

Detection of overlapping cells in microscopic scans of GFP brain tissues

Computer Vision (CS6350)
TPA - 11

1 Problem Statement

Cell detection in biomedical images can greatly advance biomedicine in various disciplines such as diagnostics and drug screening. Manual assessment in such cases is difficult as it is labor intensive and prone to inter-observer variations. Computer-vision based cell detection algorithms are hence proven to significantly improve the objectivity and reproducibility. Although a plethora of such algorithms exists, accurate detection is challenging because of cell-to-cell variability, cell shape irregularities, presence of cluttered & overlapping cells, image noise and contrast which requires problem-specific tailoring of algorithms. The goal of this project is to develop an efficient algorithm to accurately detect Green Fluorescent Protein (GFP) labeled nuclei in 2D scans of mouse brains. The main focus is to detect nuclei of strongly overlapping cells.

2 Input

- Images/tiles consisting of Green Fluorescent Protein (GFP) tagged cells.

An example tile is shown in figure 1.

3 Expected Output

Given a few tiles containing GFP tagged cells, the following results are expected:

- **Qualitative Results:** Location of the cell nuclei in the image.
- **Quantitative Results:** Precision-Recall values for each test image provided.

4 Dataset

- GFP Dataset (will be provided)

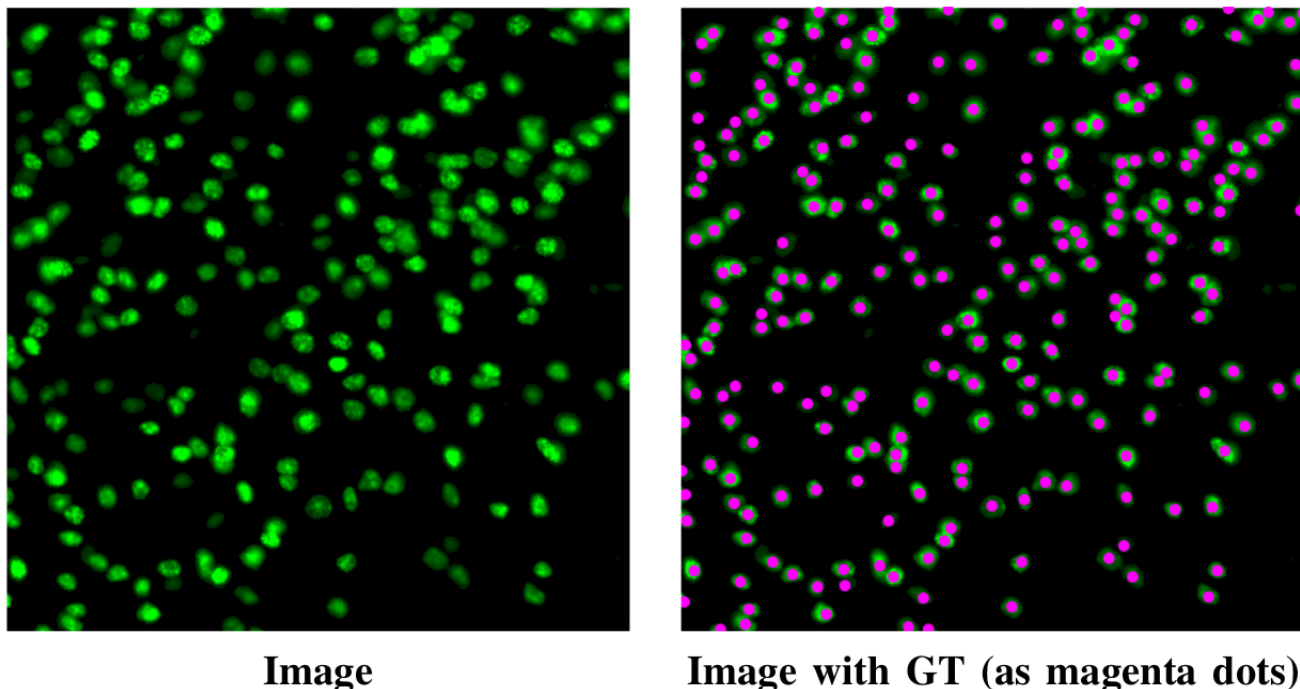


Figure 1: Left: An input tile (after contrast enhancement); Right: GT cell centers overlayed on the input image.

5 References

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