

# Supplementary Information

## **Semi-automatic organelle detection on transmission electron microscopic images**

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Table S1. An example of selected features for mitochondria detection as shown in Figure 2.

Feature#	Window size	Description
46	Original	Kurtosis of intensity distribution of the original image in the region of binary image by Otsu's method
64	Original	Angle parallelness of the fitted ellipse of the blobs in the Sobel filtered and binary image by Otsu's method
122	Original	Mean intensity of the Sobel filtered image in the region of the Sobel filtered and binary image by 50 percentile
140	Original	$\Sigma$ (Minor axis length of the fitted ellipse of the blob in the binary image by mean intensity $\cdot$ Area of the blob in the binary image by mean intensity)
172	Original	Angle parallelness of the fitted ellipse of the blobs in the Sobel filtered and binary image by mean intensity
176	Original	Mean intensity of the Sobel filtered image in the region of Sobel filtered and binary image by mean intensity
189	Original	Noc1Sd, one of the statistical geometric features in the original image
211	Original	Inrt1Avg, one of the statistical geometric features in the original image
216	Original	TArea0Mean, one of the statistical geometric features in the original image
227	Original	CArea1Avg, one of the statistical geometric features in the original image
270	Original	CArea0Max, one of the statistical geometric features in the Sobel filtered image
283	Original	Range of coefficient of the ring in the image correlation spectrometry ( $r_0 = 2$ pixels, $r_1 = 4$ pixels) in the original image
29	Enlarged	Minor axis length of the fitted ellipse of the binary image by Otsu's method
61	Enlarged	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the Sobel filtered and binary image by Otsu's method $\cdot$ Area of the blob in the Sobel filtered and binary image by Otsu's method) / Area of the region of the Sobel filtered and binary image by Otsu's method
89	Enlarged	$\Sigma$ (Minor axis length of the fitted ellipse of the blob in the binary image by 50 percentile $\cdot$ Area of the blob in the binary image by 50 percentile) / Area of the binary image by 50 percentile
200	Enlarged	Disp0Mean, one of the statistical geometric features in the original image
239	Enlarged	Wlrgl0Avg, one of the statistical geometric features in the Sobel filtered image
254	Enlarged	Inrt0Max, one of the statistical geometric features in the Sobel filtered image
255	Enlarged	Inrt0Avg, one of the statistical geometric features in the Sobel filtered image
275	Enlarged	CArea1Avg, one of the statistical geometric features in the Sobel filtered image

Table S2. An example of selected features for amyloplast detection as shown in Figure 3.

Feature#	Window size	Description
14	Original	Modal range in the Sobel filtered image
33	Original	$\Sigma$ (Minor axis length of the fitted ellipse of the blob in the binary image by Otsu's method $\cdot$ Area of the blob in the binary image by Otsu's method) / $\Sigma$ (Major axis length of the fitted ellipse of the blob in the binary image by Otsu's method $\cdot$ Area of the blob in the binary image by Otsu's method)
112	Original	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the Sobel filtered and binary image by 50 percentile $\cdot$ Area of the blob in the Sobel filtered and binary image by 50 percentile)
144	Original	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the binary image by mean intensity $\cdot$ Area of the blob in the binary image by mean intensity) / $\Sigma$ (Minor axis length of the fitted ellipse of the blob in the binary image by mean intensity $\cdot$ Area of the blob in the binary image by mean intensity)
195	Original	Wlrgl1Avg, one of the statistical geometric features in the original image
218	Original	TArea1Max, one of the statistical geometric features in the original image
230	Original	Noc0Max, one of the statistical geometric features in the Sobel filtered image
244	Original	Wlrgl1Mean, one of the statistical geometric features in the Sobel filtered image
254	Original	Inrt0Max, one of the statistical geometric features in the Sobel filtered image
265	Original	TArea0Sd, one of the statistical geometric features in the Sobel filtered image
266	Original	TArea1Max, one of the statistical geometric features in the Sobel filtered image
16	Enlarged	Standard deviation of intensity distribution – Modal range in the Sobel filtered image
77	Enlarged	Mean area of the blobs in the binary image by 50 percentile
119	Enlarged	Minimum intensity of the Sobel filtered image in the region of the Sobel filtered and binary filtered image by 50 percentile
166	Enlarged	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the Sobel filtered and binary image by mean intensity $\cdot$ Area of the blob in the Sobel filtered and binary image by mean intensity)
184	Enlarged	Noc0Mean, one of the statistical geometric features in the original image
197	Enlarged	Wlrgl1Sd, one of the statistical geometric features in the original image
205	Enlarged	Disp1Sd, one of the statistical geometric features in the original image
258	Enlarged	Inrt1Max, one of the statistical geometric features in the Sobel filtered image
274	Enlarged	CArea1Max, one of the statistical geometric features in the Sobel filtered image

