

IKOSA®

Application Documentation

Application Name	CAM Grid Assay
Version	1.1.0
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Input Image(s)	Single Image
Input Parameter(s)	None
Keywords	CAM, grid, onplant, chorioallantoic membrane, in-vivo, angiogenesis, chick, vessel, growth, microscopy, assay
Short Description	Segmentation of new blood vessels on polymerized grids ("onplants") placed on chick chorioallantoic membrane assay used in in-vivo angiogenesis research.
References / Literature	For more information regarding the assay check e.g. https://www.ncbi.nlm.nih.gov/pubmed/19007659

Table of Contents

IKOSA® Image Analysis	2
Application Description	2
Sample Data and Further Information	2
Requirements	3
Input Image(s)	3
Input Parameter(s)	3
Results	4
Files	4
Description of files	4



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IKOSA® Image Analysis

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Application Description

This application automatically measures the number and sizes of blood vessels in microscopy images that are taken from CAM Assay samples. The application is optimized for detecting new blood vessels that grow through polymerized grids (onplants) placed on the CAM small vessels. Since the focus is on neoangiogenesis, larger vessels in the background are not detected.

Sample Data and Further Information

Sample Data: To try out this application, sample images can be downloaded here: https://drive.google.com/open?id=1WnUnZr4gbXp6-vpEvPfla8yBqW_Ko3-P.

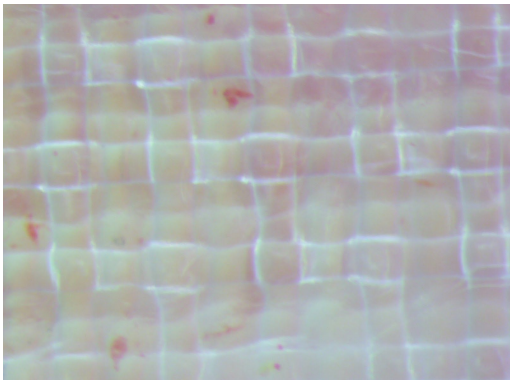
If you have any questions regarding this application or if you want to know if your specific type of images can be analyzed, please get in touch with us at support@kmlvision.com. Also, if you have requests or ideas regarding additional image analysis applications that you would require, please get in touch with us at support@kmlvision.com.

For more information, please visit www.ikosa.ai.

Requirements

Input Image(s)

Input for this application is the following image data:

No .	Image data	Type of image	Color Channels	Color Depth (per channel)	Size [Px]	Resolution [$\mu\text{m}/\text{Px}$]
#1	Single image	Standard	3 (RGB)	8 Bit	Min: 128 x 128 Max: 6680 x 5239	Min: 0.8 Max: 1.2
<p>Image Content: Microscopy image of CAM Assay region with typically 40x magnification and usage of polarisation filter.</p> <p>Additional requirements:</p> <ul style="list-style-type: none"> • The background must be yellow to orange, avoid red background. • Use a polarisation filter while imaging. <p>Examples</p> 						

For all images, the following requirements apply:

- The illumination must be constant throughout the image(s).
- The sample must be in focus, i.e. no blurry regions in image(s).

Input Parameter(s)

No additional input parameters are required for this application.

Results

Files

No.	File type	Content and Description
1	csv	<i>segmentation_stats.csv</i> : Coverage of conidia/hyphae for each well. See also below (Description of files).
2	jpg	<i>segmentation.jpg</i> : An image containing for each pixel a confidence value in the range 0-255 for being a vessel ("prediction").
3	jpg	<i>results_visualization.jpg</i> : A combined visualization of the original image, the prediction, and an overlay of original image and prediction..

Description of files

File no. 1: Single csv-file with the following content (*segmentation_stats.csv*):

Col. no.	Column name	Examples	Value range	Description
1	total vessel area [pixel]	3668	0 - #of pixels in image	Total area of detected vessels in pixel.
2	number of vessels	7	>=0	Number of vessels detected.
3	mean vessel area [pixel]	524.0	0 - #of pixels in image	Mean size of vessels in pixels.
4	median vessel area [pixel]	336.0	0 - #of pixels in image	Median size of vessels in pixels.
5	mean CNN prediction intensity	0.00708	0 - 1	Mean intensity of prediction in image. A value 0 means no vessels, while 1 would mean that everything is covered by vessels.
6	number of vessels (threshold 0.1)	11	>=0	Number of vessels detected for alternative threshold of prediction (0.1).
7	mean vessel area (threshold 0.1) [pixel]	572.6	0 - #of pixels in image	Mean size of vessels in pixels for alternative threshold of prediction (0.1).
8	median vessel area (threshold 0.1) [pixel]	490.0	0 - #of pixels in image	Median size of vessels in pixels for alternative threshold of prediction (0.1).