A method for utilizing automated machine learning for histopathlogical classification of testis based on Johnsen scores

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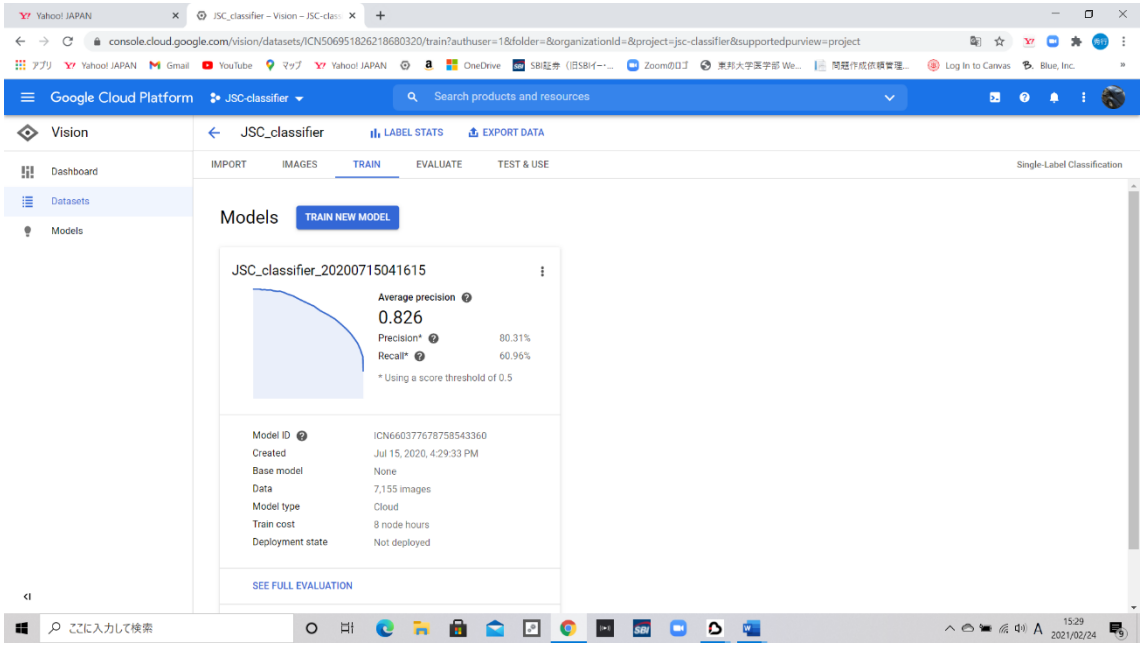
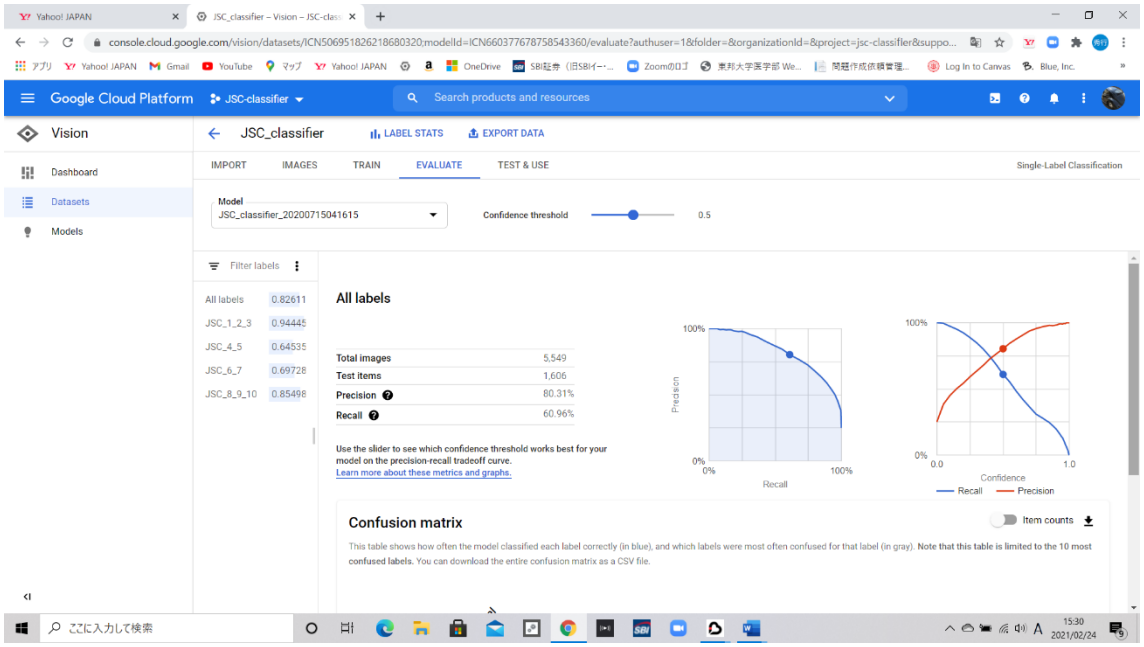
Supplementary data

All statistical analyses for JSC_classifier: an image dataset of 7155 magnification images (X400) and JSC_classifier_Part2: an image dataset of 9822 expansion images (5.0 X 5.0 cm)

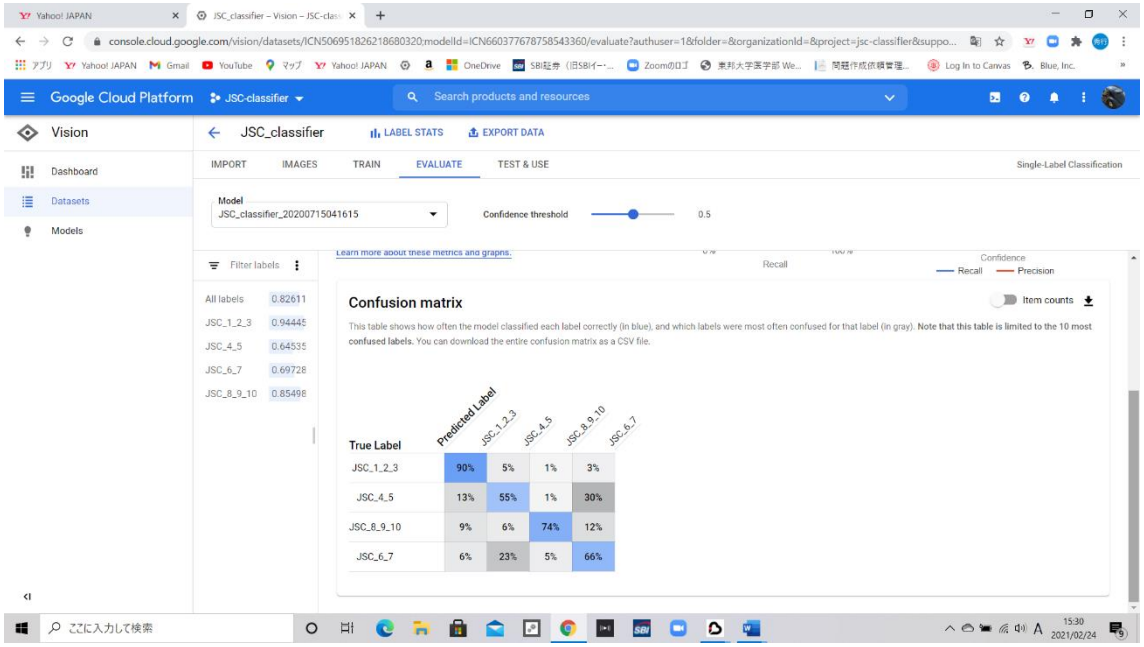
JSC_classifier: an image dataset of 7155 magnification images (X400)

The average precision (positive predictive value) of the algorithm was 82.6%, precision was 80.31%, and recall was 60.96% for all labels.

