Code and Output

Name – Adwait Lokhand

1. Code

```
clear all;
close all;
clc;

image1 = imread('Miami Beach (1).png');
image2 = imread('Miami Beach (2).png');

image1_gray = rgb2gray(image1);
image2_gray = rgb2gray(image2);

edges1 = edge(image1_gray, 'Canny');
edges2 = edge(image2_gray, 'Canny');
difference = abs(double(edges2) - double(edges1));

threshold = 0.5;

binary_mask = difference > threshold;
color_mask = cat(3, binary_mask, ~binary_mask, ~binary_mask);
output = image1;
output(color_mask) = image2(color_mask);

figure;
subplot(2, 2,
1);
imshow(image1);
title('Image
1');

subplot(2, 2, 2);
imshow(image2);
title('Image 2');

subplot(2, 2, 3);
imshow(difference);
title('Difference');

subplot(2, 2, 4);
imshow(output);
title('Output Image');
```

```
shoreline1 = sum(edges1(:));
shoreline2 = sum(edges2(:));

erosion_length_pixels = shoreline2 - shoreline1;
disp(['Erosion Length (Pixels): ' num2str(erosion_length_pixels)]);
conversion_factor = 0.;
erosion_length_feet = erosion_length_pixels * conversion_factor;

disp(['Erosion Length (Feet): ' num2str(erosion_length_feet)]);

shoreline_change_percentage = (erosion_length_pixels / shoreline1) * 100;

disp(['Percentage of Shoreline Change: ' num2str(shoreline_change_percentage) '%']);

years = 1;
average_retreat_rate_feet_per_year = erosion_length_feet / years;

disp(['Average Retreat Rate (Feet/Year): '
num2str(average_retreat_rate_feet_per_year)]);

combined = imfuse(image1, image2, 'blend', 'Scaling', 'joint');

difference = abs(double(edges2) - double(edges1));

threshold = graythresh(difference);
erosionMask = imbinarize(difference, threshold);

combinedErosion = combined;
combinedErosion(repmat(~erosionMask, 1, 1, 3)) = 0;

figure;
subplot(2, 2,
1);
imshow(image1);
title('Image
1');

subplot(2, 2, 2);
imshow(image2);
