Counting of Cells using Image Processing

Introduction:

The traditional methods of blood and several analysis involves manual counting of cells under microscope. Image processing in python modules can be used as an alternative method to reduce time consumption and complexity haemotology analyzers .This method will be low cost and portable solution for obtaining cell counts using a image processing technique on the images obtained from microscope or any other methods using watershed algorithm.

Aim:

To calculate the cell count from the images obtained from microscope.

Input:

- Image obtained from microscope
- openCV module
- Numpy module
- Matplotlib module

Variables:

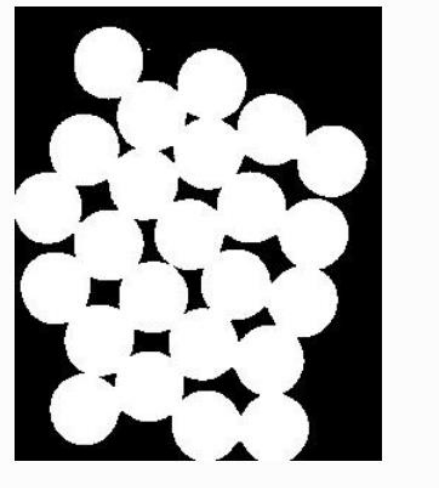
- Img
- Gray
- Ret
- Thresh
- Kernel

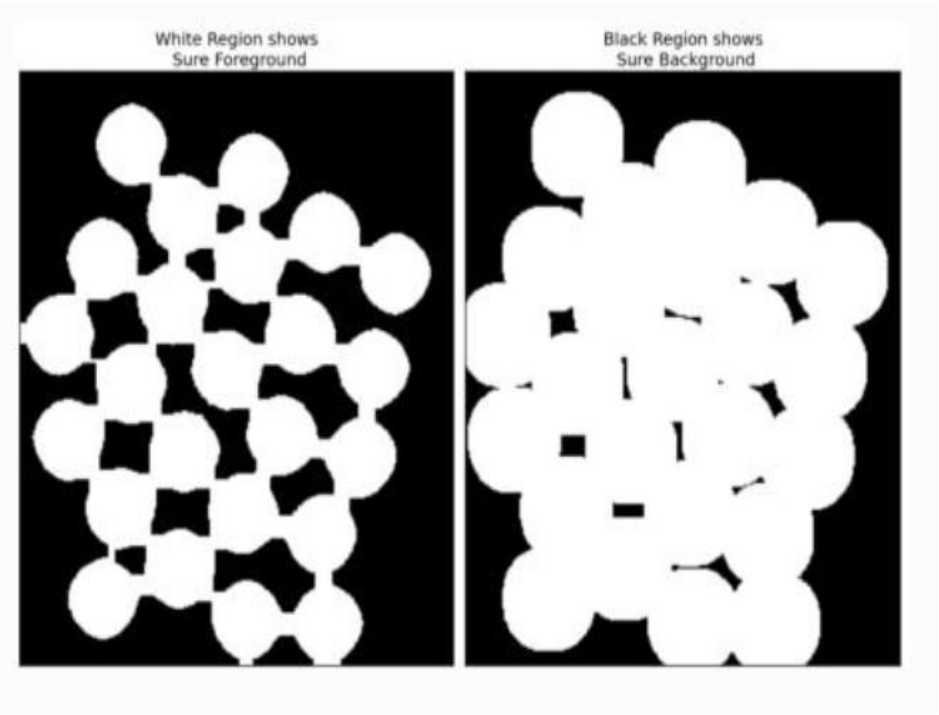
- opening
- sure_bg
- dist_trans
- ret
- sure_fg
- unknwn
- markers

