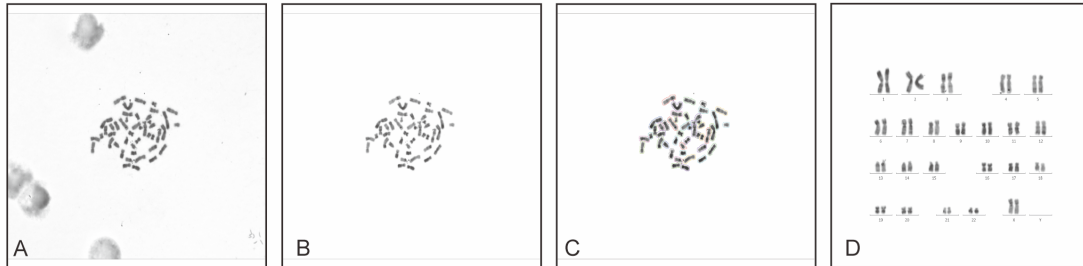
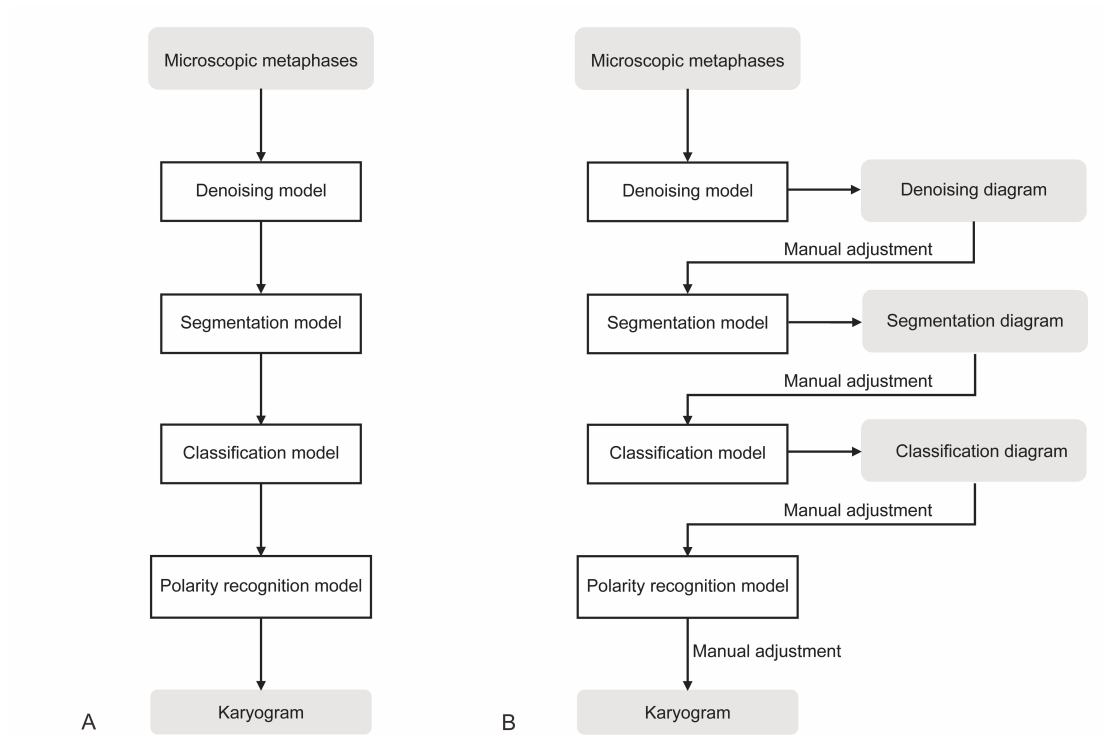


**Supplemental Digital Content, containing 2 figures and 3 tables. The Supplemental Digital Content was not copyedited by *Archives of Pathology & Laboratory Medicine*.**



**Supplemental Figure 1.** Example of a set of images exported from Ikaros system. (A) The original microscopic metaphases for the denoising and segmentation datasets, (B) the denoised metaphase used as reference for annotation, (C) the segmented metaphase used as reference for annotation, (D) the karyogram interpreted from the metaphase and used for the classification and polarity recognition dataset.



**Supplemental Figure 2.** Overview of the DNN-based integral karyotype analysis system with two strategies. (A) Workflow of the DNN-based integral karyotype analysis system with automatic strategies. (B) Workflow of the DNN-based integral karyotype analysis system with semi-automatic strategies.

**Supplemental Table 1.** Description of five-fold cross validation.

	Fold 1	Fold 2	Fold 3	Fold 4	Fold 5
Test 1	Testing	Validating	Training	Training	Training
Test 2	Training	Testing	Validating	Training	Training
Test 3	Training	Training	Testing	Validating	Training
Test 4	Training	Training	Training	Testing	Validating
Test 5	Validating	Training	Training	Training	Testing

**Supplemental Table 2. Dataset distribution.**

	Training set	Validation set	Test set
Image set ( <i>n</i> )	2,664	893	885
Denoising subset ( <i>n</i> )	2,664	893	885
Segmentation subset ( <i>n</i> )	2,664	893	885
Classification subset ( <i>n</i> )	2,664	893	885
Polarity recognition subset ( <i>n</i> )	2,664	893	885

**Supplemental Table 3.** The segmentation performance in the automatic strategy.

	Segmentation accuracy (%)
1	94.86
2	98.25
3	97.51
4	97.97
5	97.51
6	97.74
7	98.08
8	98.36
9	95.93
10	97.85
11	97.97
12	97.57
13	95.82
14	96.21
15	96.10
16	96.44
17	97.18
18	96.33
19	97.12
20	96.89
21	92.60
22	93.16
X	97.79
Y	91.02
Per image	96.67