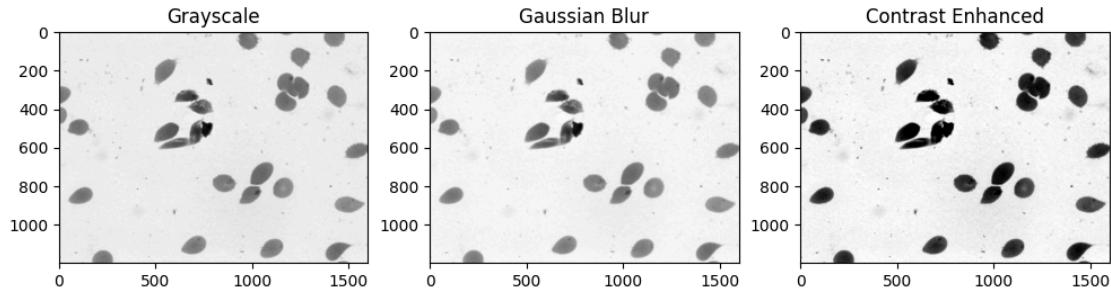


# PCD Hands-on Assignment

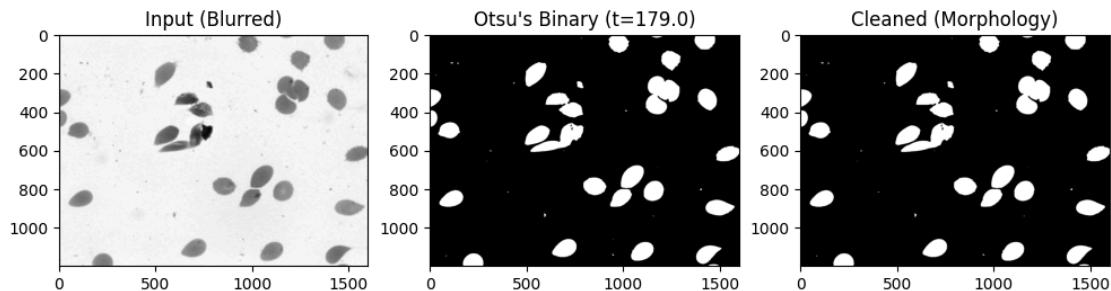
Oct 3, 2025

Workspace: [github.com/cebskie/PCD\\_Hands-on\\_Segmentation](https://github.com/cebskie/PCD_Hands-on_Segmentation)

