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ECE 5470

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Homework 11

1. Erosion and Dilation

clear

scale = 0.15;

A = im2double(imresize(imread('Fig7-1.tif'),scale));

B = im2double(imresize(imread('B.tif'),scale));

C = erode(A,B);

D = dilate(C,B);

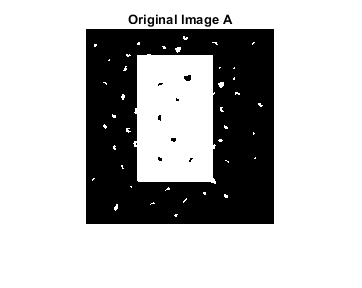
E = dilate(D,B);

F = erode(E,B);

figure();

imshow(A);

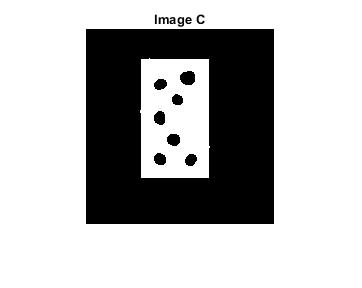
title('Original Image A');



figure();

imshow(C);

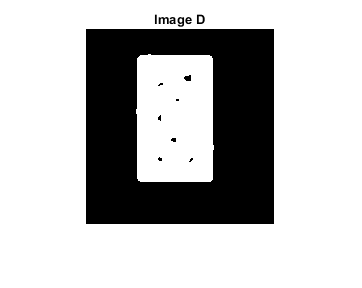
title('Image C');



figure();

imshow(D);

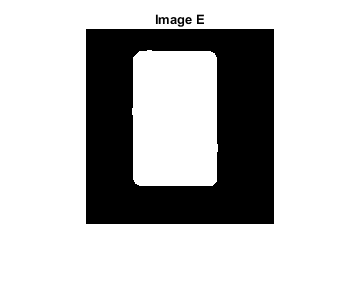
title('Image D');



figure();

imshow(E);

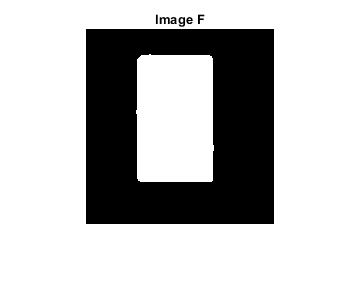
title('Image E');



figure();

imshow(F);

title('Image F');