Table S3. An example of selected features for chloroplast detection as shown in Figure 4.

Feature#	Window size	Description
22	Original	Area of the binary image by Otsu's method
127	Original	Kurtosis of intensity distribution of the Sobel filtered image in the region of the Sobel filtered and binary image by 50 percentile
152	Original	Standard deviation of intensity distribution of the original image in the region of the binary image by mean intensity
166	Original	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the Sobel filtered and binary image by mean intensity $\cdot$ Area of the blob in the Sobel filtered and binary image by mean intensity)
173	Original	Minimum intensity of the Sobel filtered image in the region of the Sobel filtered and binary image by mean intensity
189	Original	Noc1Sd, one of the statistical geometric features in the original image
216	Original	TArea0Mean, one of the statistical geometric features in the original image
227	Original	CArea1Avg, one of the statistical geometric features in the original image
238	Original	WIrgl0Max, one of the statistical geometric features in the Sobel filtered image
264	Original	TArea0Mean, one of the statistical geometric features in the Sobel filtered image
266	Original	TArea1Max, one of the statistical geometric features in the Sobel filtered image
294	Original	Maximum coefficient of the ring in the image correlation spectrometry ( $r_0 = 5$ pixels, $r_1 = 7$ pixels) in the original image / Mean intensity of the original image
20	Enlarged	Threshold intensity by Otsu's method
51	Enlarged	Contour length of the blobs in the Sobel filtered and binary image by Otsu's method
140	Enlarged	$\Sigma$ (Minor axis length of the fitted ellipse of the blob in the binary image by mean intensity $\cdot$ Area of the blob in the binary image by mean intensity)
183	Enlarged	Noc0Avg, one of the statistical geometric features in the original image
248	Enlarged	Disp0Mean, one of the statistical geometric features in the Sobel filtered image
270	Enlarged	CArea0Max, one of the statistical geometric features in the Sobel filtered image
282	Enlarged	Maximum coefficient of the ring in the image correlation spectrometry ( $r_0 = 2$ pixels, $r_1 = 4$ pixels) in the original image / Mean coefficient of the ring in the image correlation spectrometry ( $r_0 = 2$ pixels, $r_1 = 4$ pixels) in the original image
286	Enlarged	Range of coefficient of the ring in the image correlation spectrometry ( $r_0 = 2$ pixels, $r_1 = 4$ pixels) in the original image / Mean coefficient of the ring in the image correlation spectrometry ( $r_0 = 2$ pixels, $r_1 = 4$ pixels) in the original image

Table S4. An example of selected features for etioplast detection as shown in Figure 5.

