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Printed in Japan (2002)T

Code No. 2CE-XXXX-1

This brochure is printed on recycled paper made from 40% used material.

Shedding New Light On **MICROSCOPY**

AI. software solutions

NIS-Elements imaging software module

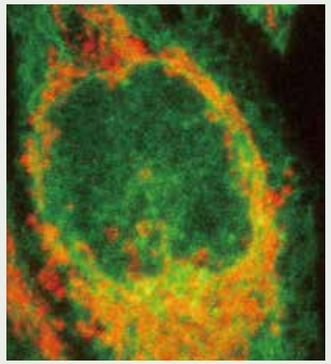
AI. software solutions

Pre-trained AI

Denoise.ai

Remove shot noise from resonant confocal images

High-speed resonant scanning enables ultra-short dwell times, reducing phototoxicity even during extended periods of timelapse imaging. However, resonant confocal images contain shot noise as a result of sampling.
With Denoise.ai , the network has been trained to recognize common patterns of shot noise and remove them from resonant confocal data sets. This trained AI algorithm can be used for noise removal in real time. It can greatly improve signal-to-noise ratios (SNR) without requiring line averaging, even when scanning with very short exposure times.



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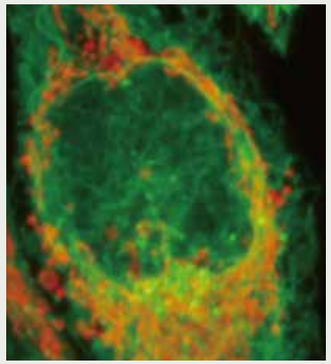
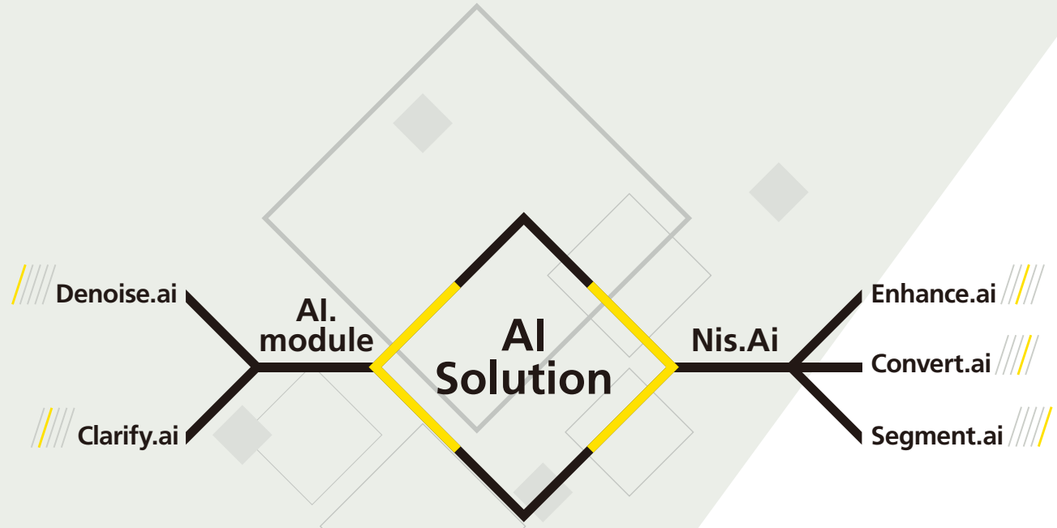


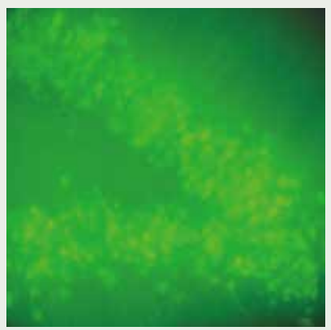
With Denoise.ai



Clarify.ai

Remove out-of-focus blur from fluorescence images

During widefield imaging, especially of thick 3D samples, image sharpness may be impaired by blurring caused by signals from sources other than the focal plane.
With Dehaze.ai, the trained AI algorithm allows the user to remove the out-of-focus blur from the image in real time. It enables acquisition of clear, haze-free images from deep within a sample without requiring traditional deconvolution even when signals are weak, and greatly reduces photo toxicity.



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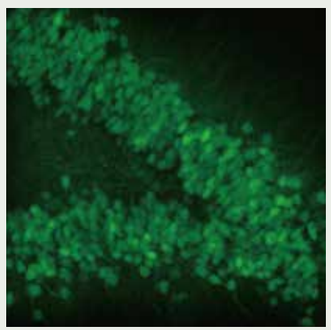


With Clarify.ai

- Provides bright, uniform illumination across an unprecedented 25 mm field of view that maximizes the sensor area of large-format CMOS cameras and significantly improves data throughput
- The hardware-triggering capabilities of Ti2-E enhance even the most challenging, high-speed imaging applications

Motorized Inverted Microscope

ECLIPSE Ti2-E

- When used with the Ti2-E, the A1R HD25 is capable of 25mm FOV images, enabling increased screening analysis throughput and large image stitching
- Equipped with both a resonant scanner capable of a maximum ultrafast imaging speed of 720 fps and a galvano scanner capable of a maximum imaging resolution of 4096 x 4096 pixels.