~~2. Hole Filling~~

~~clear~~

~~image = im2double(imread('Fig7-2(2).tif'));~~

~~imageComp = 1-image;~~

~~start = [95,239];~~

~~struct = [[0 1 0]~~

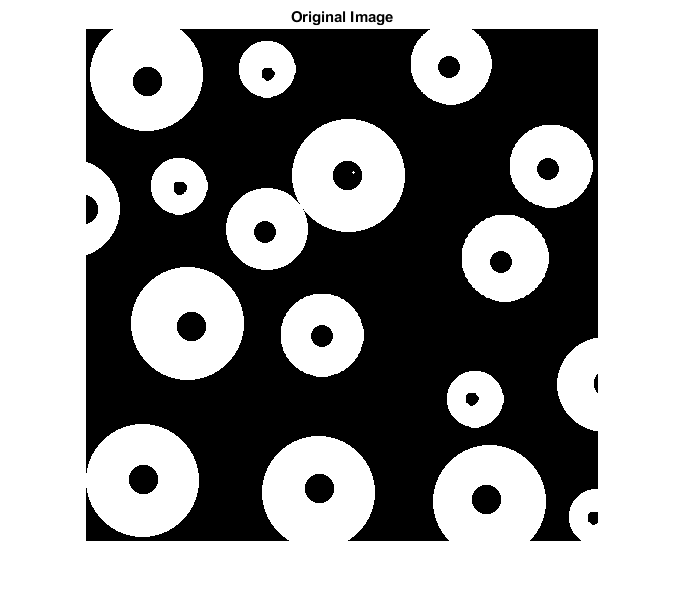
~~[1 1 1]~~

~~[0 1 0]];~~

~~filled = close(image,struct);~~

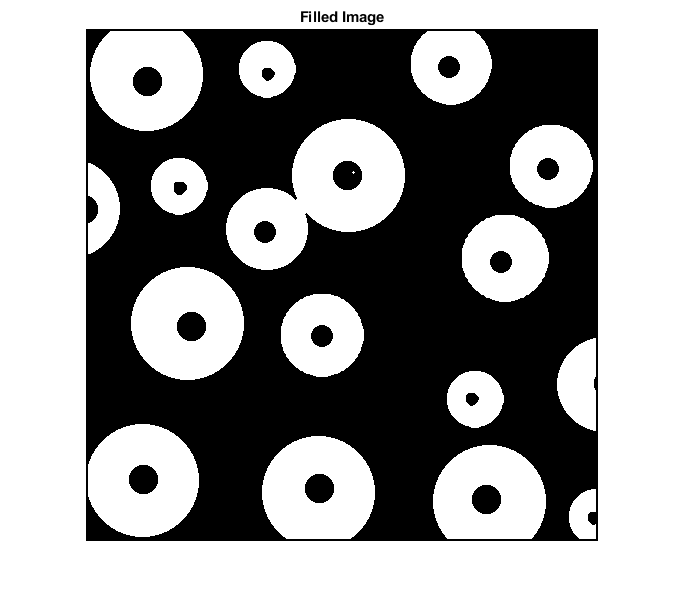
~~figure, imshow(image);~~

~~title('Original Image');~~

~~~~

~~figure, imshow(filled);~~

~~title('Filled Image');~~

~~.~~

3. Image Fix

clear

image = im2double(imread('Fig7-3.tif'));

struct1 = [[1 1 1]

[1 1 1]

[1 1 1]];

struct2 = [[0 1 0]

[1 1 1]

[0 1 0]];

imageMod = close(image,struct2);

imageMod = close(imageMod,struct2);

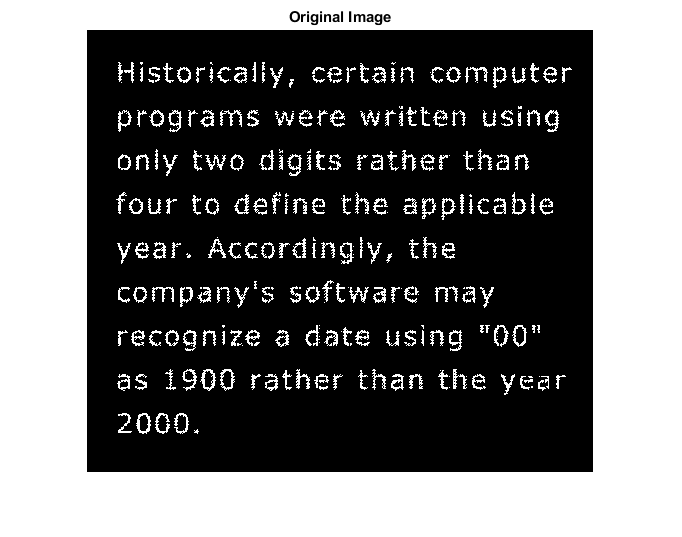
imageMod = bwperim(imageMod);

imageMod = close(imageMod,struct1);

imageMod = close(imageMod,struct2);

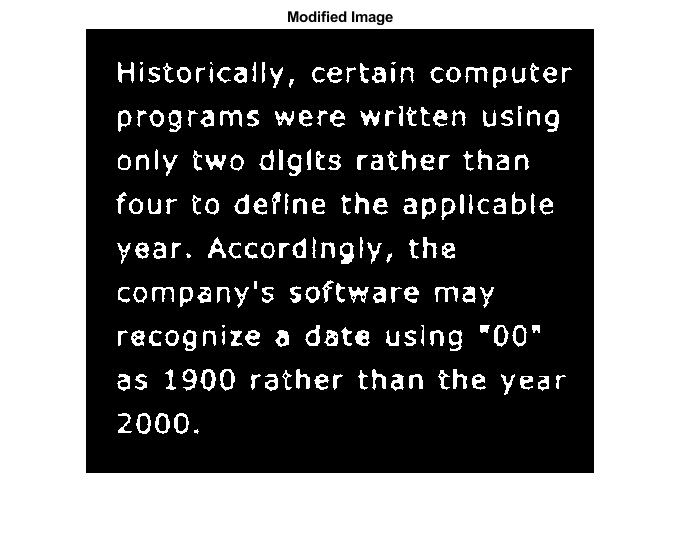
figure, imshow(image);

title('Original Image');



figure, imshow(imageMod);

title('Modified Image');



# Appendix (Functions Used)

function eroded = erode(image, struct)

eroded = zeros(size(image));

frame = zeros(size(struct));

pad = floor(size(struct,1)/2);

for i = 1+pad : size(image,1)-pad

for j = 1+pad : size(image,2)-pad

% Get Current Frame

xOffset = -1\*pad-1;

for x = 1:size(frame,1)

yOffset = -1\*pad;

xOffset = xOffset + 1;

for y = 1:size(frame,2)

frame(x,y) = image(i+xOffset,j+yOffset);

yOffset = yOffset + 1;

end

end

if((frame & struct) == struct)

eroded(i,j) = 1;

else

eroded(i,j) = 0;

end

end

end

end

function dilated = dilate(image, struct)

dilated = zeros(size(image));

frame = zeros(size(struct));

pad = floor(size(struct,1)/2);

for i = 1+pad : size(image,1)-pad

for j = 1+pad : size(image,2)-pad

% Get Current Frame

xOffset = -1\*pad-1;

for x = 1:size(frame,1)

yOffset = -1\*pad;

xOffset = xOffset + 1;

for y = 1:size(frame,2)

frame(x,y) = image(i+xOffset,j+yOffset);

yOffset = yOffset + 1;

end

end

if((frame & struct) == 0)

dilated(i,j) = 0;

else

dilated(i,j) = 1;

end

end

end

end

function filled = fill(image, struct, start)

% Not working

filled = image;

imageC = 1-image;

frame = zeros(size(struct));

frameC = zeros(size(struct));

pad = floor(size(struct,1)/2);

for i = start(2) : size(image,1)-pad

for j = 1+pad : size(image,2)-pad

% Get Current Frame

xOffset = -1\*pad-1;

for x = 1:size(frame,1)

yOffset = -1\*pad;

xOffset = xOffset + 1;

for y = 1:size(frame,2)

frame(x,y) = image(i+xOffset,j+yOffset);

frameC(x,y) = imageC(i+xOffset,j+yOffset);

yOffset = yOffset + 1;

end

end

dilated = dilate(frame,struct);

restrict = dilated&frameC;

xOffset = -1\*pad-1;

for x = 1:size(frame,1)

yOffset = -1\*pad;

xOffset = xOffset + 1;

for y = 1:size(frame,2)

filled(i+xOffset,j+yOffset) = restrict(x,y);

yOffset = yOffset + 1;

end

end

end

end

end

function opened = open(image,struct)

eroded = erode(image,struct);

opened = dilate(eroded,struct);

end

function closed = close(image,struct)

dilated = dilate(image,struct);

closed = erode(dilated,struct);

end