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The 3rd Assignment

Original Image:

- Raw Segmentation: I used a standard binary threshold at 128.
- Morphological Opening: I applied an Opening operation using a 3x3 kernel to remove background specks.
- Morphological Closing: I then applied a Closing operation using a 3x3 kernel.

Output:

Analysis of Results

With Morphological Processing:

Raw Segmentation: My initial thresholded image shows two problems. The white background is full of black noise, and the black foreground is full of white holes.
With Morphological Processing:
After Opening: The Opening step with the 3x3 kernel worked perfectly. As we can see in the middle panel, the background is now almost completely clean. It successfully removed all the small black specks.

After Closing: This is where I see the limitation of my 3x3 kernel choice. My goal for the closing step was to fill in all the white holes. However, by using a kernel that was only 3x3, it was too small to plug the larger holes. I can clearly see that the white spots in his eyes, hair, and on his collar are all still present. The 3x3 kernel was only large enough to fill the tiniest of the salt holes, but it failed on all the more noticeable ones.

This shows that while the 3x3 kernel was effective for the Opening operation since the background specks were very small, it was insufficient for the Closing operation. The white noise holes were simply larger than 3x3, so my kernel wasn't big enough to fill them.