title('Image 2');

subplot(2, 2, 3);
imshow(difference);
title('Difference');

subplot(2, 2, 4);
imshow(combinedErosion);
title('Combined with Erosion');
```

2. Output

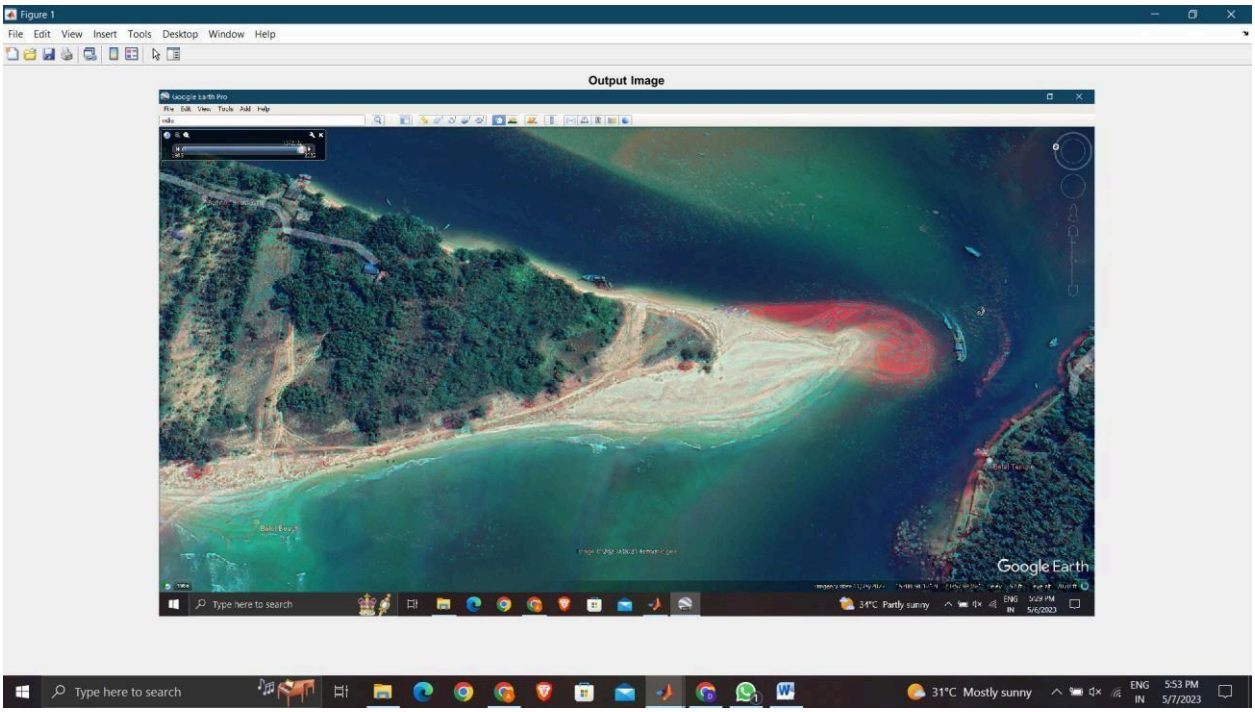
Figure 1
File Edit View Insert Tools Desktop Window Help
Output Image
Google Earth
Type here to search
31°C Mostly sunny
ENG IN 5:53 PM 5/7/2023

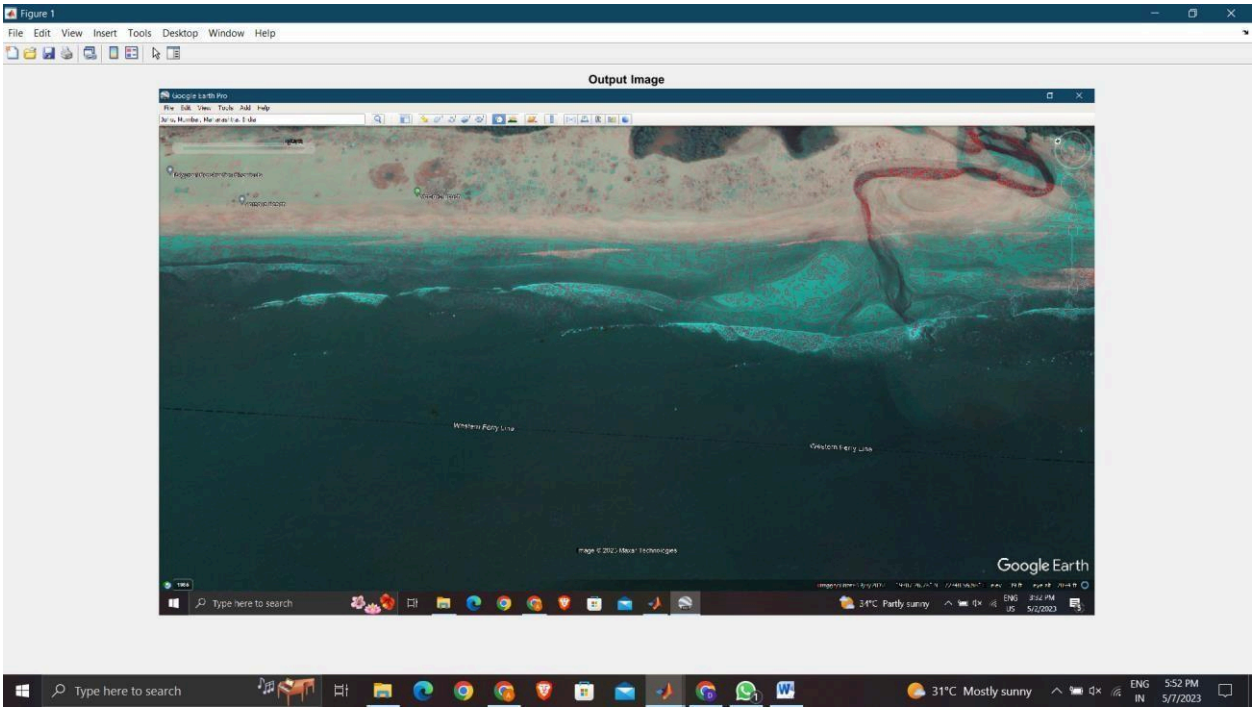
Figure 1
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Output Image
Google Earth
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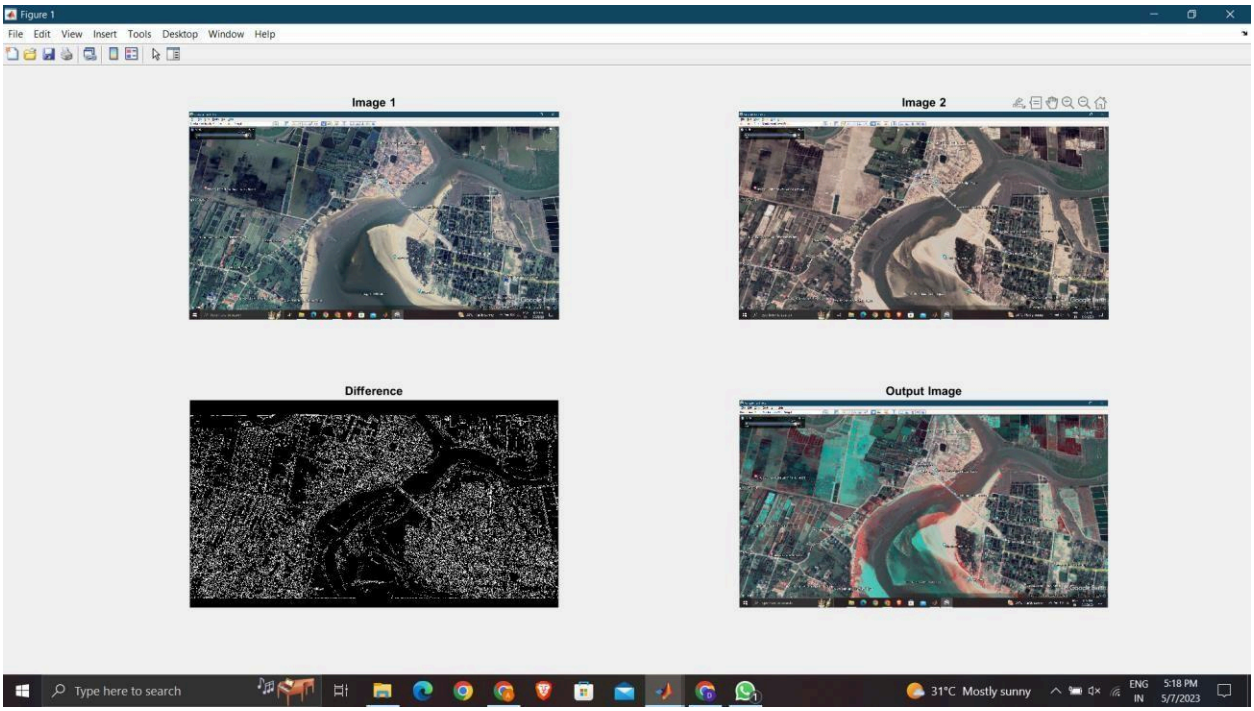
Figure 1
File Edit View Insert Tools Desktop Window Help
Image 1
Image 2
Difference
Output Image
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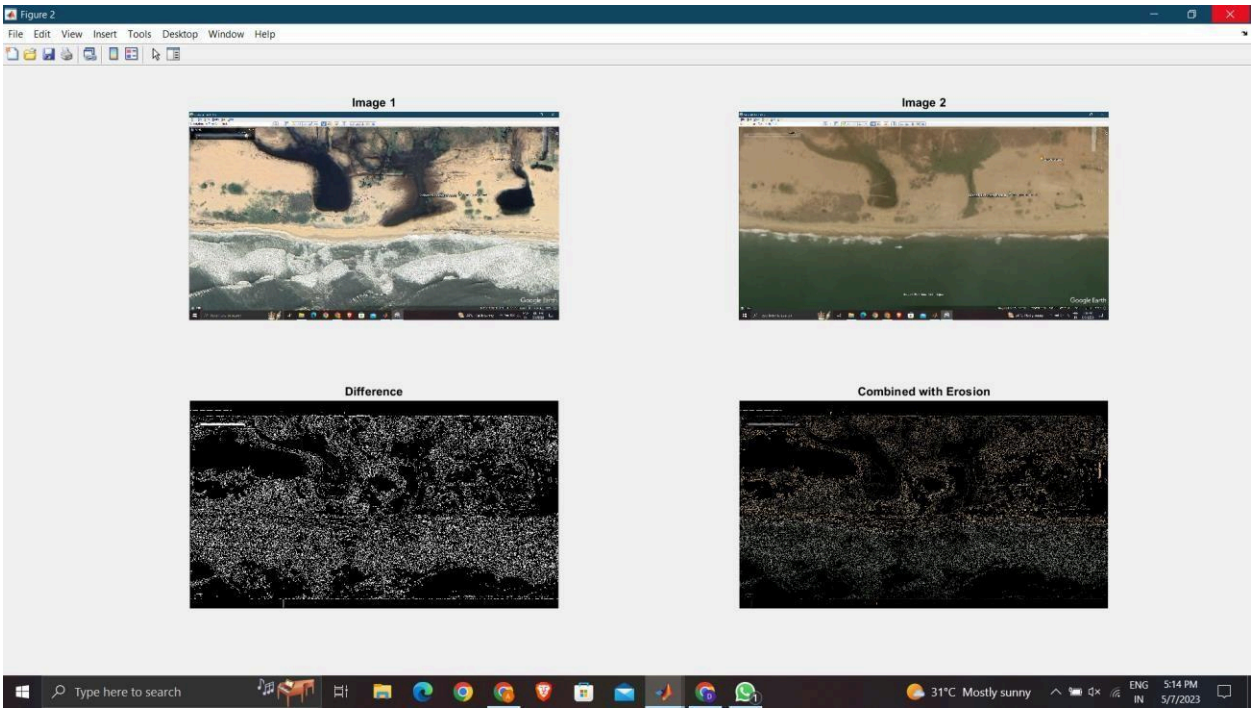
Figure 2
File Edit View Insert Tools Desktop Window Help
Image 1
Image 2
Difference
Combined with Erosion