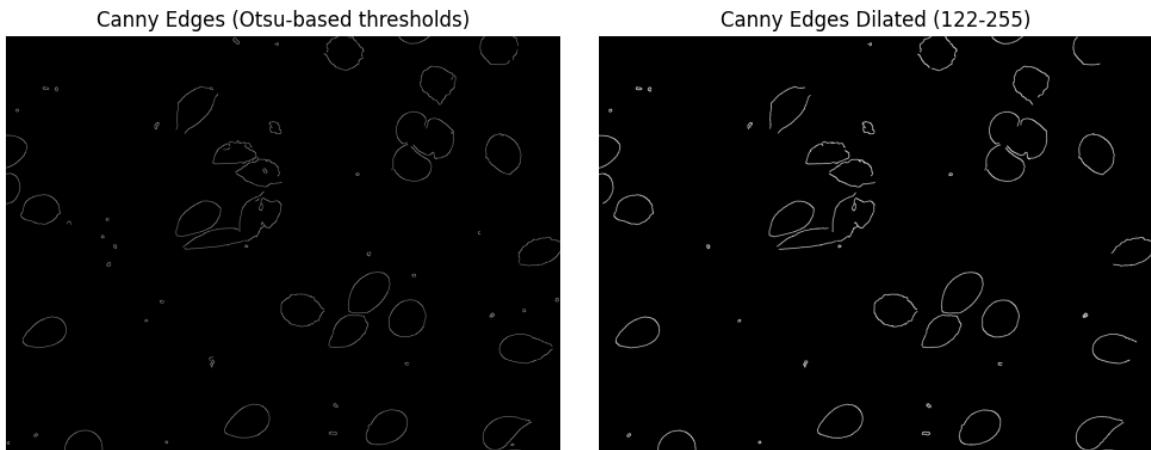
## 1. ori\_1.png and mask\_1.png



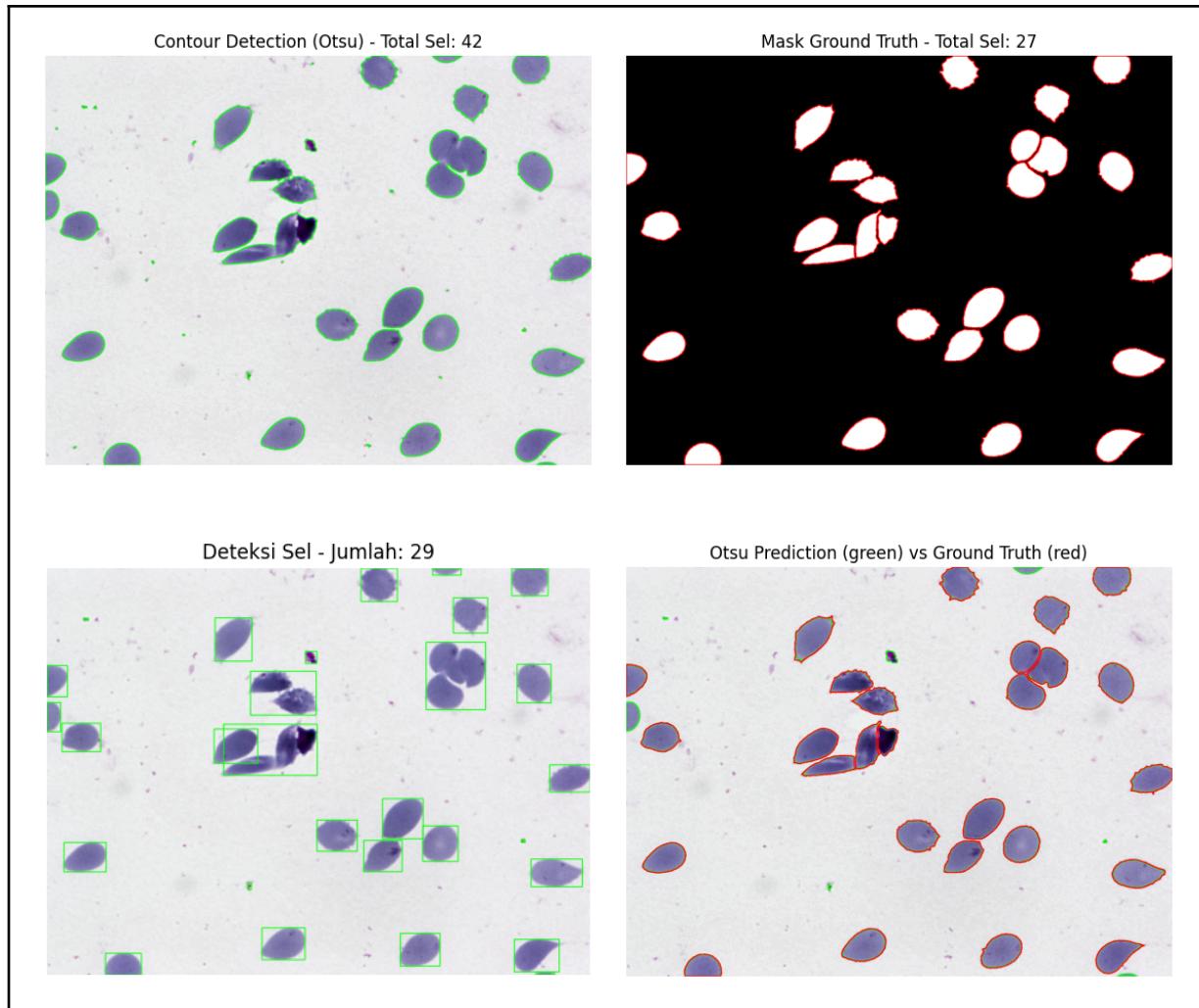
Preprocessing: Grayscale → Gaussian Blur → Contrast Enhancement



