

# Erythroblast Cells: ML Models for Multiclass Classification in Single Image and Mixed Magnification.

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Project Guide: Nirmal Punjabi, IIT Bombay  
DH 307: R & D Project  
Week 9 & 10

April 9, 2025

# Overview

- 1 Task Overview
- 2 Findings and Results
- 3 Conclusion
- 4 Plan for This Week

# Task Overview

- Segment all 9 classes of blood cells using image processing techniques.
- Randomly place the segmented cells on background images and perform detection.

# Findings and Results

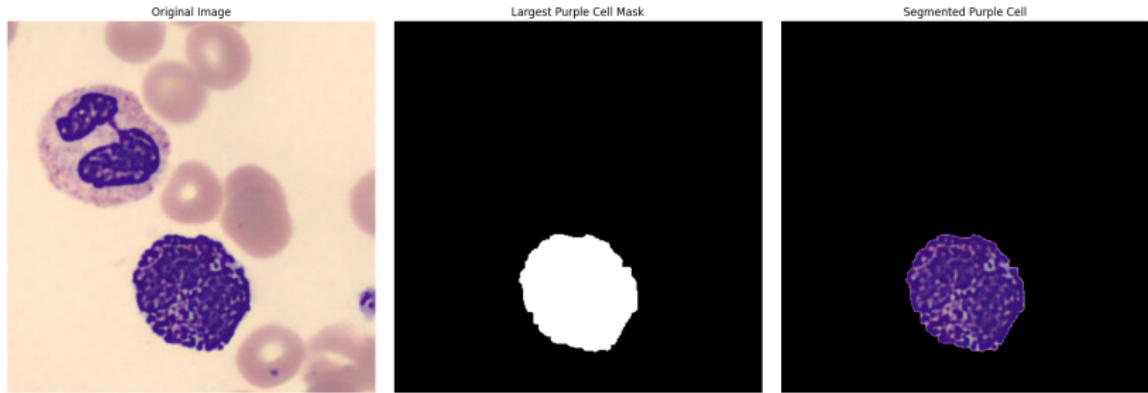


Figure: Segmentation of Basophil

