

Prostate Microscopic Image Segmentation

❑ Goals:

- To segment cancer cells from the prostate biopsy images.
- To extract object-level features such as mean intensity, area, perimeter, and standard deviation of the mean intensity of the segmented histological objects.

❑ Brief Description:

The prostate cancer diagnosis done by pathologists is very subjective and relatively slow since it heavily depends on the pathologists' interpretation. In this project, we try to use image processing technique to assist pathologists. Image segmentation is the first step. Cancer cells are segmented from the biopsy images and then object-level features, such as mean intensity, area, perimeter, and standard deviation of the mean intensity of the segmented histological objects, are extracted from segmented histological objects. This can then be used together with metabolites as features for tumor/non-tumor classification.

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- ❑ Heights of achievements throughout the semester (bullet points)
 - Segmented the cancer cells from a few images.
 - Features are extracted from the segmentation.

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- Representative Figures/Diagrams/Videos that highlight your research methodology and results.

As an example, Figure 1 shows a prostate biopsy image with pathologist circled cancer region.

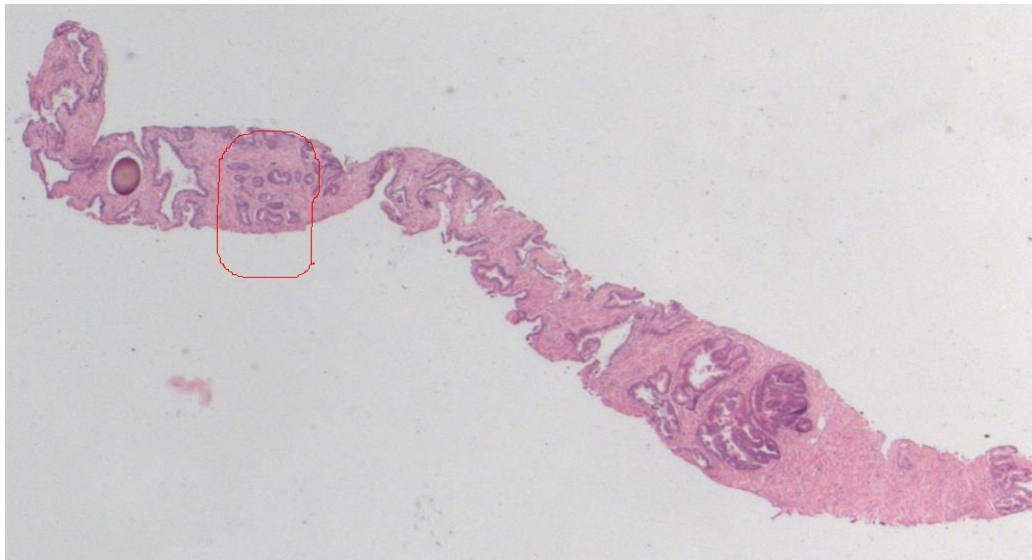


Figure 1. A prostate biopsy image with pathologist circled cancer region.

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Then the region is selected in the Leica software as shown in Figure 2(a). Cancer cells are segmented and numbered as shown in Figure 2(b).