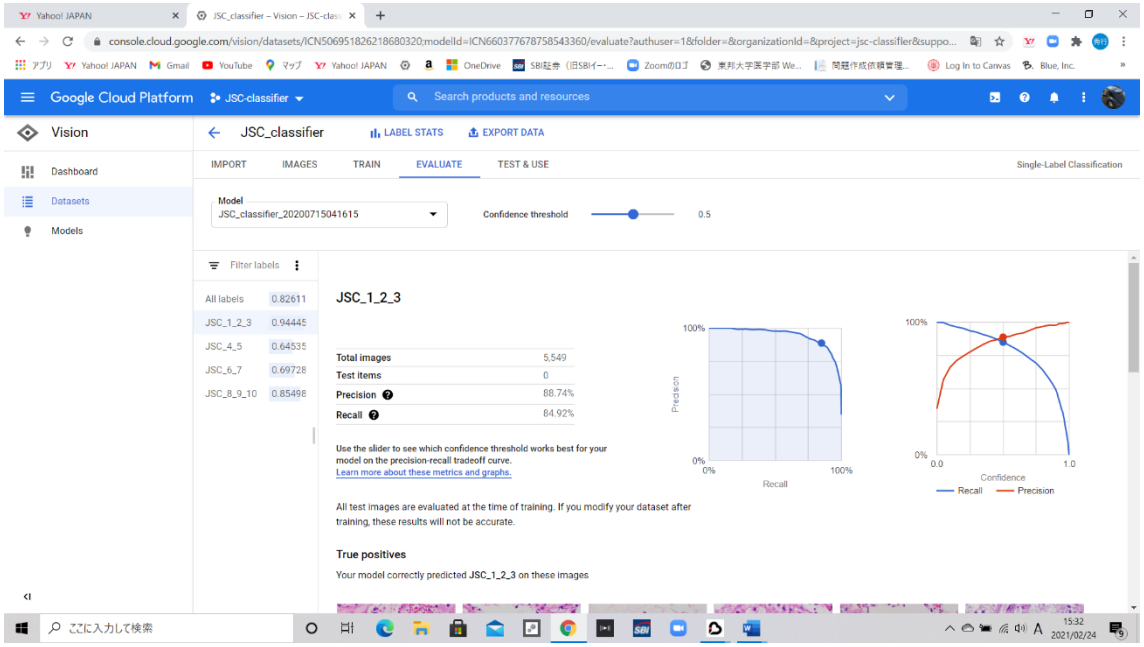


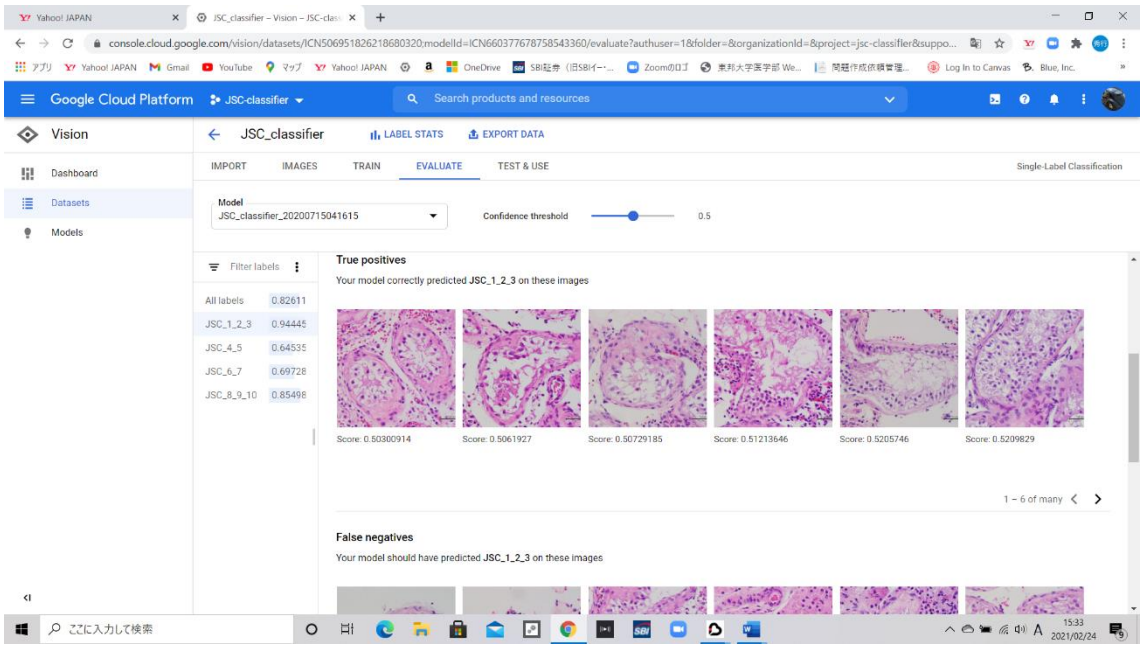


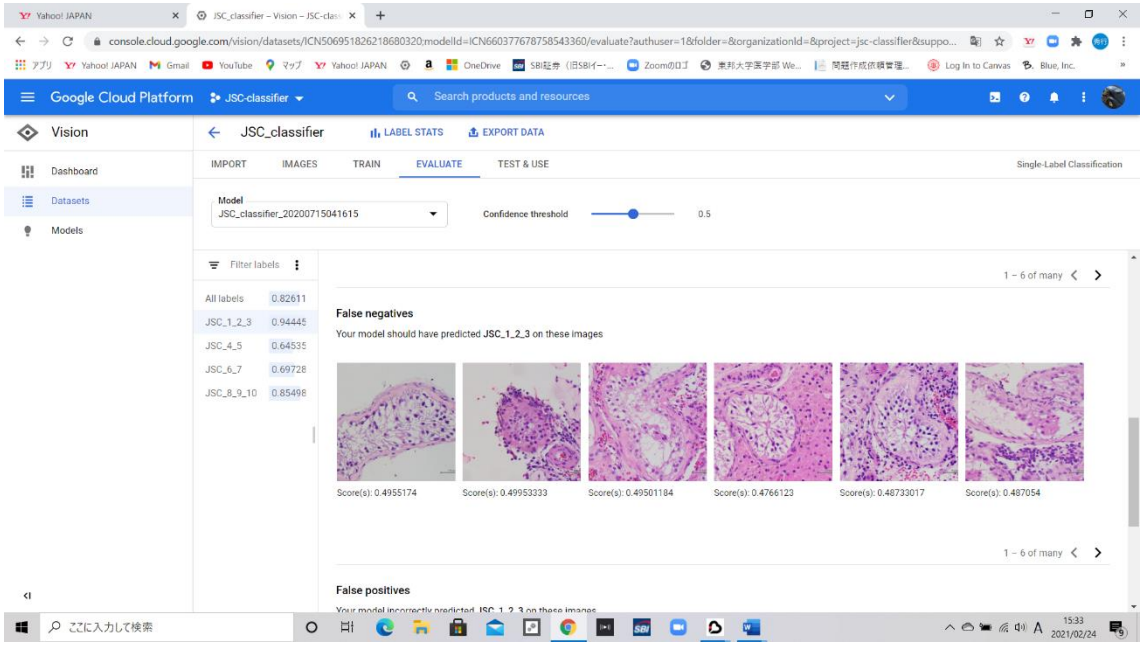
Confusion matrix



The precision was 88.74% and recall was 84.92% for a Johnsen score of 1-3. True positive, false negative, and false positive images are indicated.



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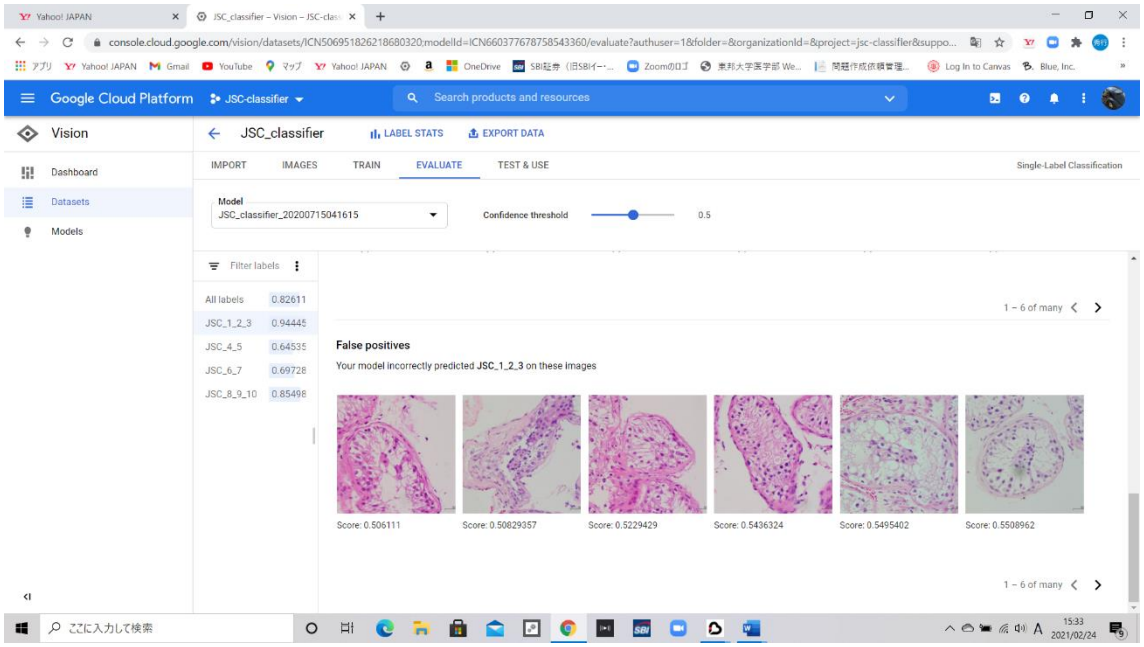
JSC_classifier_20200715041615
Confidence threshold
0.5
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
1 – 6 of many
False negatives
Your model should have predicted JSC_1_2_3 on these images
Score(s): 0.4955174
Score(s): 0.49953333
Score(s): 0.49501184
Score(s): 0.4766123
Score(s): 0.48733017
Score(s): 0.487054
1 – 6 of many
False positives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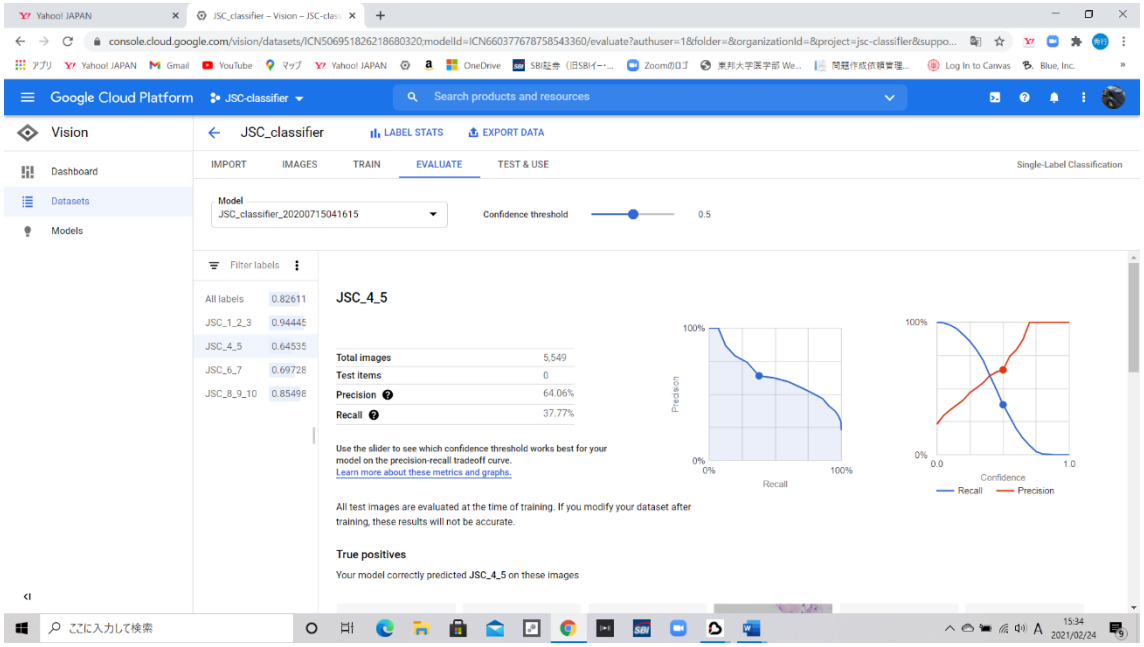
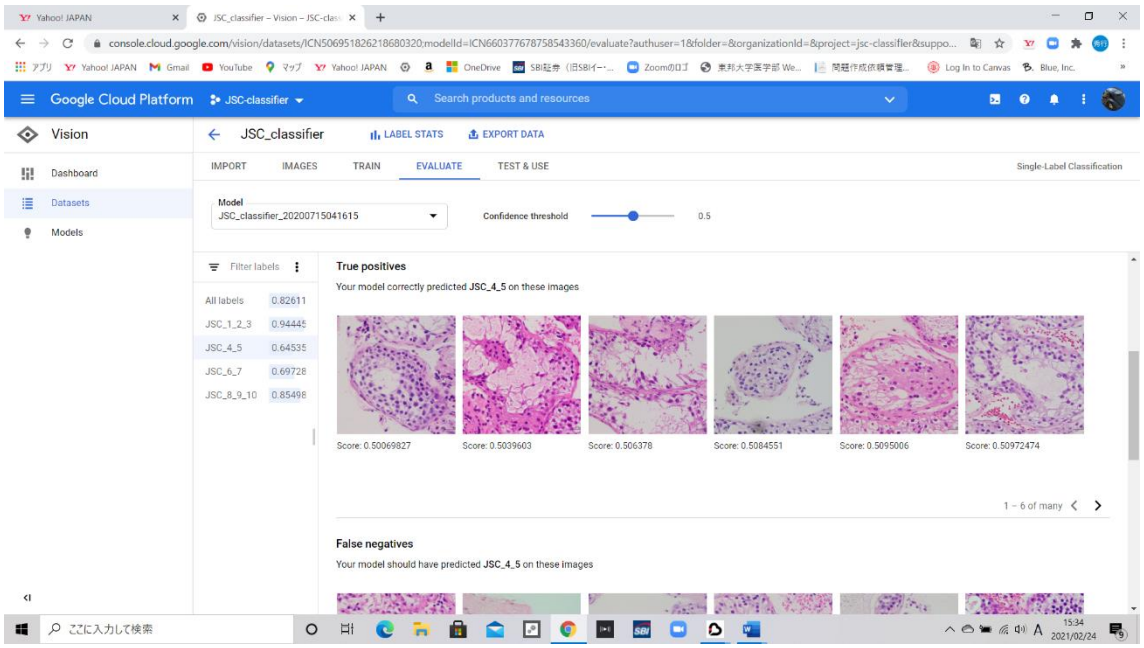
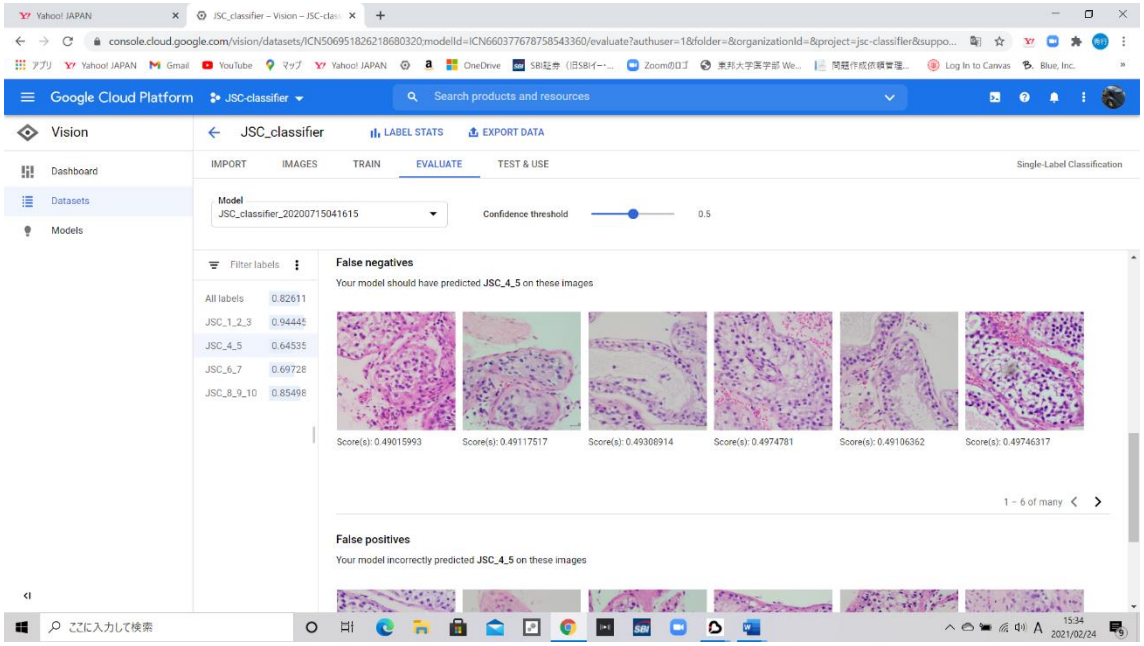
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
1 – 6 of many
False positives
Your model incorrectly predicted JSC_1_2_3 on these images
Score: 0.505111
Score: 0.50829357
Score: 0.5229429
Score: 0.5436324
Score: 0.5495402
Score: 0.5508962
1 – 6 of many