Thresholding + Morphology



Segmentation Process



Result

#### Analysis:

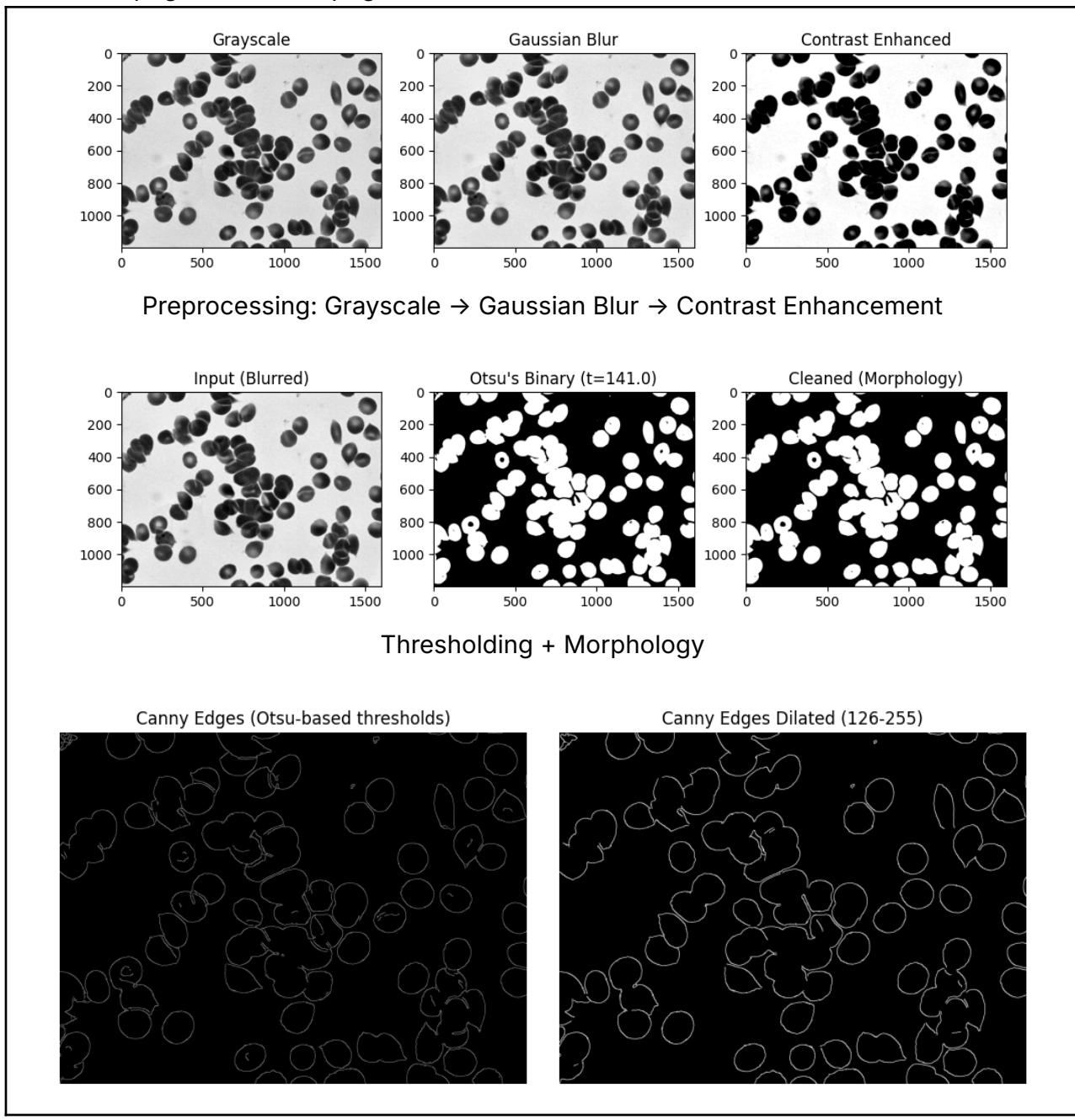
- Total cells in Otsu contour detection: 42
- Total cells detected: 29
- Ground truth: 27