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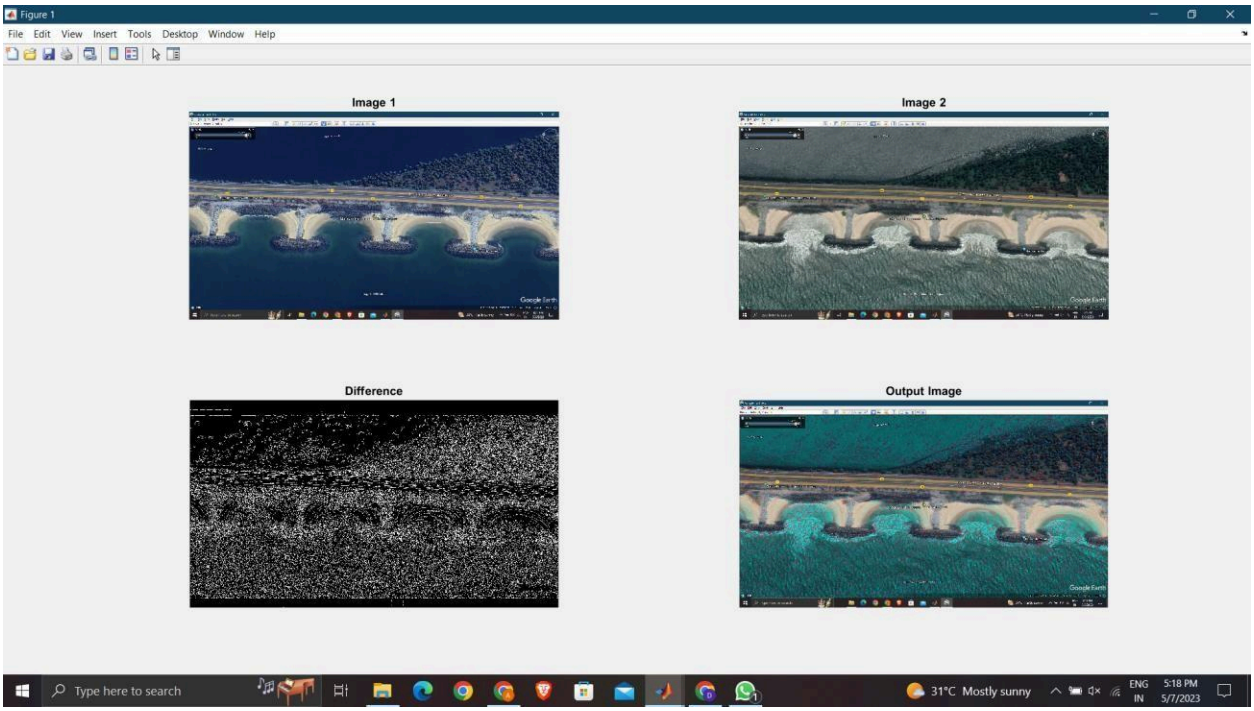
Figure 1
File Edit View Insert Tools Desktop Window Help
Image 1
Image 2
Difference
Output Image
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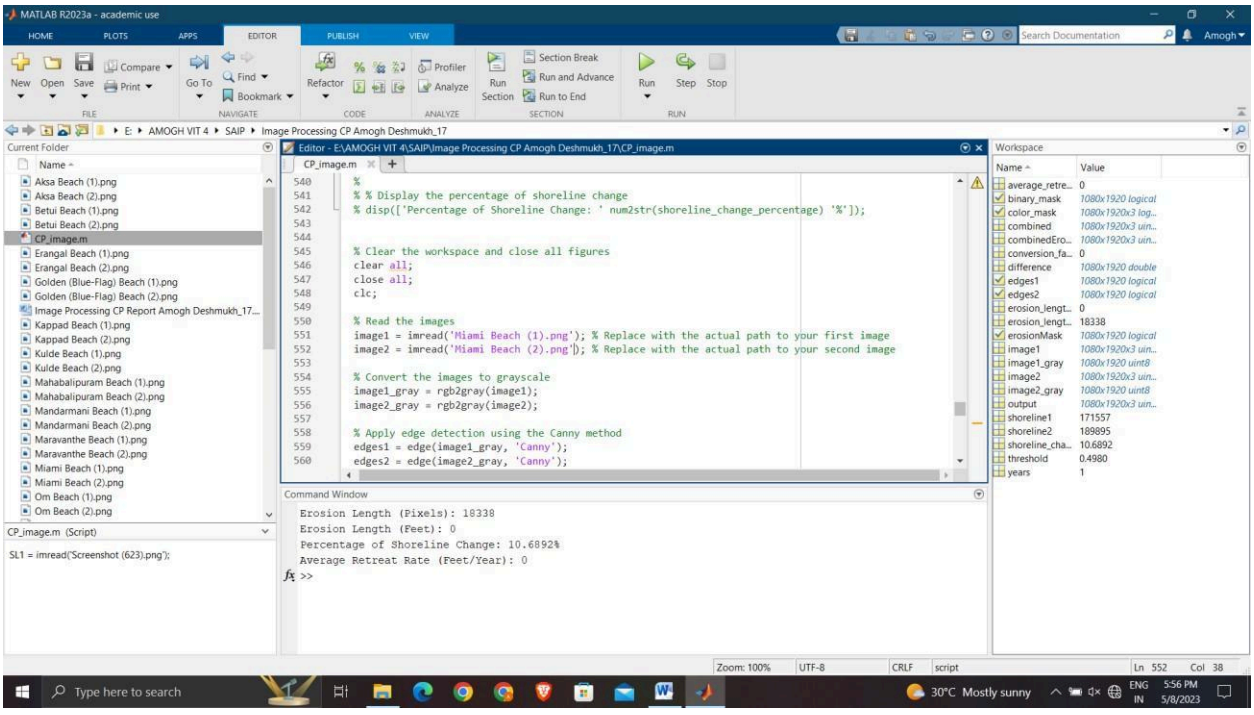
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Amogh
New Open Save Compare Print Go To Find Bookmark Refactor Profiler Analyze Run Section Section Break Run and Advance Run to End Run Step Stop
FILE NAVIGATE CODE ANALYZE SECTION RUN
E: ▸ AMOGH VIT 4 ▸ SAIP ▸ Image Processing CP Amogh Deshmukh_17
Current Folder
Name
Aksa Beach (1).png
Aksa Beach (2).png
Betui Beach (1).png
Betui Beach (2).png
CP_image.m
Erangal Beach (1).png
Erangal Beach (2).png
Golden (Blue-Flag) Beach (1).png
Golden (Blue-Flag) Beach (2).png
Image Processing CP Report Amogh Deshmukh_17...
Kappad Beach (1).png
Kappad Beach (2).png
Kulde Beach (1).png
Kulde Beach (2).png