The precision was 64.06% and recall was 37.77% for a Johnsen score of 4-5. True positive, false negative, and false positive images are indicated.



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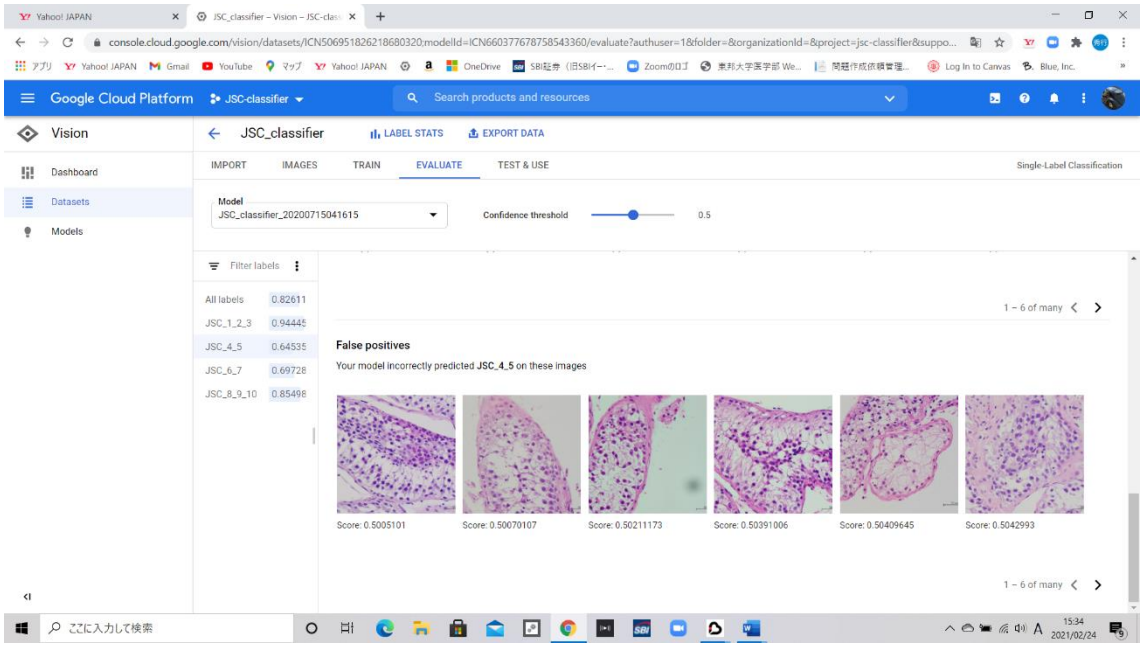
0.5
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
False negatives
Your model should have predicted JSC_4_5 on these images
Score(s): 0.49015993
Score(s): 0.49117517
Score(s): 0.49308914
Score(s): 0.4974781
Score(s): 0.49106362
Score(s): 0.49746317
1 – 6 of many
False positives
Your model incorrectly predicted JSC_4_5 on these images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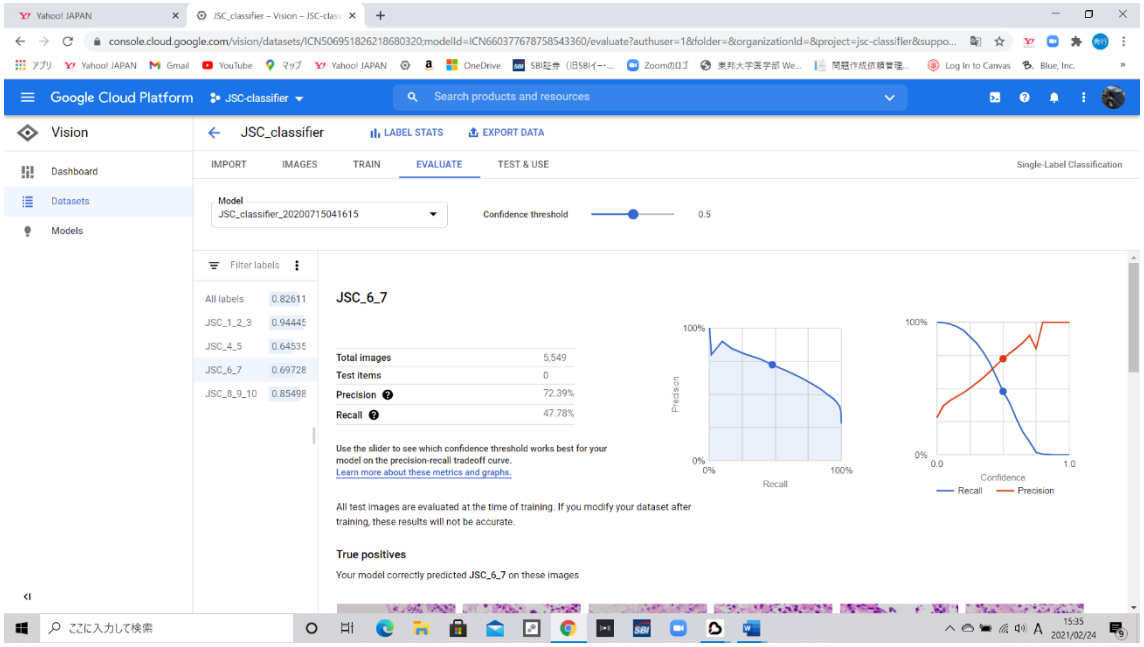
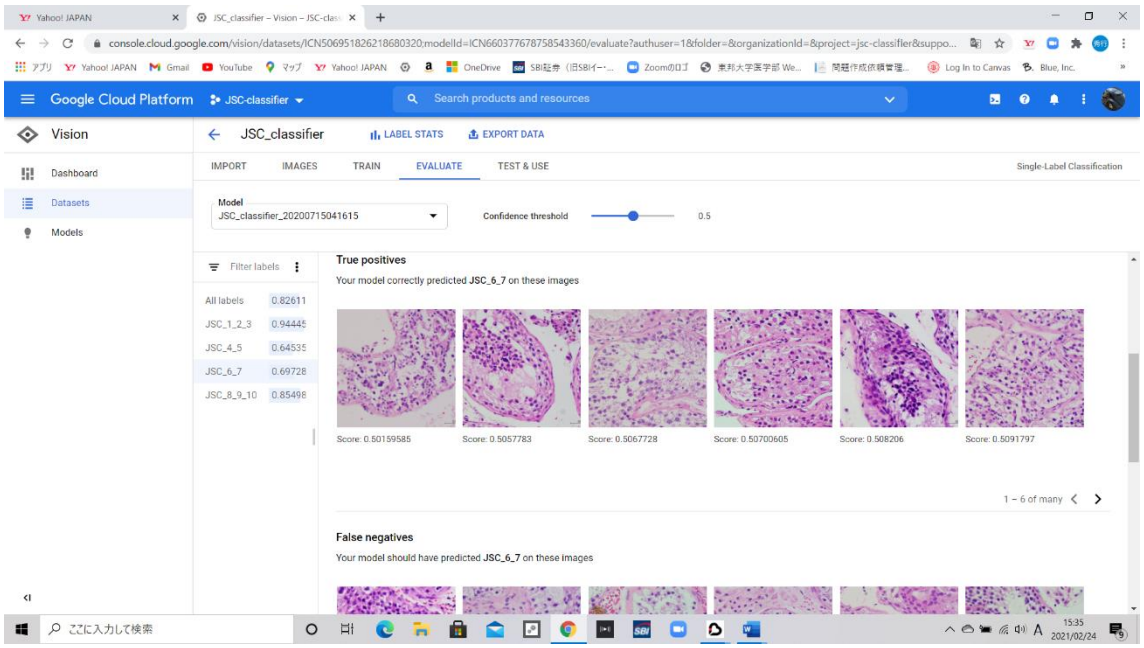
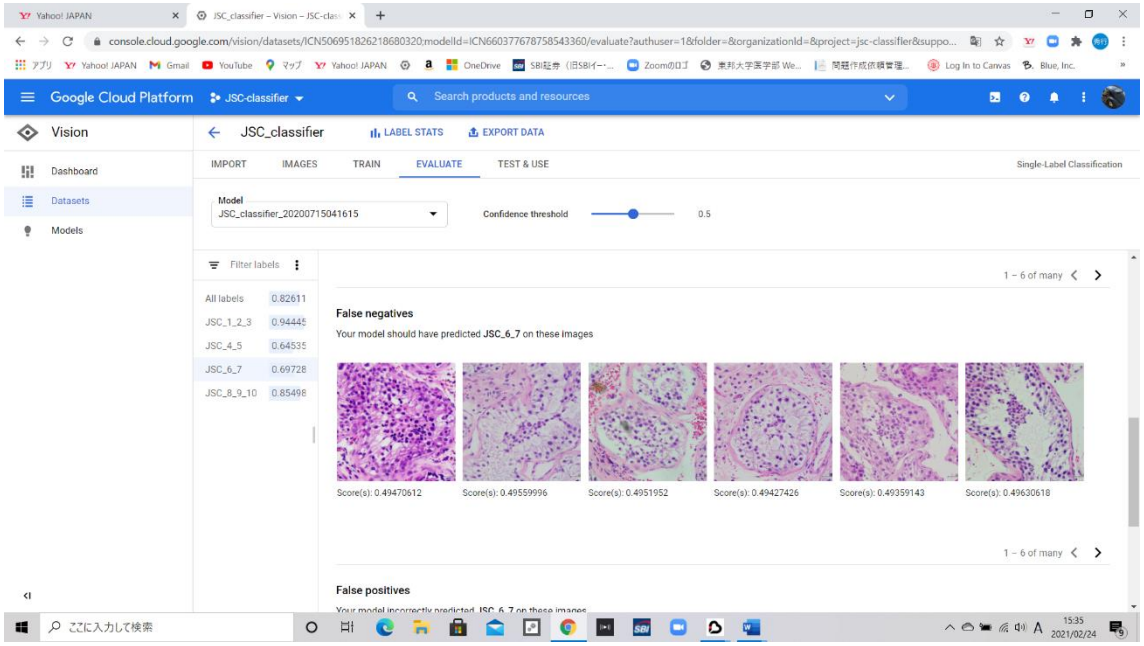
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
1 – 6 of many
False positives
Your model incorrectly predicted JSC_4_5 on these images
Score: 0.5005101
Score: 0.50070107
Score: 0.50211173
Score: 0.50391006
Score: 0.50409645
Score: 0.5042993
1 – 6 of many

The precision was 72.39% and recall was 47.78% for a Johnsen score of 6-7. True positive, false negative, and false positive images are indicated.