Confocal Microscope

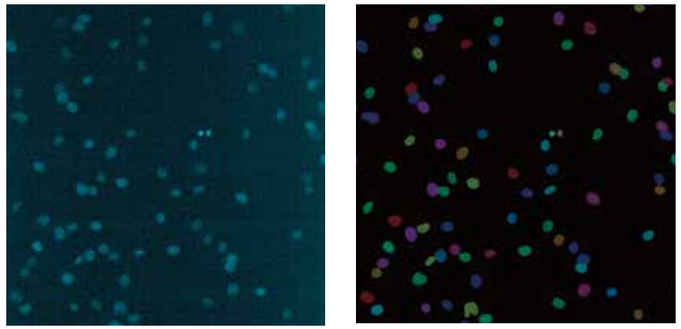
A1R HD25

User-trainable AI

Enhance.ai

Restores details in under-exposed images

Imaging of dim fluorescent samples or applications that require low-level light exposure typically result in compromised image quality with poor signal-to-noise ratio. Enhance.ai learns what a high signal-to-noise image looks like by comparing under-exposed and optimally-exposed images. Enhance.ai can then restores details in under-exposed or dim fluorescent images, enabling researchers to gain more insights from their low signal imaging applications.

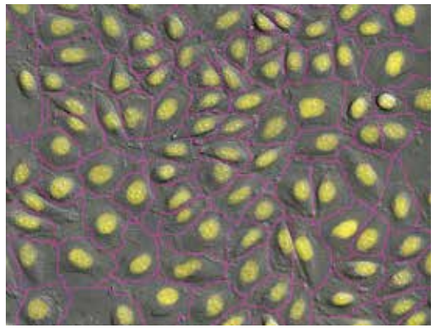


Original

Enhance.ai

DAPI stained nuclei are purposefully underexposed to limit the specimen's exposure to near-UV light. Enhance.ai is used to restore the signal-to-noise ratio to normally exposed DAPI staining, for easy segmentation and counting.

Original



With Convert.ai

DAPI staining of nuclei is a common method allowing cell counting and segmentation. Convert.ai can be trained to predict where the DAPI label is present in DIC or phase images. This predicted channel can then be used for segmentation and counting, without ever having to label the specimen with DAPI or acquire a fluorescence channel.

Convert.ai

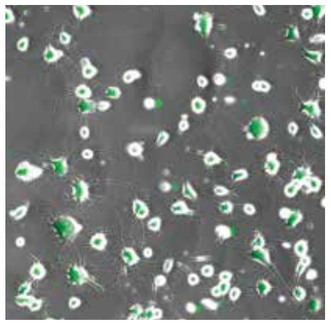
Predicts DAPI label locations based on unstained images

Convert .ai learns associated patterns present in two different imaging channels. After training, Convert.ai can then predict the pattern in the second channel even when presented with only the first channel. DAPI-based staining of nuclei is a common method for cell segmentation and counting. Convert.ai can be trained to predict where the DAPI label would be based on unstained DIC or phase-contrast images. This enables users to perform nuclei-based image analysis without having to stain samples with DAPI or acquire a fluorescent channel.

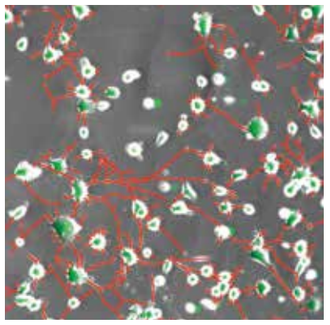
Segment.ai

Segments structures that cannot be identified by traditional thresholding

Segment.ai enables complex structures to be easily identified and segmented. Neurites in phase-contrast images are traditionally difficult to define by classic thresholding. Segment.ai can be trained with a small subset of hand-traced neurites to automatically detect and segment neurites from thousands of untraced datasets.



Original



Segment.ai

Neurites in phase-contrast were not possible to define accurately by traditional thresholding. Segment.ai was trained on hand-traced neurites (human recognized) and learned how to trace neurites in subsequent images.

Expands the NIS-Elements platform by incorporating tailor-made solutions for acquisition, visualization and analysis

Enhance.ai/Convert.ai/Segment.ai employs convolutional neural networks (CNNs) to learn from labeled training data created by either conventional segmentation or human-assisted tracing of small subsets of representative samples. When using the module, the software interface makes it easy to apply complex deep learning to sample data, eliminating the need to design a complex neural network and apply training data to it.

Automated tools take this training data and apply it to the neural network to recognize patterns. The resulting training recipe can then be applied repeatedly and reliably to similar samples to process or analyze huge volumes of data at significantly faster speeds than traditional techniques.