CLAIMS

What is claimed is:

1. An image processing method, comprising:

receiving a target image of a slide corresponding to a target specimen comprising a tissue sample of a patient;

generating a machine learning system by processing a plurality of training images, each training image comprising an image of human tissue and a diagnostic label characterizing at least one of a slide morphology, a diagnostic value, a pathologist review outcome, and an analytic difficulty;

automatically identifying, using the machine learning system, an image region that is diagnostic of the target image by analyzing microscopic features extracted from multiple image regions in the target image;

determining, using the machine learning system, a probability of a target feature being present in the image region that is diagnostic of the target image based on an average probability;

determining, using the machine learning system, a prioritization value, of a plurality of prioritization values, of the target image based on the probability of the target feature being present in the target image, the prioritization value comprising a first prioritization value determined based on preferences of a first user and a second prioritization value determined based on preferences of a second user;

upon determining that the target feature comprises a feature in the target image indicating that further preparation is to be performed, then preparing a new slide for the target image prior to a user review;

outputting, using the machine learning system, a plurality of digitized pathology images; and

ordering, using the machine learning system, the digitized pathology images based on the plurality of prioritization values associated with the digitized pathology images, and a placement of the target image based on the prioritization value of the target image based on the target feature.

2. The method of claim 1, wherein the diagnostic label comprises a preparation value corresponding to a likelihood that the further preparation is to be performed by preparing a new slide for the target image.

3. The method of claim1, wherein the diagnostic label comprises a preparation value corresponding to a likelihood that the further preparation is to be performed by preparing a new slide for the target image.

4. The method of claim 3, wherein the further preparation is performed by preparing a new slide for the target image based on at least one of a specimen recut, an immunohistochemical stain, additional diagnostic testing, additional consultation, and/or a special stain, being performed prior to a user review.

5. The method of claim 1, wherein the diagnostic label comprises a diagnostic feature of the target image.

6. The method of claim 5, the diagnostic feature comprising at least one of cancer presence, cancer grade, treatment effects, precancerous lesions, biomarkers for treatment selection, and/or presence of infectious organisms.

7. The method of claim 1, wherein the diagnostic label comprises an artifact label corresponding to at least one of scanning lines, missing tissue, and/or blur.

8. An image processing system, comprising:

a memory storing instructions; and

a processor configured to execute the instructions to perform operations comprising:

receiving a target image of a slide corresponding to a target specimen comprising a tissue sample of a patient;

generating a machine learning system by processing a plurality of training images, each training image comprising an image of human tissue and a diagnostic label

characterizing at least one of a slide morphology, a diagnostic value, a pathologist review outcome, and an analytic difficulty;

automatically identifying, using the machine learning system, an image region that is diagnostic of the target image by analyzing microscopic features extracted from multiple image regions in the target image;

determining, using the machine learning system, a probability of a target feature being present in the image region that is diagnostic of the target image based on an average probability;

determining, using the machine learning system, a prioritization value, of a plurality of prioritization values, of the target image based on the probability of the target feature being present in the target image, the prioritization value comprising a first prioritization value determined based on preferences of a first user and a second prioritization value determined based on preferences of a second user;

upon determining that the target feature comprises a feature in the target image indicating that further preparation is to be performed, then preparing a new slide for the target image prior to a user review;

outputting, using the machine learning system, a plurality of digitized pathology images; and

ordering, using the machine learning system, the digitized pathology images based on the plurality of prioritization values associated with the digitized pathology images, and a placement of the target image based on the prioritization value of the target image based on the target feature.

9. The system of Claim 8, wherein the diagnostic label comprises a preparation value corresponding to a likelihood that the further preparation is to be performed by preparing a new slide for the target image.

10. The system of Claim 8, wherein the diagnostic label comprises a preparation value corresponding to a likelihood that the further preparation is to be performed by preparing a new slide for the target image.

11. The system of Claim 8, wherein the further preparation is performed for the target image based on at least one of a specimen recut, an immunohistochemical stain, additional diagnostic testing, additional consultation, and/or a special stain, being performed prior to a user review.

12. The system of Claim 8, wherein the diagnostic label comprises a diagnostic feature of the target image.

13. The system of Claim 12, the diagnostic feature comprising at least one of cancer presence, cancer grade, treatment effects, precancerous lesions, biomarkers for treatment selection, and/or presence of infectious organisms.

14. The system of Claim 8, wherein the diagnostic label comprises an artifact label corresponding to at least one of scanning lines, missing tissue, and/or blur.

15. A non-transitory computer-readable medium storing instructions that, when executed by at least one processor, cause the at least one processor to perform an image processing method, the method comprising:

receiving a target image of a slide corresponding to a target specimen comprising a tissue sample of a patient;

generating a machine learning system by processing a plurality of training images, each training image comprising an image of human tissue and a diagnostic label characterizing at least one of a slide morphology, a diagnostic value, a pathologist review outcome, and an analytic difficulty;

automatically identifying, using the machine learning system, an image region that is diagnostic of the target image by analyzing microscopic features extracted from multiple image regions in the target image;

determining, using the machine learning system, a probability of a target feature being present in the image region that is diagnostic of the target image based on an average probability;

determining, using the machine learning system, a prioritization value, of a plurality of prioritization values, of the target image based on the probability of the target feature

being present in the target image, the prioritization value comprising a first prioritization value determined based on preferences of a first user and a second prioritization value determined based on preferences of a second user;

upon determining that the target feature comprises a feature in the target image indicating that further preparation is to be performed, then preparing a new slide for the target image prior to a user review;

outputting, using the machine learning system, a plurality of digitized pathology images; and

ordering, using the machine learning system, the digitized pathology images based on the plurality of prioritization values associated with the digitized pathology images, and a placement of the target image based on the prioritization value of the target image based on the target feature.

16. The non-transitory computer-readable medium of Claim 15, wherein the diagnostic label comprises a preparation value corresponding to a likelihood that the further preparation is to be performed by preparing a new slide for the target image.

17. The non-transitory computer-readable medium of Claim 15, wherein the diagnostic label comprises a preparation value corresponding to a likelihood that the further preparation is to be performed by preparing a new slide for the target image.

18. The non-transitory computer-readable medium of Claim 17, wherein the further preparation is performed by preparing a new slide for the target image based on at least one of a specimen recut, an immunohistochemical stain, additional diagnostic testing, additional consultation, and/or a special stain, being performed prior to a user review.

19. The non-transitory computer-readable medium of Claim 15, wherein the diagnostic label comprises a diagnostic feature of the target image, the diagnostic feature comprising at least one of cancer presence, cancer grade, treatment effects, precancerous lesions, biomarkers for treatment selection, and/or presence of infectious organisms.