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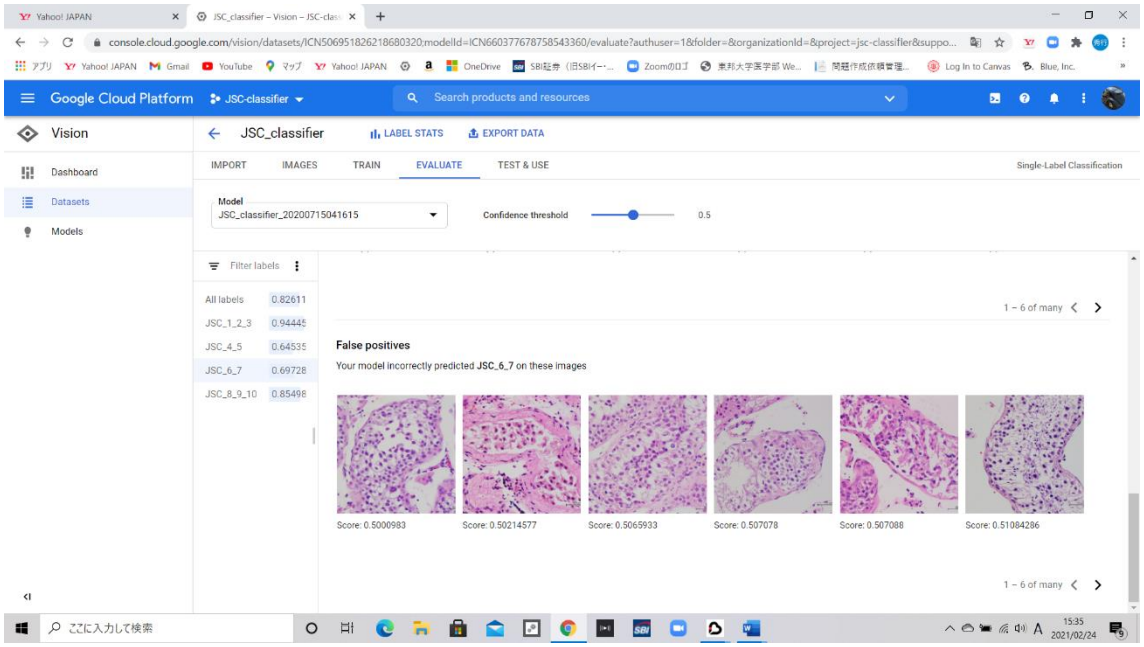
0.5
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
1 – 6 of many
False negatives
Your model should have predicted JSC_6_7 on these images
Score(s): 0.49470612
Score(s): 0.49559996
Score(s): 0.4951952
Score(s): 0.49427426
Score(s): 0.49359143
Score(s): 0.49630618
1 – 6 of many
False positives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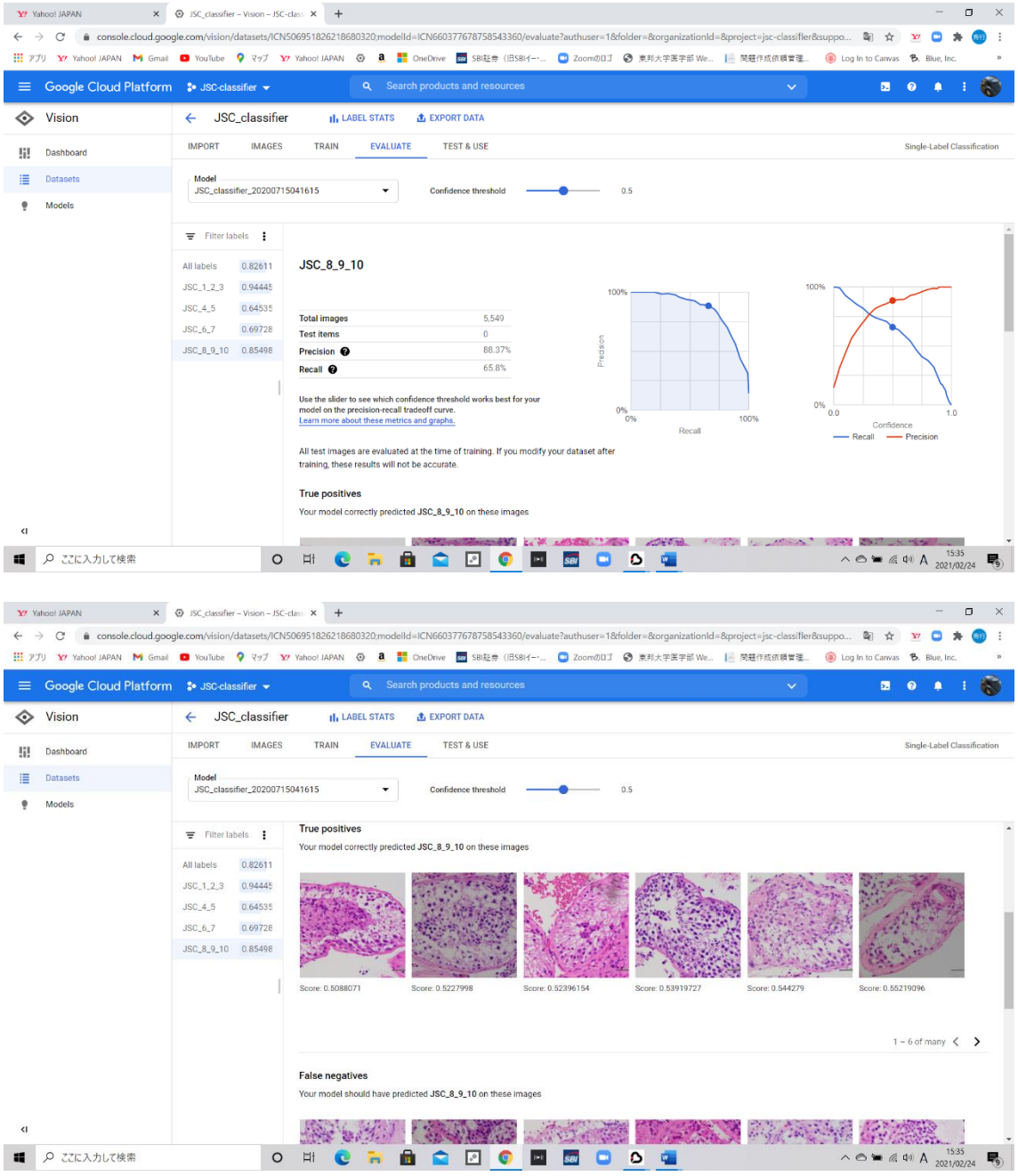
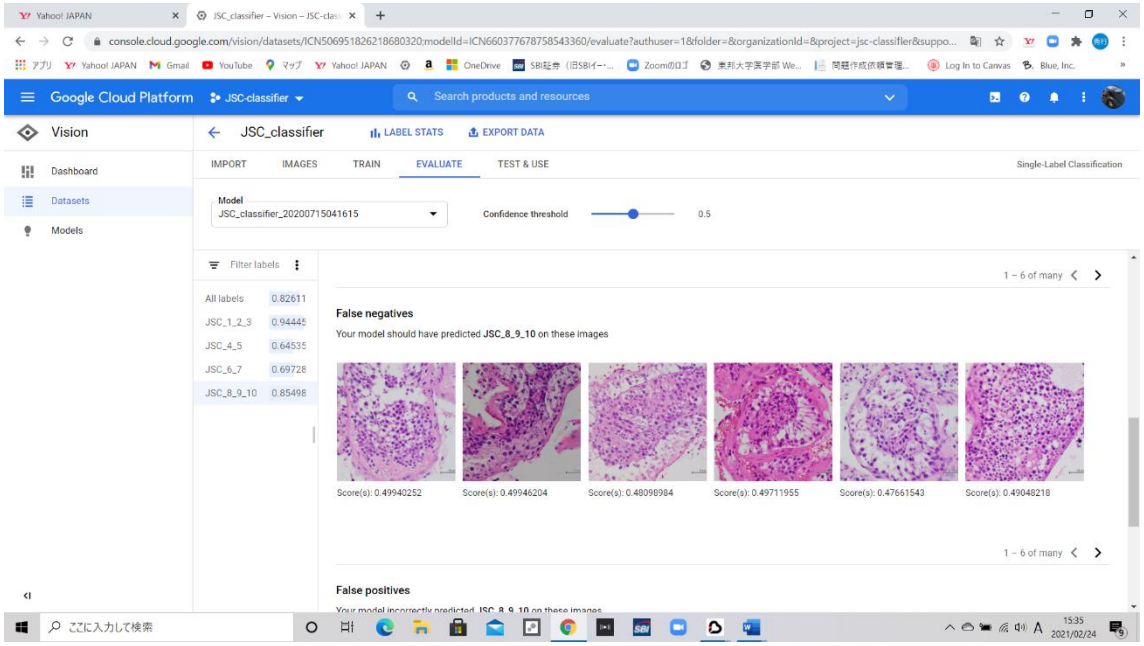
Confidence threshold
0.5
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
1 – 6 of many
False positives
Your model incorrectly predicted JSC_6_7 on these images
Score: 0.5000983
Score: 0.50214577
Score: 0.5065933
Score: 0.507078
Score: 0.507088
Score: 0.51084286
1 – 6 of many

The precision was 88.37% and recall was 65.8% for a Johnsen score of 8-10. True positive, false negative, and false positive images are indicated.

