**Task 5 (1):**

img = imread(sourcePath);

grayImg = imread(resizedPath);

grayPath = strcat(GRAY\_FOLDER\_PATH,imageName,FORMAT);

redChannel = grayImg(:,:,1);

greenChannel = grayImg(:,:,2);

blueChannel = grayImg(:,:,3);

[imgHeight, imgLength] = size(redChannel);

grayscaleChannel = zeros(imgHeight, imgLength);

blackwhiteChannel = zeros(imgHeight, imgLength);

for i = 1:imgHeight

for j = 1:imgLength

grayscaleValue = 0.2989 \* redChannel(i,j) + 0.5870 \* greenChannel(i,j) + 0.1140 \* blueChannel(i,j);

grayscaleChannel(i, j) = grayscaleValue;

end

end

imwrite(redChannel, grayPath);

**Task 5 (2):**

img = imread(sourcePath);

grayImg = imread(resizedPath);

grayPath = strcat(GRAY\_FOLDER\_PATH,imageName,FORMAT);

redChannel = grayImg(:,:,1);

greenChannel = grayImg(:,:,2);

blueChannel = grayImg(:,:,3);

[imgHeight, imgLength] = size(redChannel);

grayscaleChannel = zeros(imgHeight, imgLength);

blackwhiteChannel = zeros(imgHeight, imgLength);

for i = 1:imgHeight

for j = 1:imgLength

grayscaleValue = 0.2989 \* redChannel(i,j) + 0.5870 \* greenChannel(i,j) + 0.1140 \* blueChannel(i,j);

grayscaleChannel(i, j) = grayscaleValue;

end

end

imwrite(redChannel, grayPath);

% converting grayscale images to BW

bwPath = strcat(BW\_FOLDER\_PATH,imageName,FORMAT);

for i = 1:imgHeight

for j = 1:imgLength

if grayscaleChannel(i, j) < THRESHOLD

blackwhiteChannel(i, j) = 0;

else

blackwhiteChannel(i, j) = 1;

end

end

end

imwrite(blackwhiteChannel, bwPath);

% converting BW matrix to vector

bwVector = blackwhiteChannel';

bwVector = bwVector(:)';

% adding the binary image to a matrix

imagesFinalMatrix(imageIndex,:) = bwVector;

writematrix(imagesFinalMatrix, 'matrix.csv')

**Task 5 (3):**

% To Print the foreground pixel count and background pixel count

imgBW= imread(bwPath);

foregroundPixelCount= sum(imgBW(:)==1);

backgroundPixelCount= sum(imgBW(:)==0);

fprintf('Total Foreground pixels: %d\n', foregroundPixelCount);

fprintf('Total Background pixels: %d\n', backgroundPixelCount);

**Task 5 (4):**

img = imread(sourcePath);

imgResized = imresize(img, [225 225]);

resizedPath = strcat(RESIZED\_FOLDER\_PATH,imageName,FORMAT);

imwrite(imgResized, resizedPath);

foregroundPixelCount= sum(img(:)==1);

backgroundPixelCount= sum(img(:)==0);

fprintf('Total Foreground pixels: %d\n', foregroundPixelCount);

fprintf('Total Background pixels: %d\n', backgroundPixelCount);

pixelCountMatrix = [];

pixelCountMatrix = [pixelCountMatrix, foregroundPixelCount, backgroundPixelCount];

writematrix(pixelCountMatrix, 'PixelCountMatrix.csv')