Feature#	Window size	Description
36	Original	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the binary image by Otsu's method $\cdot$ Area of the blob in the binary image by Otsu's method) / $\Sigma$ (Minor axis length of the fitted ellipse of the blob in the binary image by Otsu's method $\cdot$ Area of the blob in the binary image by Otsu's method)
102	Original	Numbers of the blobs in the Sobel filtered and binary image by 50 percentile
150	Original	Median of intensity distribution of the original image in the region of the binary image by mean intensity
246	Original	Disp0Max, one of the statistical geometric features in the Sobel filtered image
264	Original	TArea0Mean, one of the statistical geometric features in the Sobel filtered image
288	Original	Maximum coefficient of the ring in the image correlation spectrometry ( $r_0 = 5$ pixels, $r_1 = 7$ pixels) in the original image
294	Original	Maximum coefficient of the ring in the image correlation spectrometry ( $r_0 = 5$ pixels, $r_1 = 7$ pixels) in the original image / Mean intensity of the original image
3	Enlarged	Mean intensity in the original image
76	Enlarged	Area of the binary image by 50 percentile
80	Enlarged	Irregularity of the binary image by 50 percentile
82	Enlarged	Major axis length of the fitted ellipse of the binary image by 50 percentile
112	Enlarged	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the Sobel filtered and binary image by 50 percentile $\cdot$ Area of the blob in the Sobel filtered and binary image by 50 percentile)
151	Enlarged	Modal range of the original image in the region of the binary image by mean intensity
166	Enlarged	$\Sigma$ (Major axis length of the fitted ellipse of the blob in the Sobel filtered and binary image by mean intensity $\cdot$ Area of the blob in the Sobel filtered and binary image by mean intensity)
173	Enlarged	Minimum intensity of the Sobel filtered image in the region of the Sobel filtered and binary image by mean intensity
196	Enlarged	Wlrg11Mean, one of the statistical geometric features in the original image
216	Enlarged	TArea0Mean, one of the statistical geometric features in the original image
220	Enlarged	TArea1Mean, one of the statistical geometric features in the original image
223	Enlarged	CArea0Avg, one of the statistical geometric features in the original image
255	Enlarged	Inrt0Avg, one of the statistical geometric features in the Sobel filtered image

Table S5. An example of selected features for Golgi stack detection as shown in Figure 6.

Feature#	Window size	Description
2	Original	Intensity range in the original image
8	Original	Skewness of intensity distribution in the original image
26	Original	Irregularity of the binary image by Otsu's method
72	Original	Skewness of intensity distribution of the Sobel filtered image in the region of the Sobel filtered and binary image by Otsu's method
127	Original	Kurtosis of intensity distribution of the Sobel filtered image in the region of the Sobel filtered and binary image by 50 percentile
134	Original	Irregularity of binary image by mean intensity
158	Original	Mean area of the blobs in the Sobel filtered and binary image by mean intensity
200	Original	Disp0Mean, one of the statistical geometric features in the original image
231	Original	Noc0Avg, one of the statistical geometric features in the original image
39	Enlarged	Maximum intensity of the original image in the region of binary image by Otsu's method
40	Enlarged	Intensity range of the original image in the region of binary image by Otsu's method
75	Enlarged	Numbers of the blobs in the binary image by 50 percentile
116	Enlarged	$\Sigma$ (Minor axis length of the fitted ellipse of the blob in the Sobel filtered and binary image by 50 percentile $\cdot$ Area of the blob in the Sobel filtered and binary image by 50 percentile) / Area of the region of the Sobel filtered and binary image by 50 percentile
131	Enlarged	Mean area of the blobs in the binary image by mean intensity
185	Enlarged	Noc0Sd, one of the statistical geometric features in the original image
191	Enlarged	Wlrgl0Avg, one of the statistical geometric features in the original image
216	Enlarged	TArea0Mean, one of the statistical geometric features in the original image
227	Enlarged	CArea1Avg, one of the statistical geometric features in the original image
285	Enlarged	Maximum coefficient of the ring in the image correlation spectrometry ( $r_0 = 2$ pixels, $r_1 = 4$ pixels) in the original image / Mean intensity of the original image
294	Enlarged	Maximum coefficient of the ring in the image correlation spectrometry ( $r_0 = 5$ pixels, $r_1 = 7$ pixels) in the original image / Mean intensity of the original image