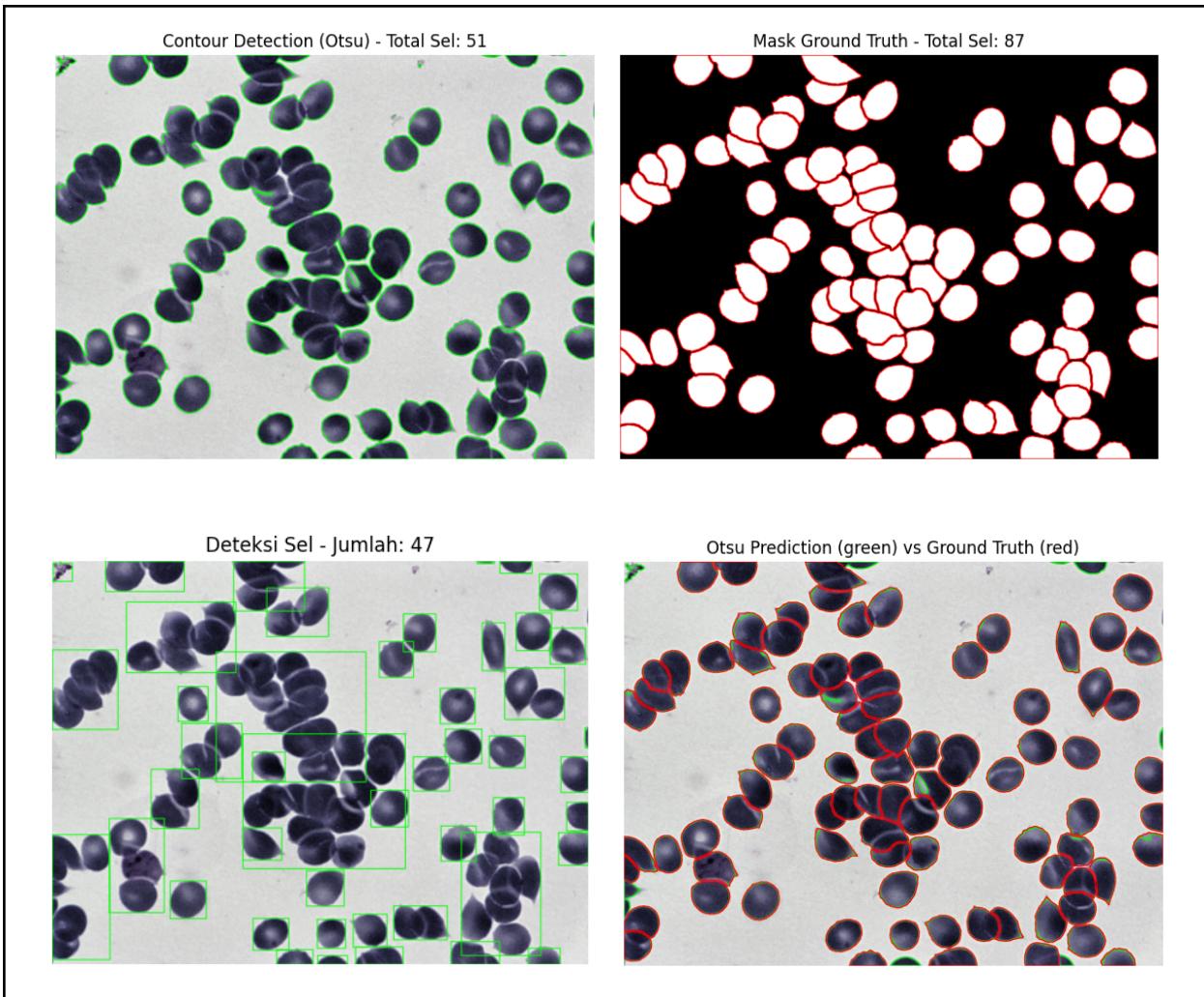
The cells detected by Otsu contour detection are quite high because it also counts the noisy grains. This may happen because the Gaussian filter does not smooth the image enough that it still leaves some noisy grains. However, during the detection process, since

```
if cv2.contourArea(cnt) > 50: # filter area kecil agar bukan noise
```

the smaller areas (like noisy grains) are not counted, the detected cells reduce to closely similar to the ground truth with only 2 falsely detected cells.

