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Task 2 : Image Segmentation.

Introduction

In this project, demonstrating the image segmentation.

Implementation and Methodology

For the implementation of the project, Processing software is used, and Python programming language is used.

- Setup Function :- load the image and display.
- Convert image to array function :- Convert image into 2D array and store pixel brightness in that array.
- Processing array function :- Calculated absolute difference(Weight) for horizontal nodes, Vertical nodes and diagonal nodes.
- Absolute difference(Weight) for horizontal nodes :-
    - Check starts index (node 1) – end index (node 2)
    - Check difference and store in array.
    - Similarly, calculate for the Vertical and diagonal nodes.
- Sorted the array of result of horizontal, vertical and diagonal nodes weights in increasing order.
    - Key = lambda this function is takes tuple x and return weight and sorting this array based on weight.
- Initialized array of segment
- Union and find function
- Find operation:- This function finds from which segment pixel belongs to. It checks the is it part of the own segment or another pixel. And if it is connected to another pixel, it will find the root of the segment.
- Union operation:- With the help of Find function this function marge the segment.
- Update the final segment array
- Assign the unique colour to each segment and display segmented image.
- To assign the unique colour for each segment set() function is used.

Results :

Figure 1Original and segmented image

References

[1] gnjatovic.info: The Milan Gnjatovic Website
[2] How to Implement Union-Find Algorithm in Python | Delft Stack