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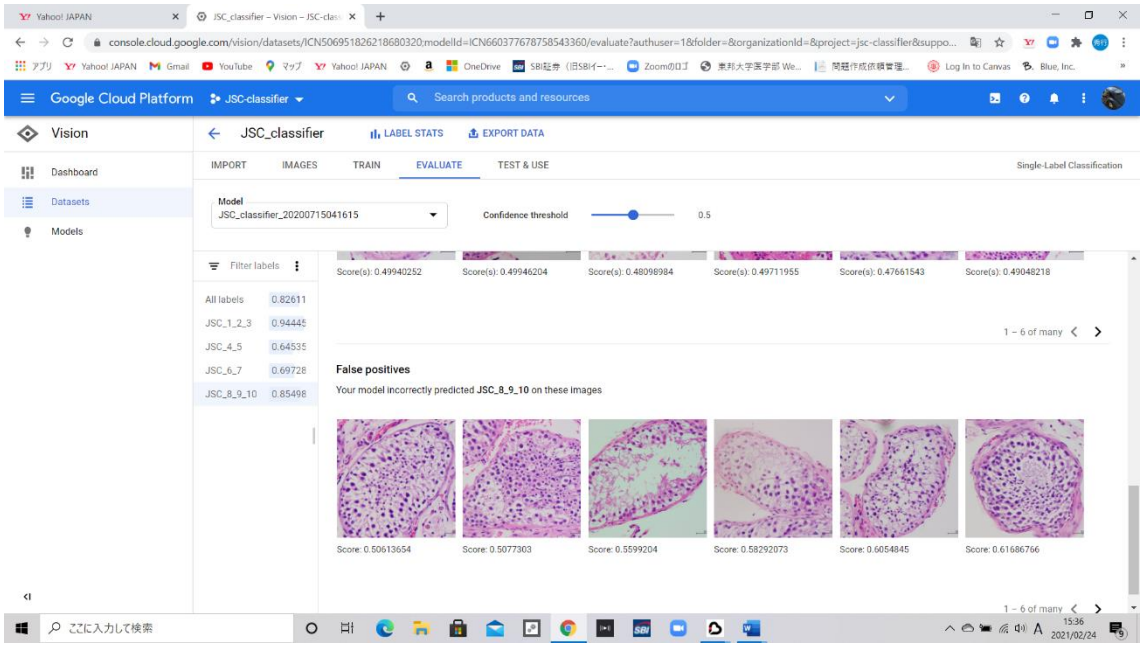
Confidence threshold
0.5
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
1 – 6 of many
False negatives
Your model should have predicted JSC_8_9_10 on these images
Score(s): 0.49940252
Score(s): 0.49946204
Score(s): 0.48096984
Score(s): 0.49711955
Score(s): 0.47661543
Score(s): 0.49048218
1 – 6 of many
False positives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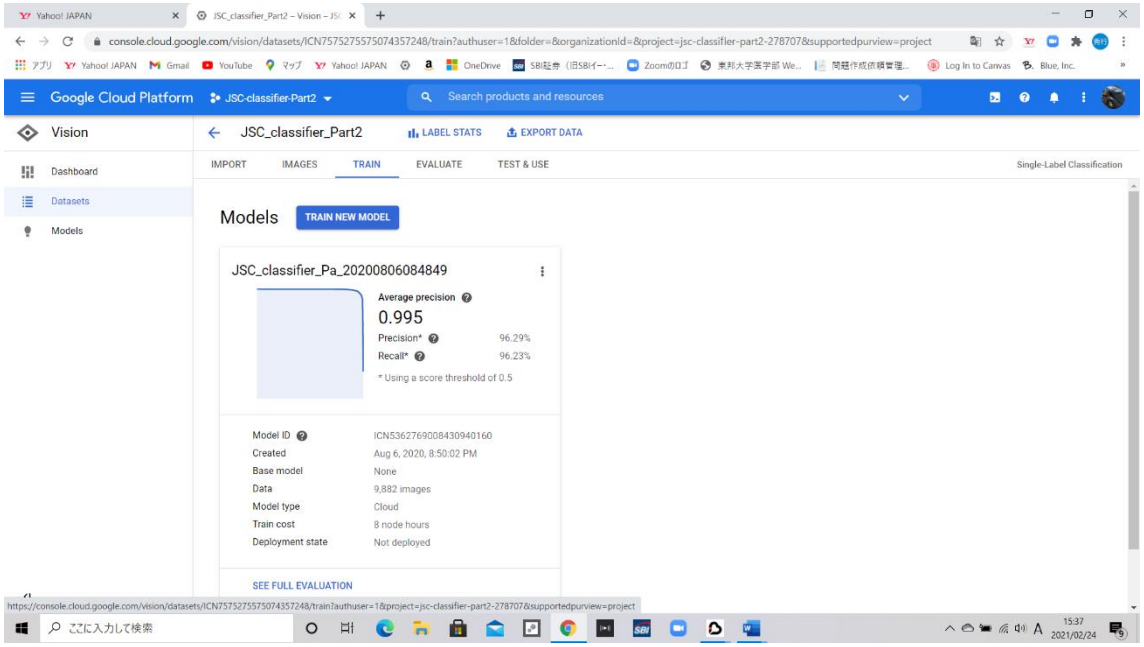
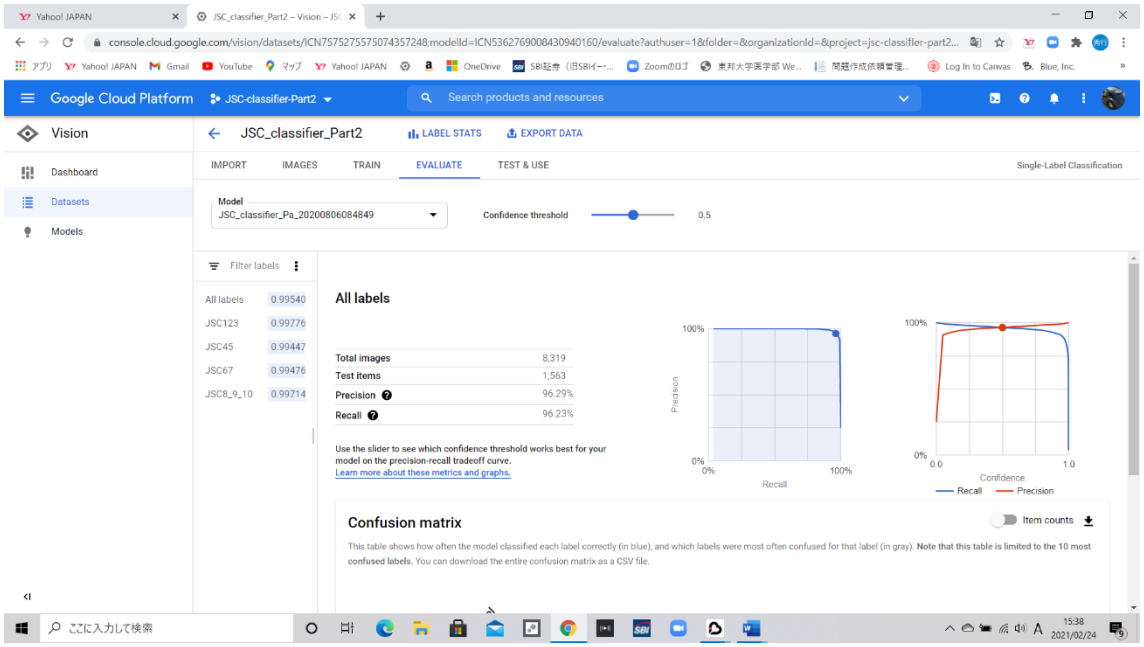
JSC_classifier_20200715041615
Confidence threshold
0.5
Filter labels
All labels 0.82611
JSC_1_2_3 0.94445
JSC_4_5 0.64535
JSC_6_7 0.69728
JSC_8_9_10 0.85498
Score(s): 0.49940252
Score(s): 0.49946204
Score(s): 0.48096984
Score(s): 0.49711955
Score(s): 0.47661543
Score(s): 0.49048218
1 – 6 of many
False positives
Your model incorrectly predicted JSC_8_9_10 on these images
Score: 0.50613654
Score: 0.5077303
Score: 0.5599204
Score: 0.58292073
Score: 0.6054845
Score: 0.61686766
1 – 6 of many

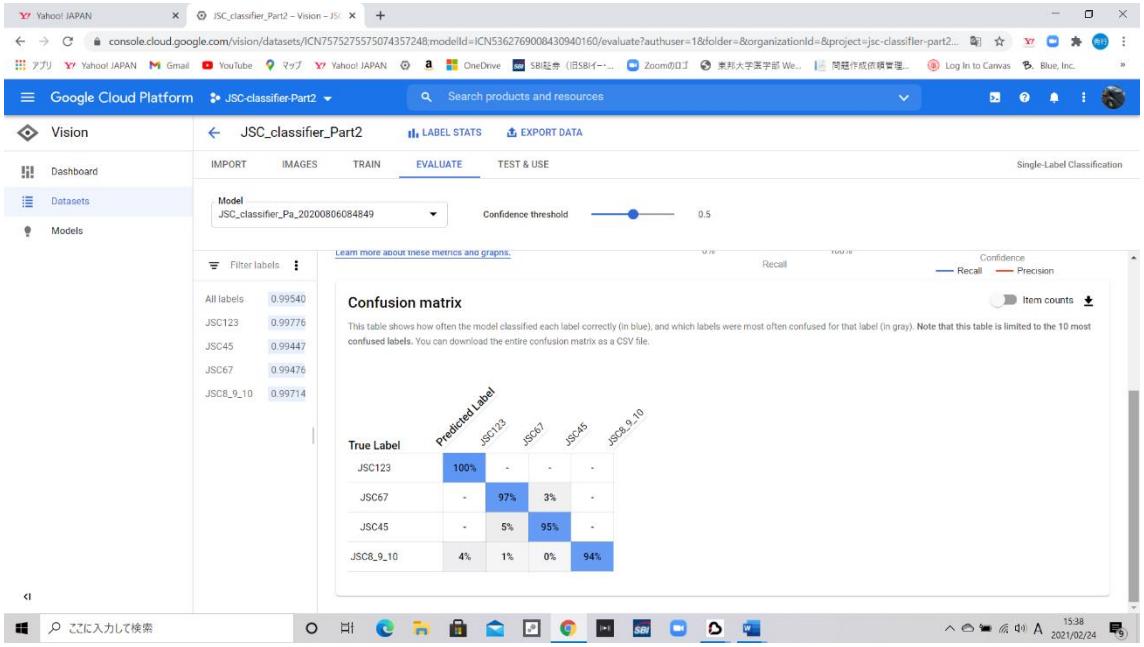
JSC_classifier_Part 2: image dataset of 9822 expansion images (5.0 X 5.0 cm)

The average precision (positive predictive value) of the algorithm was 99.5%, precision was 96.29%, and recall was 96.23% for all labels.