## 2. ori\_2.png and mask\_2.png





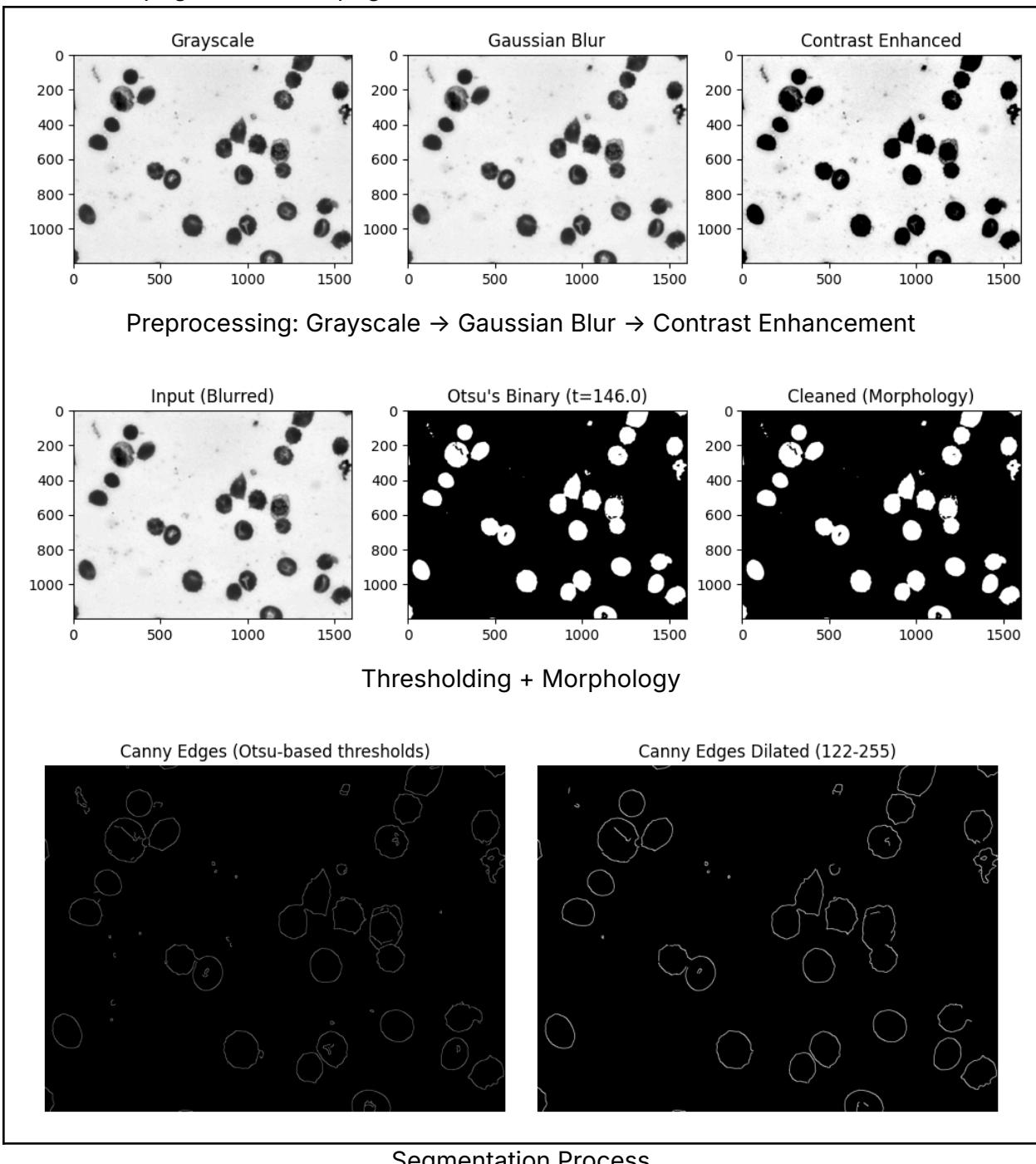
Result

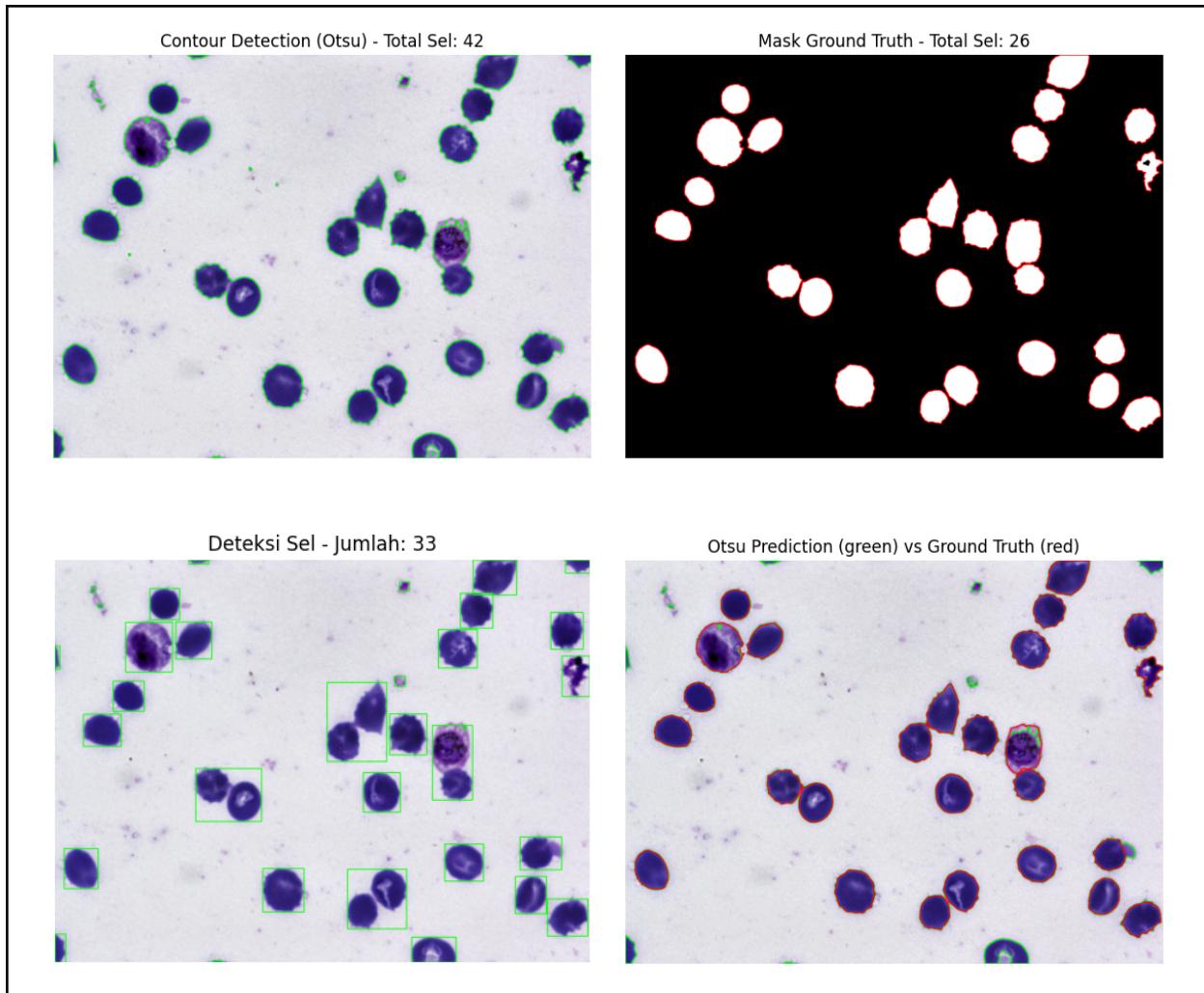
#### Analysis:

- Total cells in Otsu contour detection: 51
- Total cells detected: 47
- Ground truth: 87

In this case, since the detection counts only by the area where contour is filtered, the overlapping cells were counted as one, hence, falsely counting multiple cells that are touching or overlapping with each other to be a single cell. To overcome this, new methods to better detect edges can be used to improve the accuracy of the cells detected.

### 3. ori\_3.png and mask\_3.png





Result

#### Analysis:

- Total cells in Otsu contour detection: 42
- Total cells detected: 33
- Ground truth: 26

In this case 11 cells were falsely counted, with details: 3 cropped cells (not whole cells in the image), and 8 noisy grains detected. However, due to the logic of the algorithm that counts only by the area where contour is filtered, 4 pairs of cells that are touching each other are counted as 1 for each pair. This case is a combination of the problems from the 2 previous cases. To overcome this, more robust methods to reduce noise and detect edges of overlapping objects can be implemented.