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%=====
% Name:          hw3_4.m
%
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%
%=====

fprintf('a)\n');
fprintf('Distance transform is an operator applied to binary images that\n');
fprintf('that results in a grayscale image, where the distance from the\n');
fprintf('closest boundary determines the intensities of the gray scale.\n');
fprintf('\n\n');
fprintf('Two distance types are Manhattan distance and Euclidean distance:\n');
fprintf('\tIn Manhattan distance, the distance between two points is the\n');
fprintf('\tsum of the difference in absolute differences of the Cartesian\n');
fprintf('\tcoordinates.\n');
fprintf('\tIn Euclidean distance, the distance between two points is the\n');
fprintf('\tstraight line distance between two points in Euclidean space.\n');
fprintf('\tIn other words, it is the square root of the sum of the squares\n');
fprintf('\tof its Cartesian coordinates.\n');

fprintf('b)\n');
% Set threshold values
lowerThresh = 959;
upperThresh = 978;

% Apply threshold to range image
binImage = (range > lowerThresh) & (range < upperThresh);

% bwdistgeodesic to pick out person
distGray = bwdistgeodesic(binImage, [300], [261]);

figure(1);
distGray(isnan(distGray)) = 255;
imshow(distGray,[0,255]);
title('Distance image of original binary image');

fprintf('c)\n');
threshold = 164;
distGray2 = distGray;
distGray2(distGray2 > threshold) = 255;
figure(2);
imshow(distGray2,[0,255]);
title('Distance image of original binary image with threshold');

fprintf('d)\n');
fprintf('\tThe distance transform allows filtering of objects that are far\n');
fprintf('\tfrom the seed points. This was effective in removing the unnecessary\n');
fprintf('\tbottom board that was attached to the filtered person in the bwselect\n');
fprintf('\tfiltering method. However, the feet were chopped off the filtered person.\n');

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a)
Distance transform is an operator applied to binary images that that results in a grayscale image, where the distance from the closest boundary determines the intensities of the gray scale.

Two distance types are Manhattan distance and Euclidean distance:
In Manhattan distance, the distance between two points is the sum of the difference in absolute differences of the Cartesian coordinates.

In Euclidean distance, the distance between two points is the straight line distance between two points in Euclidean space. In other words, it is the square root of the sum of the squares of its Cartesian coordinates.

- b)
- c)
- d)

The distance transform allows filtering of objects that are far from the seed points. This was effective in removing the unnecessary bottom board that was attached to the filtered person in the bwselect filtering method. However, the feet were chopped off the filtered person.

Distance image of original binary image



Distance image of original binary image with threshold