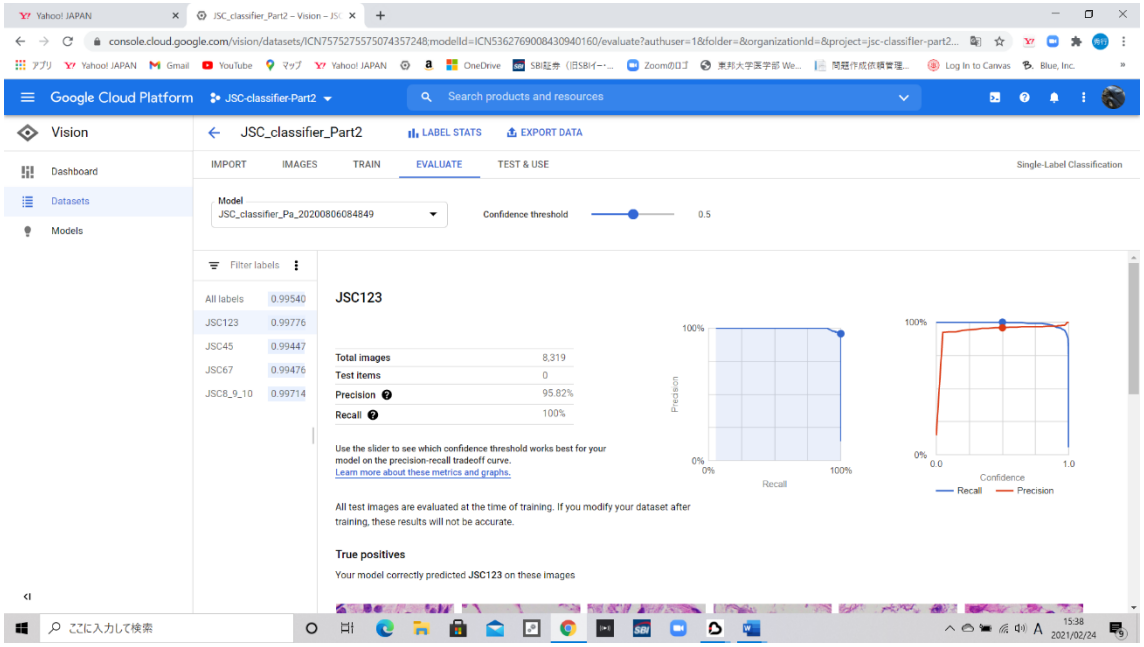


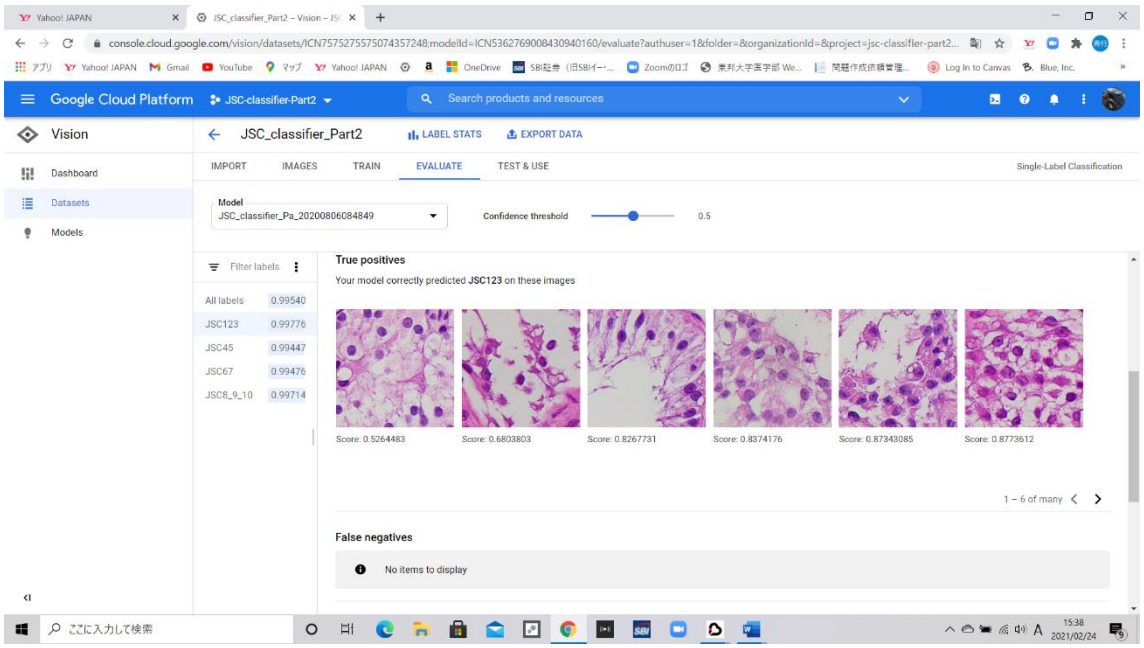


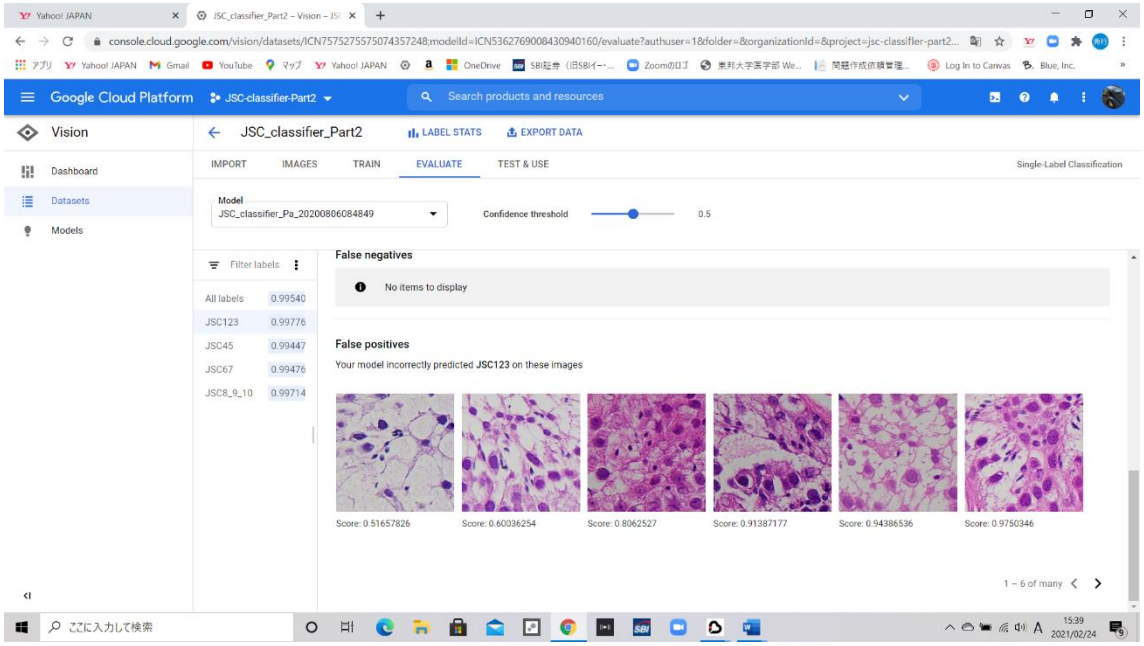
Confusion matrix



The precision was 95.82% and recall was 100% for a Johnsen score of 1-3. True positive and false positive images are indicated.



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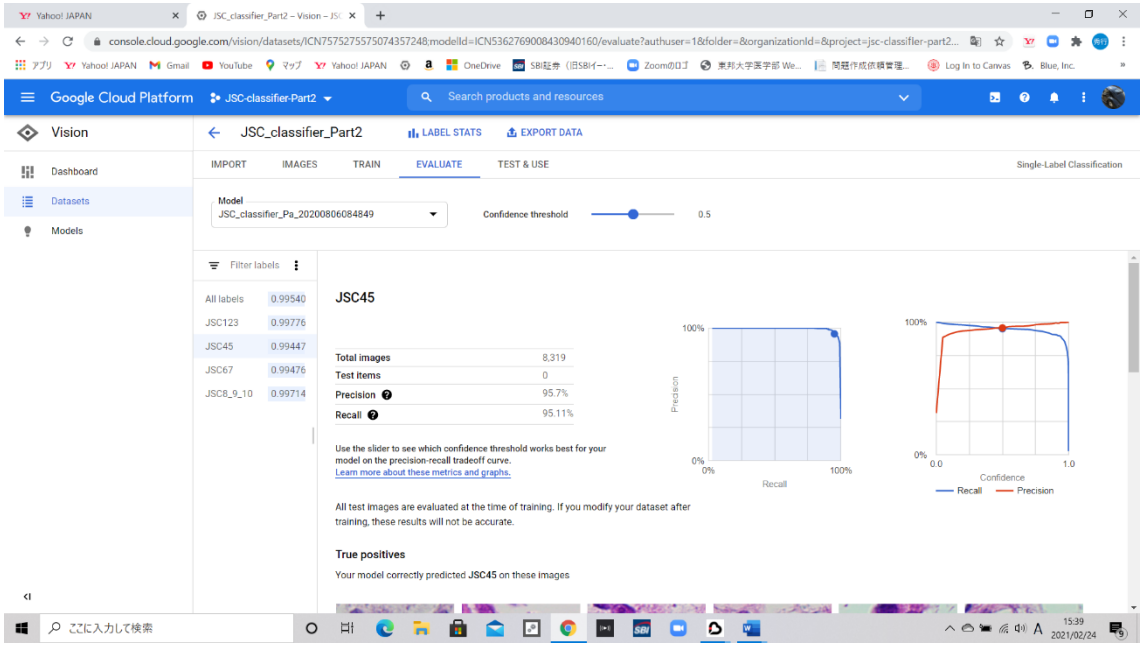
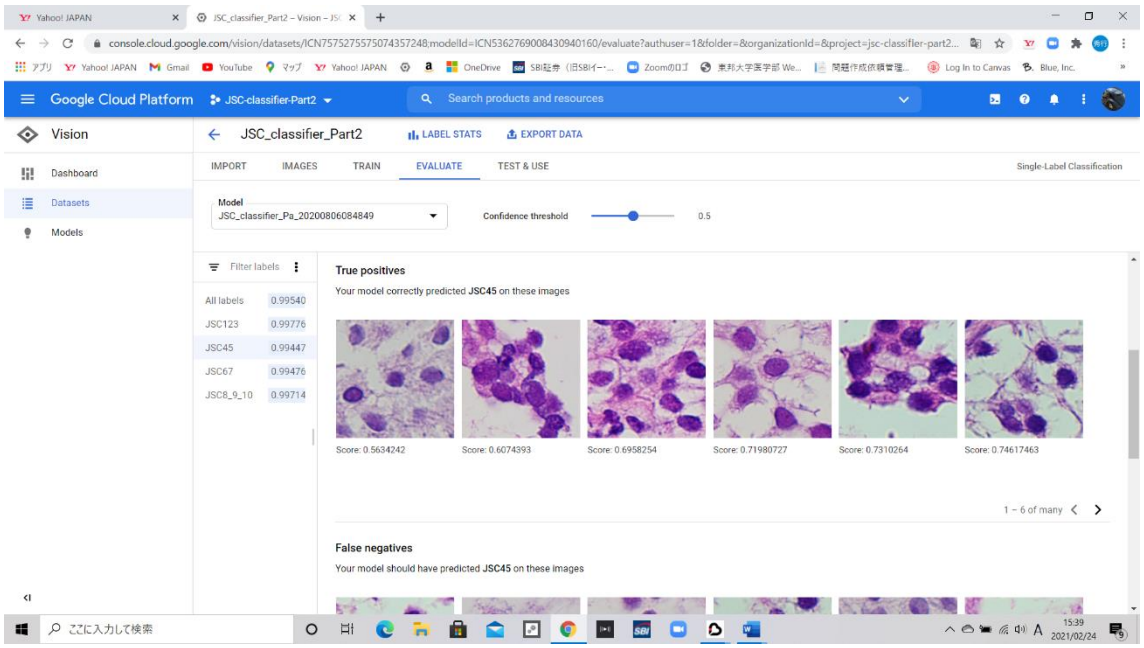
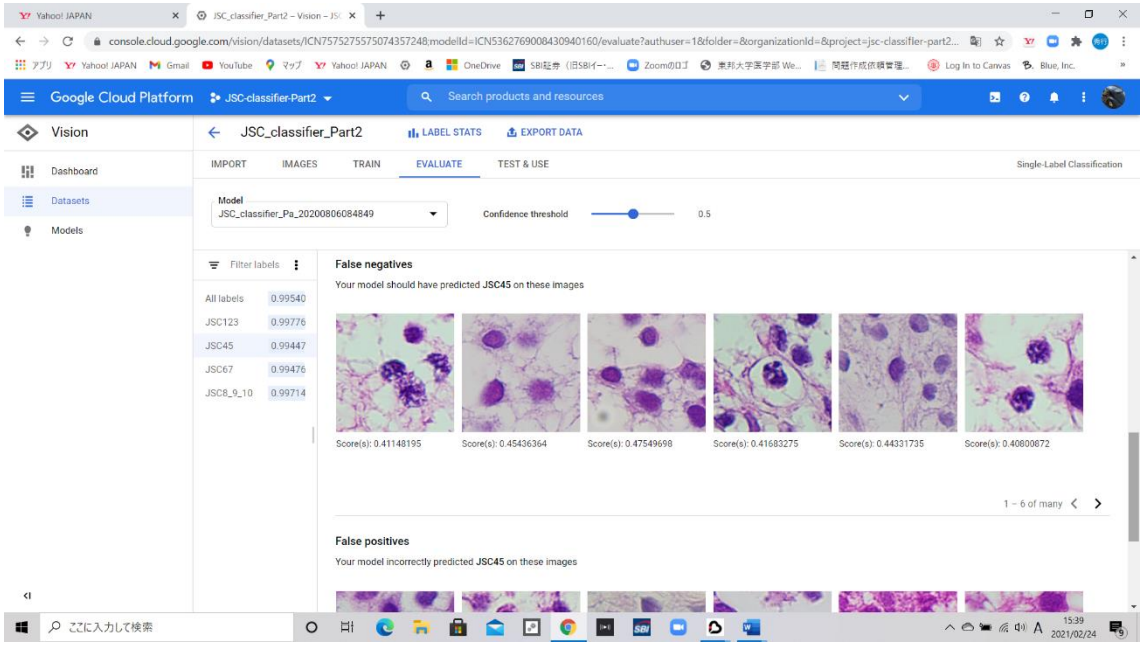
Model
JSC_classifier_Pa_20200806084849
Confidence threshold
0.5
Filter labels
All labels 0.99540
JSC123 0.99776
JSC45 0.99447
JSC67 0.99476
JSC8_9_10 0.99714
False negatives
No items to display
False positives
Your model incorrectly predicted JSC123 on these images
Score: 0.51657826
Score: 0.60036254
Score: 0.8062527
Score: 0.91387177
Score: 0.94386536
Score: 0.9750346
1 – 6 of many
ここに入力して検索
15:39
2021/02/24