# Findings and Results

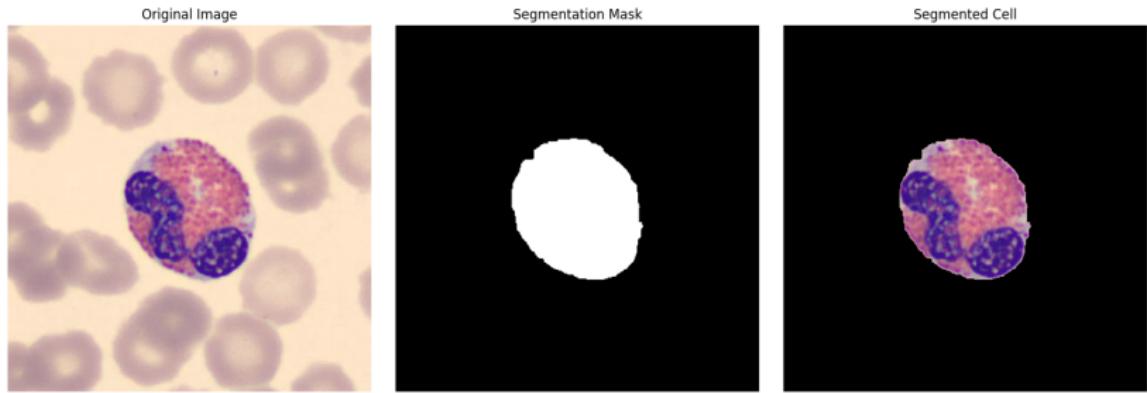


Figure: Segmentation of Eosinophil

# Findings and Results

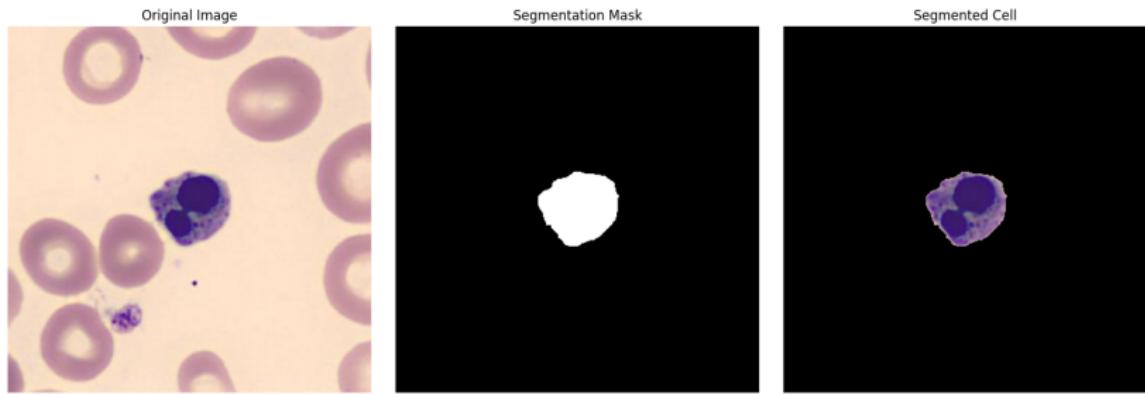


Figure: Segmentation of Erythroblast

# Findings and Results

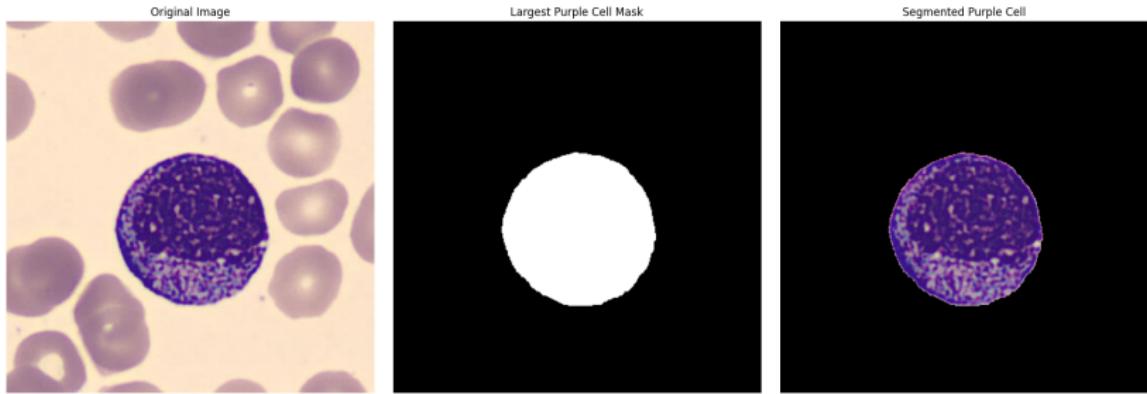


Figure: Segmentation of Immunoglobulin

# Findings and Results

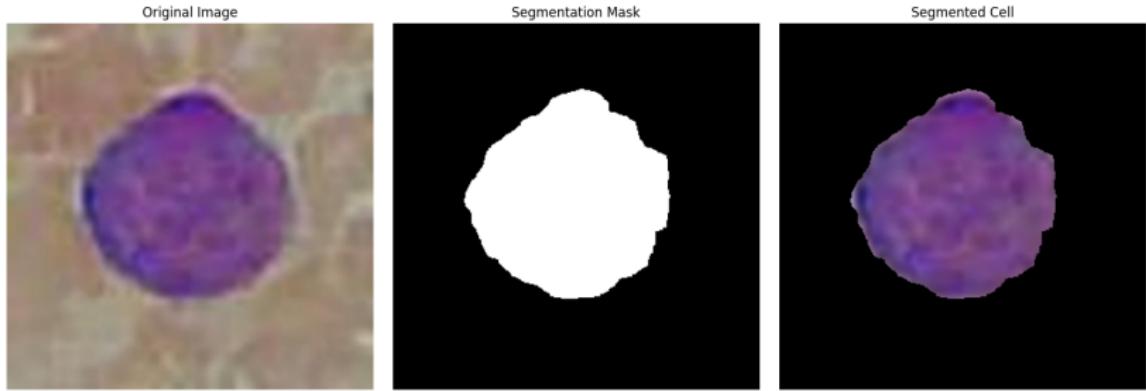


Figure: Segmentation of Lymphoblast

# Findings and Results

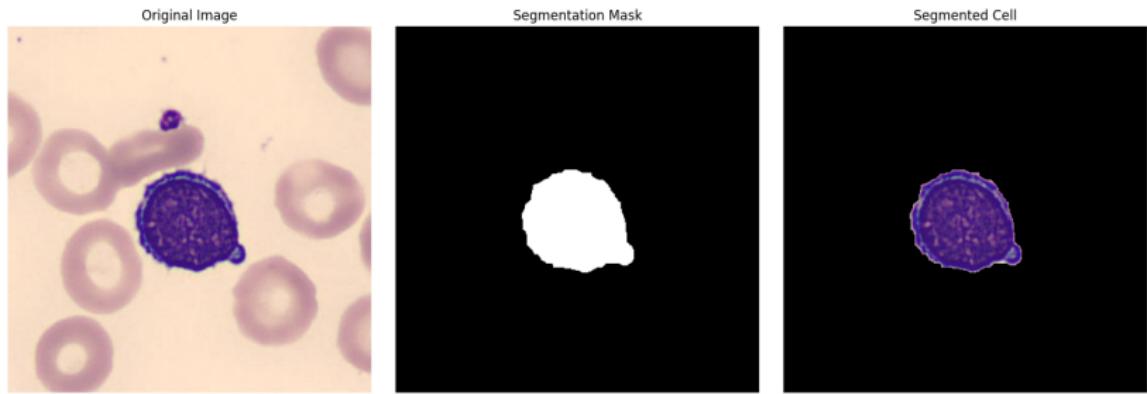


Figure: Segmentation of Lymphocyte

# Findings and Results

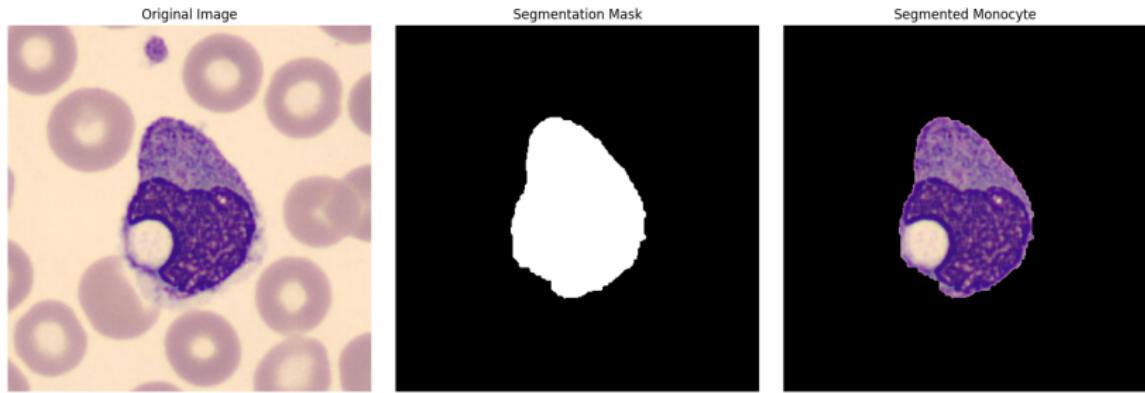


Figure: Segmentation of Monocyte

