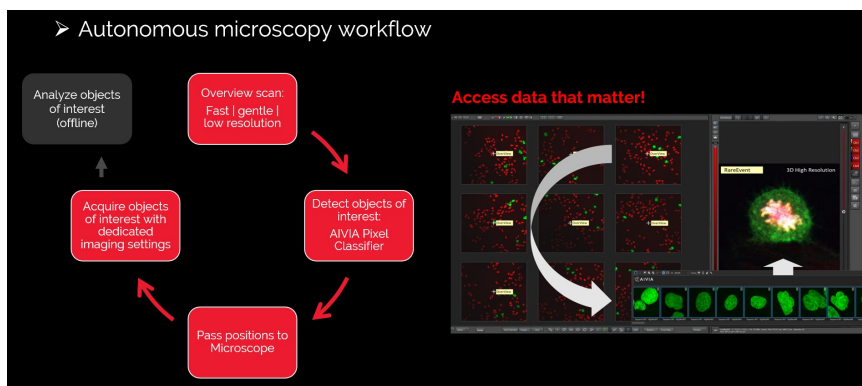
¹ Leica Microsystems CMS GmbH, Am Friedensplatz 3, 68165 Mannheim (Germany), email: volker.schweikhard@leica-microsystems.com.

Abstract

Advances in hardware and software technology are revolutionizing the world by enabling Artificial Intelligence (AI) tools to simplify daily life tasks, such as searching tools, voice assistants, autonomous vehicles etc.

Researchers now have access to such tools as well. AI tools for image analysis have been developed in order to enable researchers to segment objects which cannot be detected by standard procedures or which could only be detected by manual segmentation or counting.

We will discuss how such tools can now be incorporated into the microscopy workflow, in order to enable researchers to gather the data they need in the easiest way possible, and to expand the capabilities of state-of-the-art instruments for experiments that were previously not possible due to time and/or complexity.



Schematic of an autonomous microscopy workflow for rare event detection. First, fast, gentle, low-resolution overview scans are acquired. These are then analysed for the presence of objects of interest using artificial intelligence tools. The coordinates of the detected objects are passed back to the microscope, and objects of interest are re-imaged with dedicated imaging settings according to the requirements of the user.