The precision was 95.7% and recall was 95.11% for a Johnsen score of 4-5. True positive, false negative, and false positive images are indicated.



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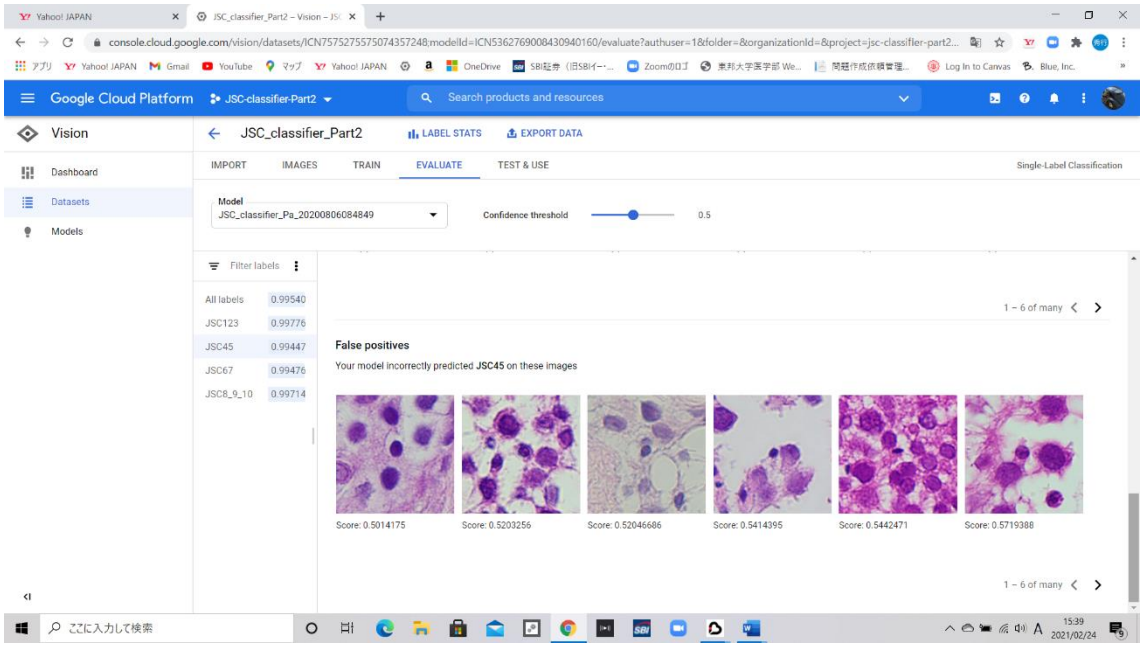
Confidence threshold
0.5
Filter labels
All labels 0.99540
JSC123 0.99776
JSC45 0.99447
JSC67 0.99476
JSC8_9_10 0.99714
False negatives
Your model should have predicted JSC45 on these images
Score(s): 0.41148195
Score(s): 0.45436364
Score(s): 0.47549698
Score(s): 0.41683275
Score(s): 0.44331735
Score(s): 0.40800872
1 – 6 of many
False positives
Your model incorrectly predicted JSC45 on these images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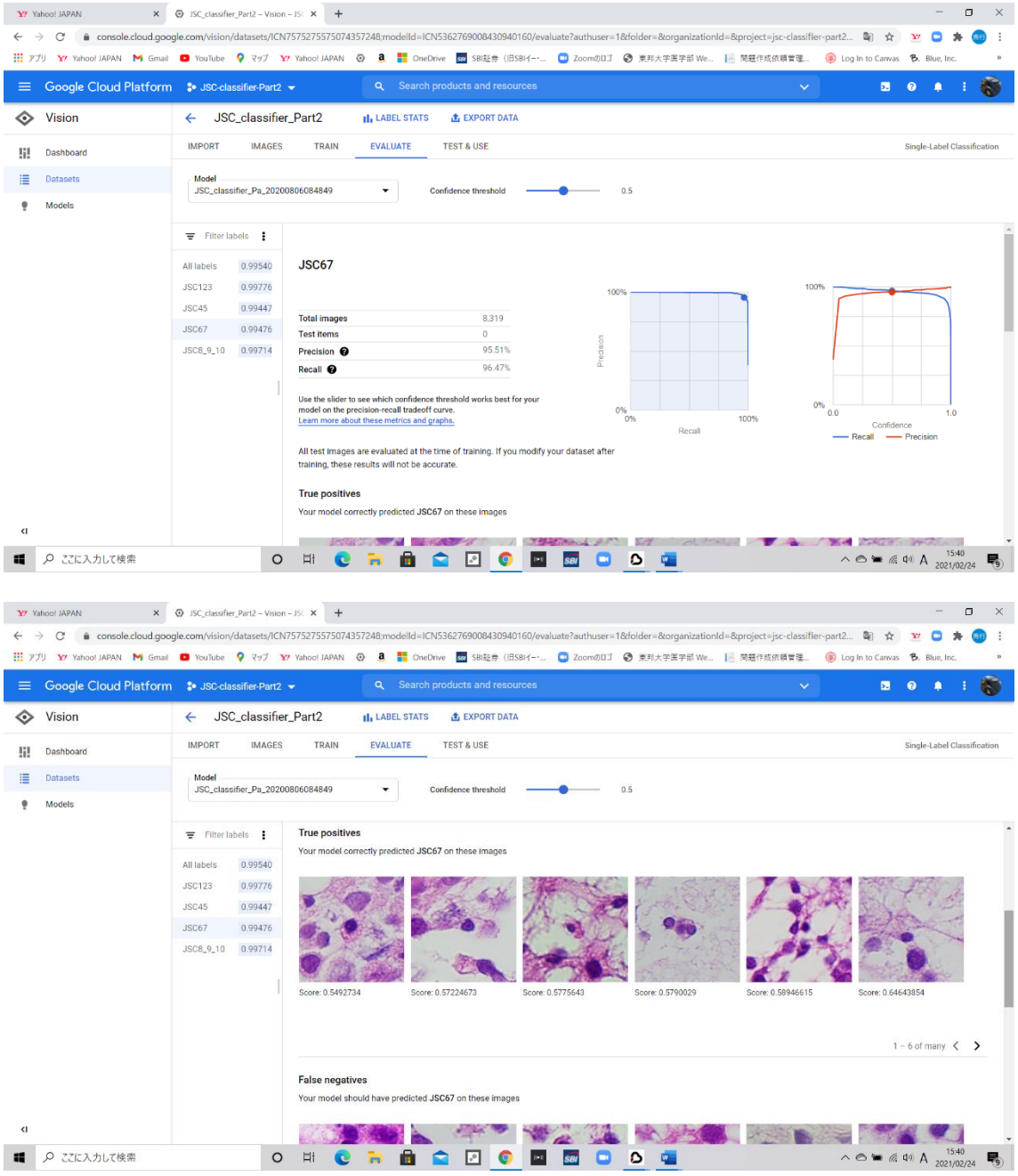
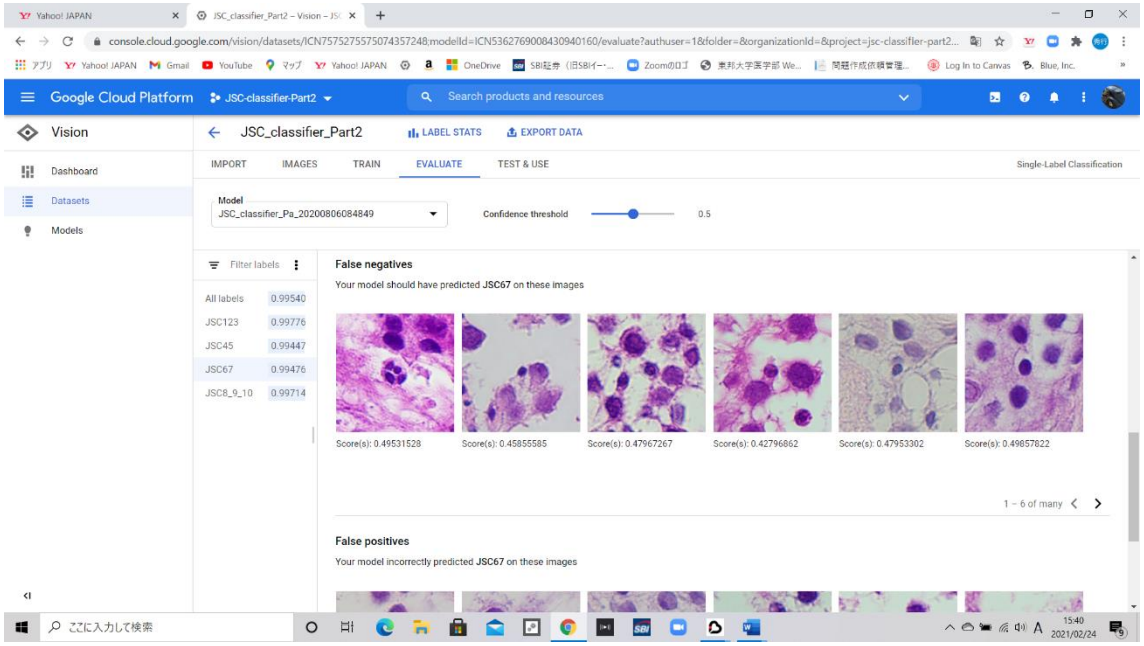
Confidence threshold
0.5
Filter labels
All labels 0.99540
JSC123 0.99776
JSC45 0.99447
JSC67 0.99476
JSC8_9_10 0.99714
1 – 6 of many
False positives
Your model incorrectly predicted JSC45 on these images
Score: 0.5014175
Score: 0.5203256
Score: 0.52046686
Score: 0.5414395
Score: 0.5442471
Score: 0.5719388
1 – 6 of many

The precision was 95.51% and recall was 96.47% for a Johnsen score of 6-7. True positive, false negative, and false positive images are indicated.