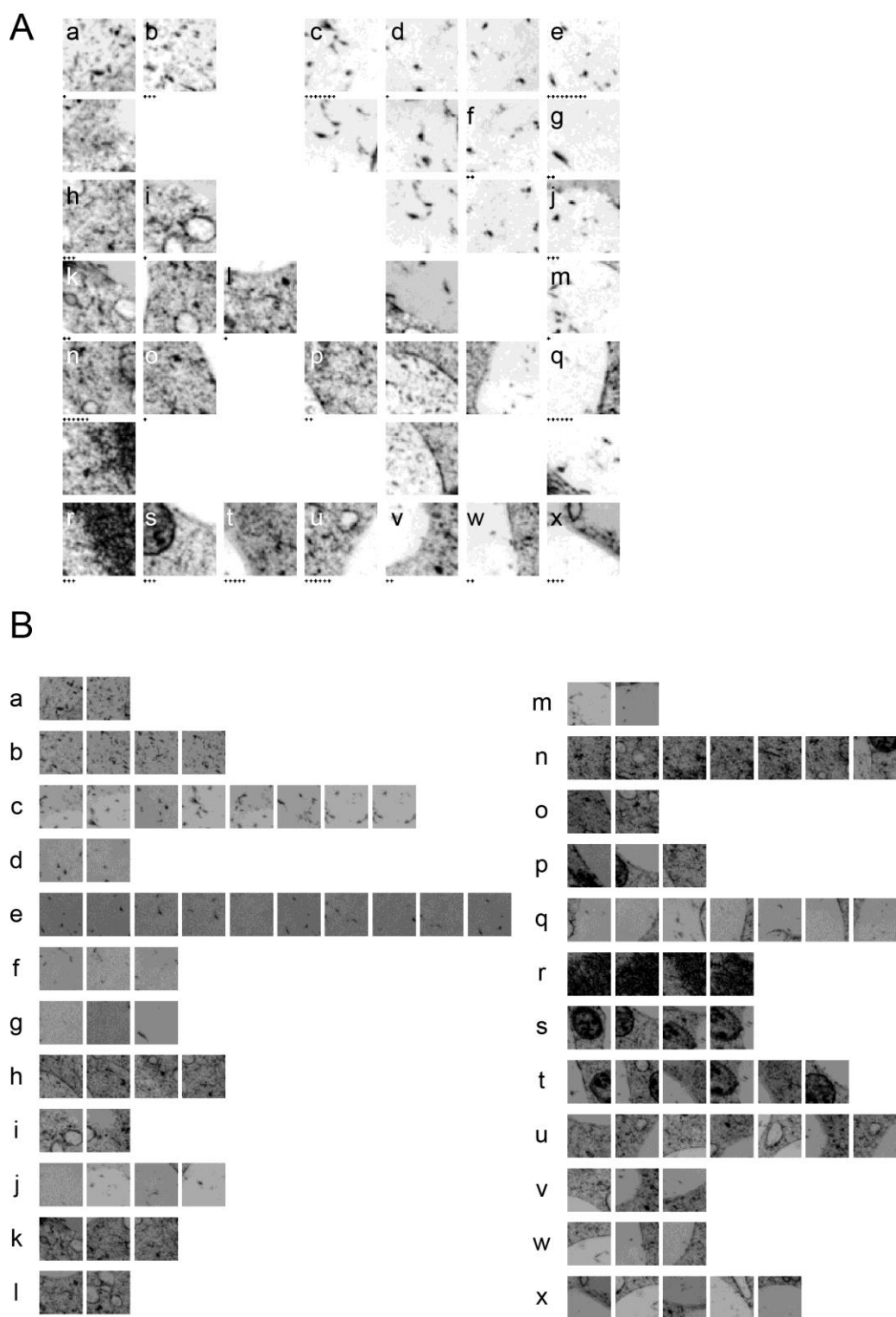


Figure S1. A tiled map and hidden windows. (A) The improved tiled map as shown in Figure 1B. Stars indicate number of hidden windows at each node. (B) The list of hidden windows at the node (a) – (x) in (A).