Mahabalipuram Beach (1).png
Mahabalipuram Beach (2).png
Mandarmani Beach (1).png
Mandarmani Beach (2).png
Maravanthe Beach (1).png
Maravanthe Beach (2).png
Miami Beach (1).png
Miami Beach (2).png
Om Beach (1).png
Om Beach (2).png
CP_image.m (Script)
SL1 = imread('Screenshot (623).png');
Editor - E:\AMOGH VIT 4\SAIP\Image Processing CP Amogh Deshmukh_17\CP_image.m
CP_image.m
% % Display the percentage of shoreline change
% disp(['Percentage of Shoreline Change: ' num2str(shoreline_change_percentage) '%']);
% Clear the workspace and close all figures
clear all;
close all;
clc;
% Read the images
image1 = imread('Miami Beach (1).png'); % Replace with the actual path to your first image
image2 = imread('Miami Beach (2).png'); % Replace with the actual path to your second image
% Convert the images to grayscale
image1_gray = rgb2gray(image1);
image2_gray = rgb2gray(image2);
% Apply edge detection using the Canny method
edges1 = edge(image1_gray, 'Canny');
edges2 = edge(image2_gray, 'Canny');
Command Window
Erosion Length (Pixels): 18338
Erosion Length (Feet): 0
Percentage of Shoreline Change: 10.6892%
Average Retreat Rate (Feet/Year): 0
>>
Workspace
Name Value
average_retre... 0
binary_mask 1080x1920 logical
color_mask 1080x1920x3 log...
combined 1080x1920x3 uin...
combinedEro... 1080x1920x3 uin...
conversion_fa... 0
difference 1080x1920 double
edges1 1080x1920 logical
edges2 1080x1920 logical
erosion_lengt... 0
erosion_lengt... 18338
erosionMask 1080x1920 logical
image1 1080x1920x3 uin...
image1_gray 1080x1920 uint8
image2 1080x1920x3 uin...
image2_gray 1080x1920 uint8
output 1080x1920x3 uin...
shoreline1 171557
shoreline2 189895
shoreline_cha... 10.6892
threshold 0.4980
years 1
Zoom: 100% UTF-8 CRLF script Ln 552 Col 38
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