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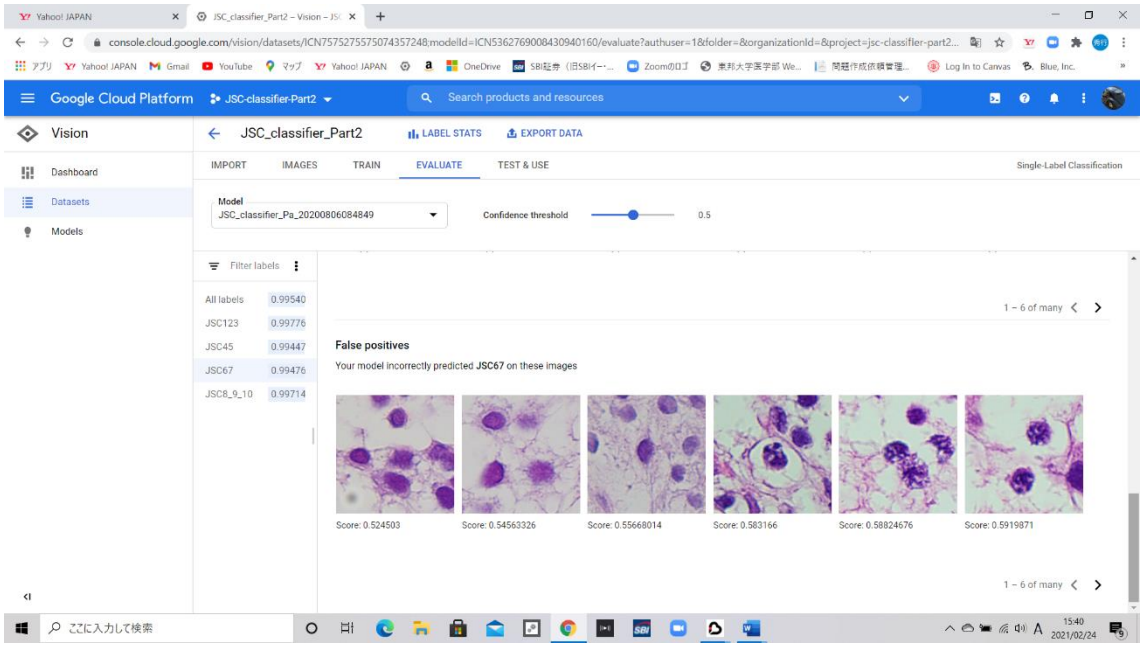
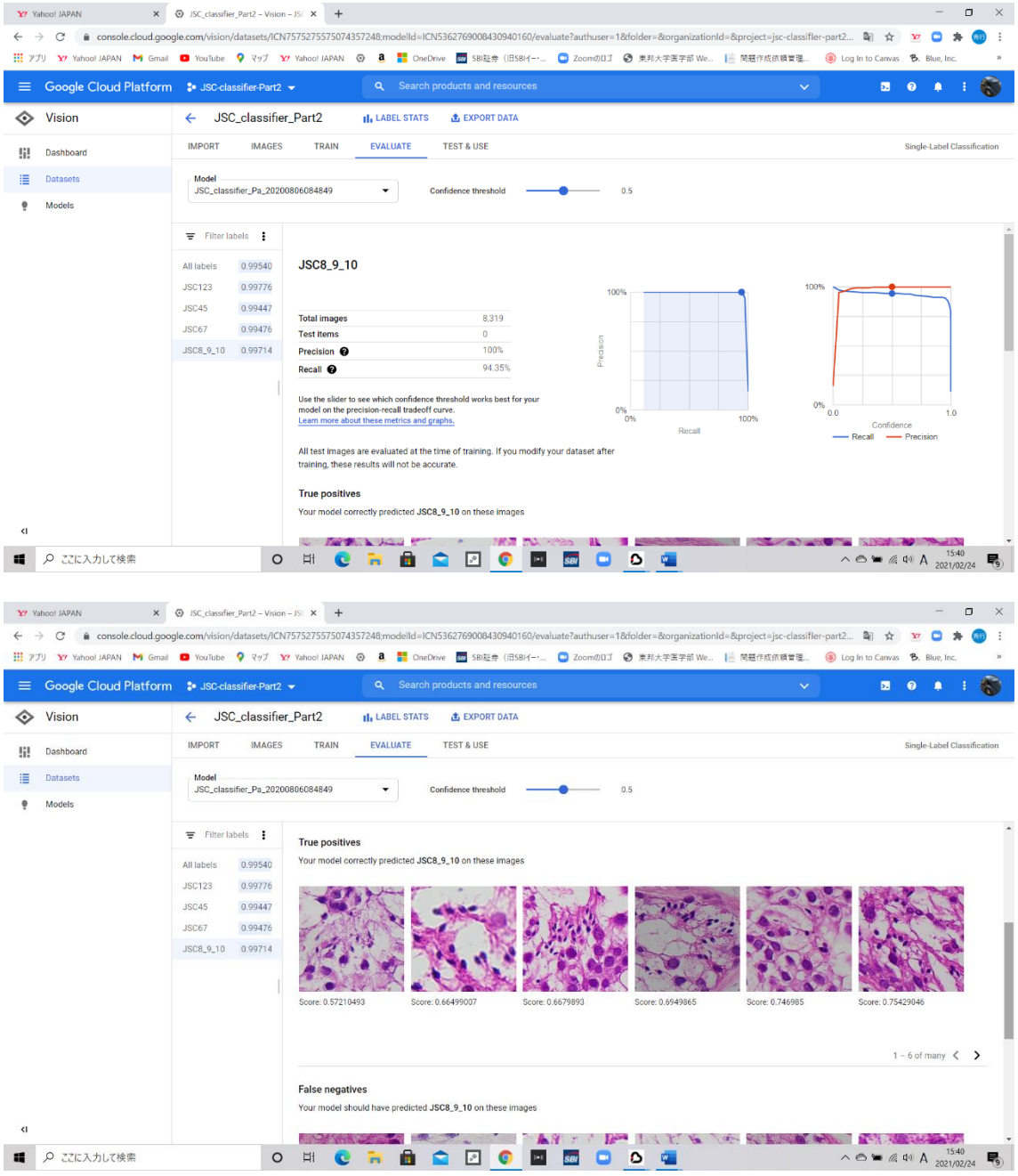
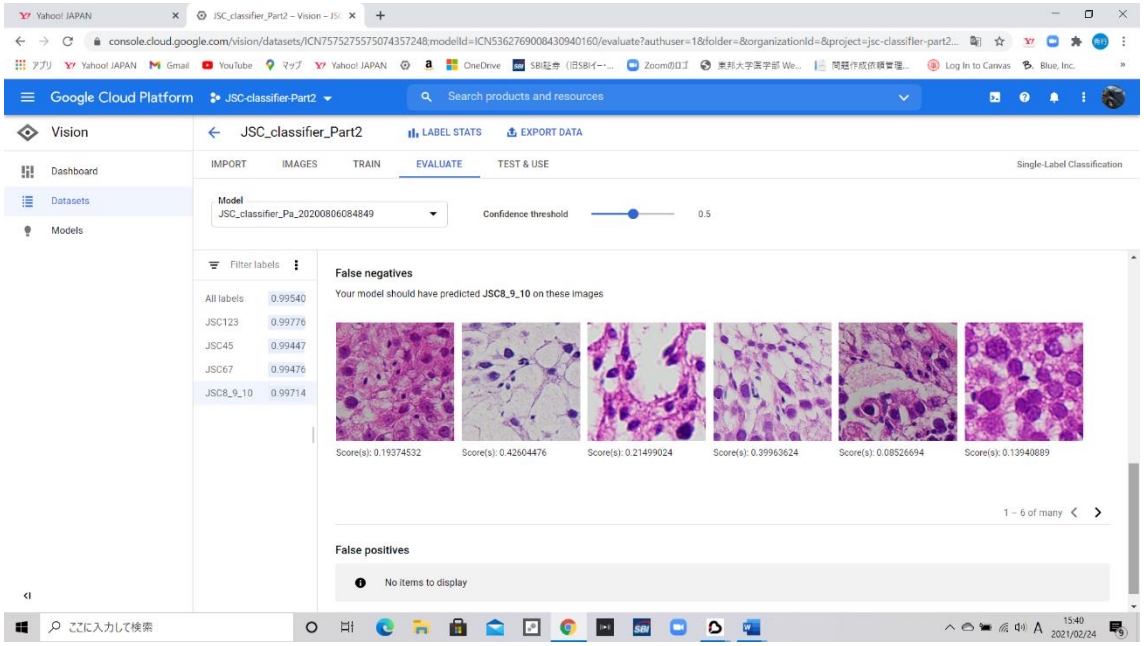
Confidence threshold
0.5
Filter labels
All labels 0.99540
JSC123 0.99776
JSC45 0.99447
JSC67 0.99476
JSC8_9_10 0.99714
False negatives
Your model should have predicted JSC67 on these images
Score(s): 0.49531528
Score(s): 0.45855585
Score(s): 0.47967267
Score(s): 0.42796862
Score(s): 0.47953302
Score(s): 0.49857822
1 – 6 of many
False positives
Your model incorrectly predicted JSC67 on these images


Google Cloud Platform
JSC-classifier-Part2
Search products and resources
Vision
JSC_classifier_Part2
LABEL STATS
EXPORT DATA
IMPORT
IMAGES
TRAIN
EVALUATE
TEST & USE
Single-Label Classification
Dashboard
Datasets
Models
Model
JSC_classifier_Pa_20200806084849
Confidence threshold
0.5
Filter labels
All labels 0.99540
JSC123 0.99776
JSC45 0.99447
JSC67 0.99476
JSC8_9_10 0.99714
1 – 6 of many
False positives
Your model incorrectly predicted JSC67 on these images
Score: 0.524503
Score: 0.54563326
Score: 0.55668014
Score: 0.583166
Score: 0.58824676
Score: 0.5919871
1 – 6 of many

The precision was 100% and recall was 94.35% for a Johnsen score of 8-10. True positive and false negative images are indicated.

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0.5
Filter labels
All labels 0.99540
JSC123 0.99776
JSC45 0.99447
JSC67 0.99476
JSC8_9_10 0.99714
False negatives
Your model should have predicted JSC8_9_10 on these images
Score(s): 0.19374532
Score(s): 0.42604476
Score(s): 0.21499024
Score(s): 0.39963624
Score(s): 0.08526694
Score(s): 0.13940889
1 – 6 of many
False positives
No items to display