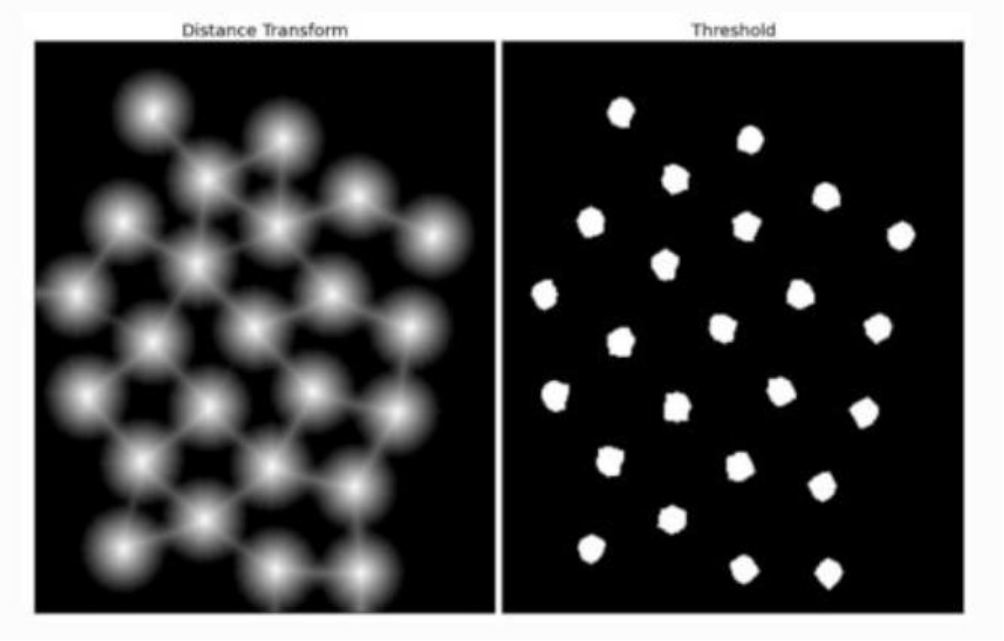
Classes/variables/functions used:

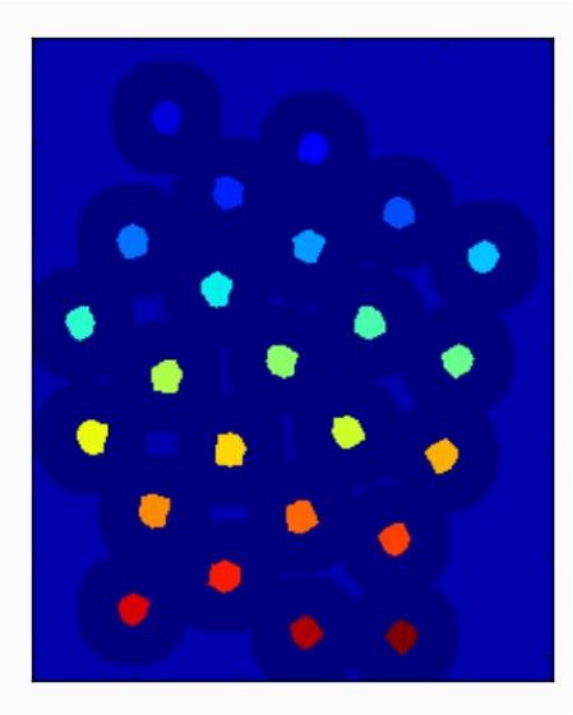
- import numpy as np
- import cv2
- from matplotlib import pyplot as plt
- imread (image)
- cv2Color(img,cv2.COLOR_BGR2GRAY)
- cv2.threshold(gray,0,255,cv2.THRESH_BINARY_INV+cv2.THRESH_OTSU)
- cv2.watershed(img,markers)

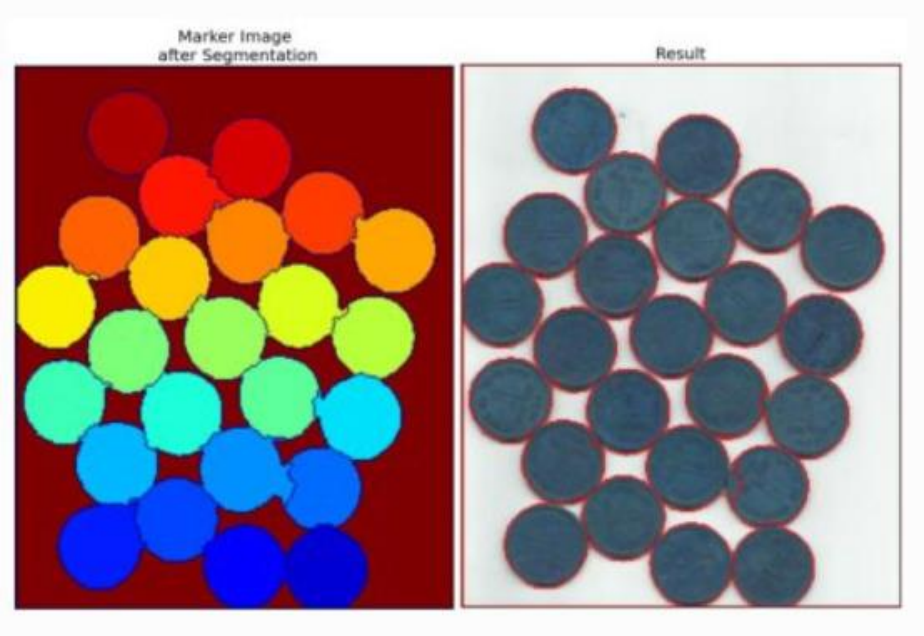
Output:




White Region shows
Sure Foreground
Black Region shows
Sure Background


Distance Transform
Threshold





Psuedocode:

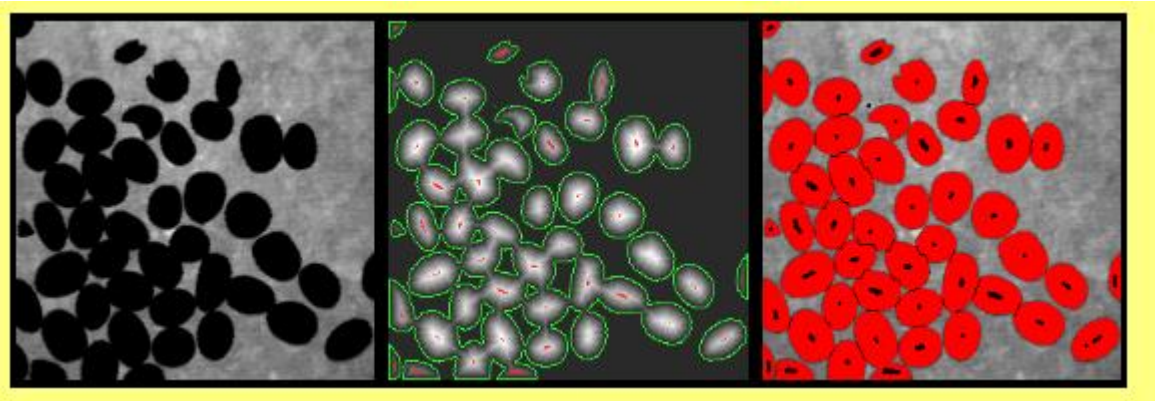
1. Any greytone image can be considered as a topographic surface.
2. If we flood this surface from its minima and, if we prevent the merging of the waters coming from different sources,

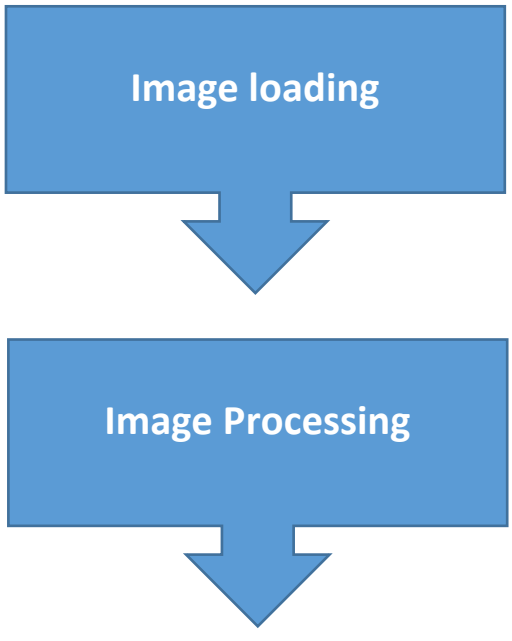
we partition the image into two different sets: the catchment basins and the watershed lines.

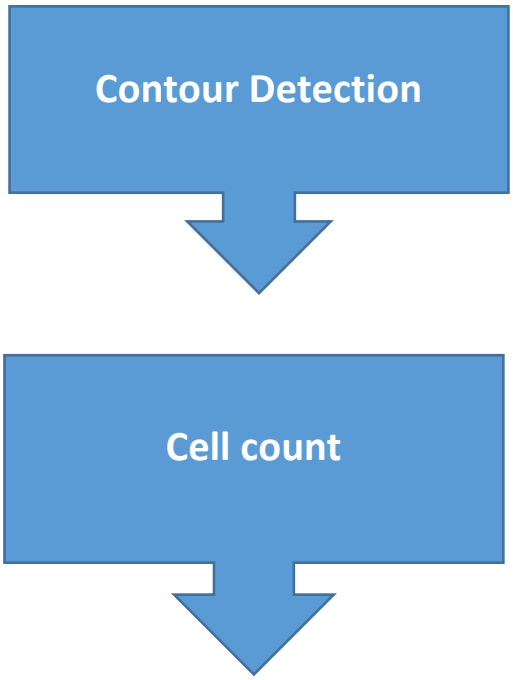
3. If we apply this transformation to the image gradient, the catchment basins should theoretically correspond to the homogeneous grey level regions of this image.
4. However, in practice, this transform produces an important over-segmentation due to noise or local irregularities in the gradient image.

From top to bottom and from right to left:

- *Original image.*
- *Gradient image.*
- *Watershed of the gradient image.*
- *Finalcontours.*






Contour Detection
Cell count