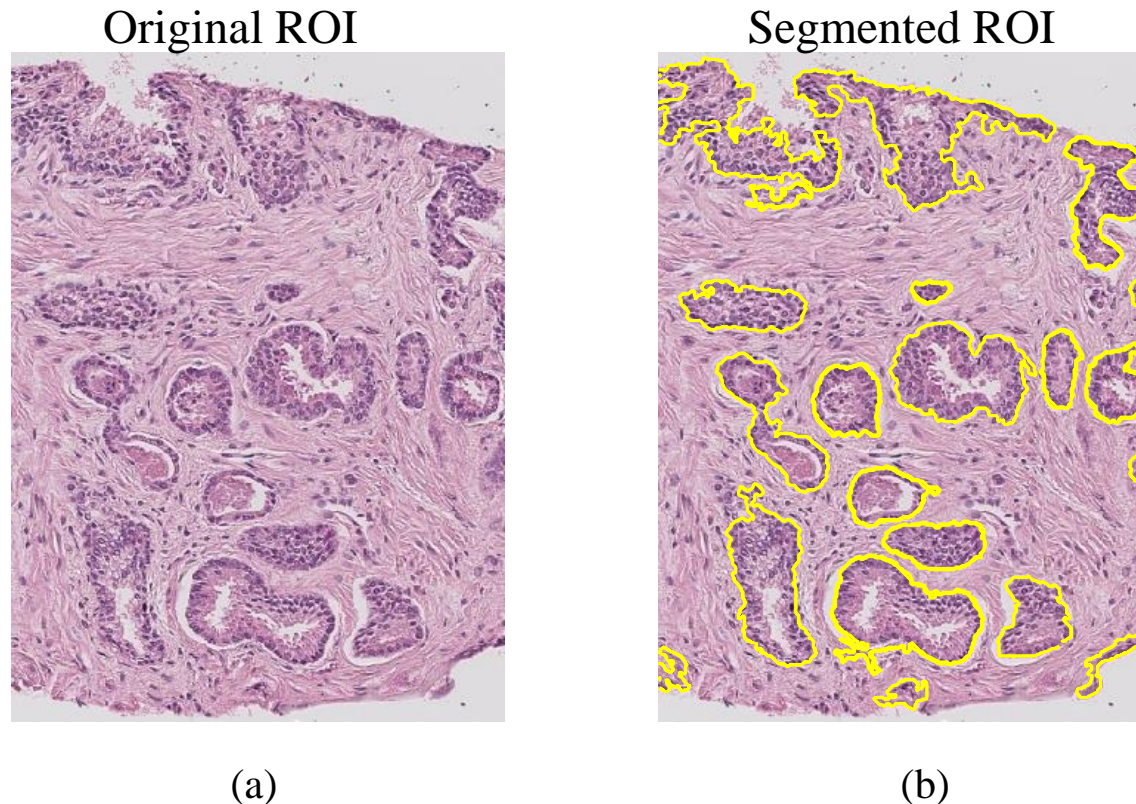


Figure 2. (a) selected region of interest (ROI) from the prostate biopsy image and (b) segmented ROI.

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A few object-level features, such as mean intensity, area, and perimeter of the segmented histological objects, are extracted from the segmentation as shown in Figure 3.

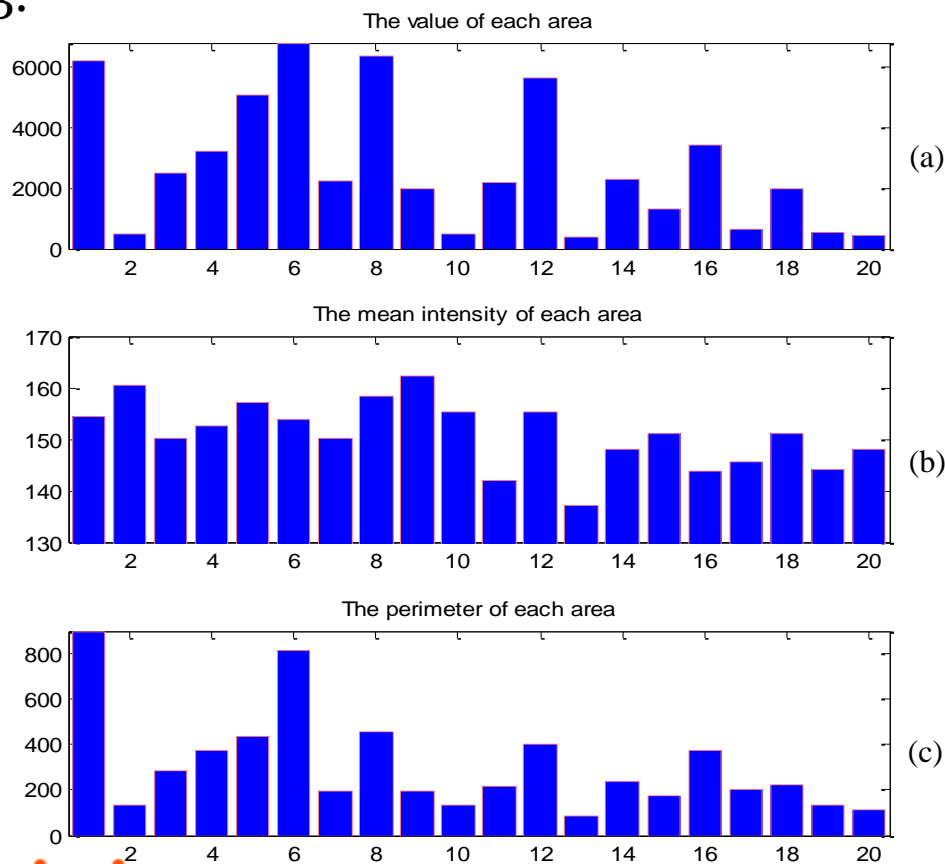


Figure 3. Object-level features, (a) mean intensity, (b) area, and (c) perimeter of the segmented histological objects, are extracted from the segmentation.