# Findings and Results

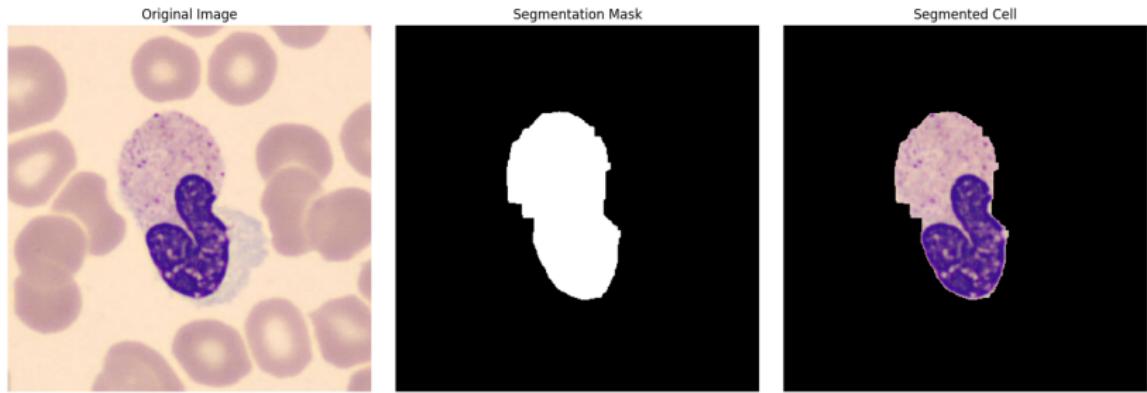


Figure: Segmentation of Neutrophil

# Findings and Results

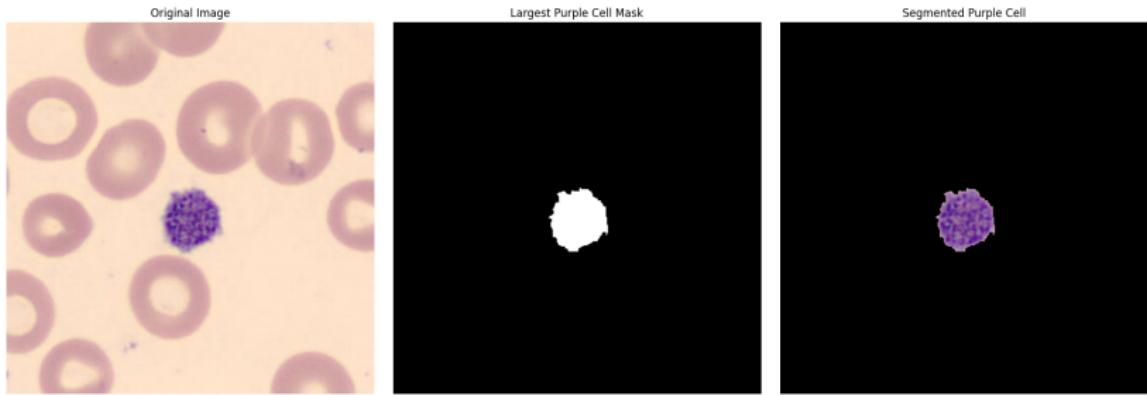


Figure: Segmentation of Platelet

# Findings and Results

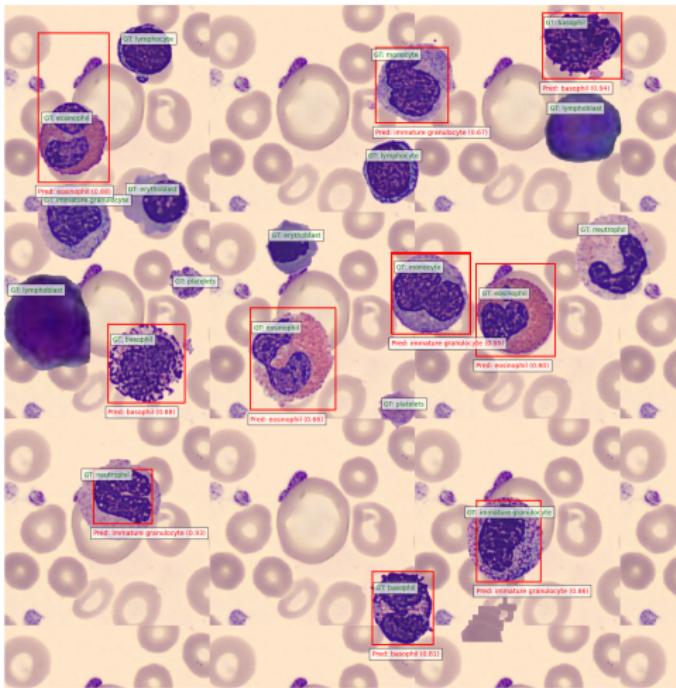


Figure: Prediction

# Conclusion

- The segmentation pipelines use a range of image processing techniques tailored for different cell types.
- Preprocessing includes converting color spaces (BGR, RGB, HSV, LAB) and enhancing contrast (e.g., CLAHE).
- Thresholding and morphological operations are applied to isolate regions of interest.
- Contour analysis, along with advanced methods like watershed and GrabCut, refines the segmentation.
- The final masks are used to extract and visualize the specific cell class from microscopy images.
- The YOLO prediction was not accurate—possibly due to background-induced bias. The model needs to be retrained.

## Plan for This Week

- Current model was trained on stitched images ( $1\times 1$ ,  $2\times 2$ ,  $3\times 3$ ,  $4\times 4$ ) that include background.
- This may have introduced bias due to repetitive background patterns.
- Plan to create a new dataset by randomly pasting segmented cells on backgrounds.
- Retrain the model using this new dataset.