Area of a polygon given the xml file. Documentation

Naggita Keziah

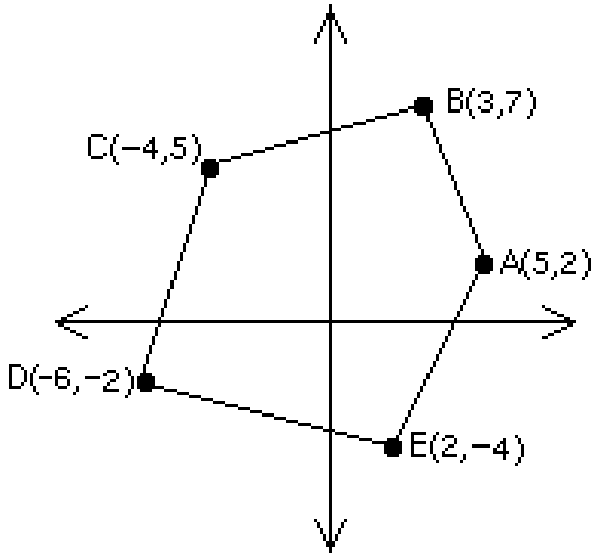
Makerere University, Internship at AI Labs

1 Introduction

This document explains imagesArea.py python code. It gives the general description of all the methods used, how they work and the citations used.

2 General Overview

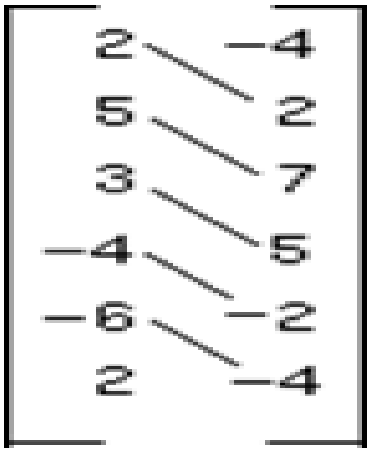
1. I first looped through the folder containing xml files representing the images. The os.listdir (path) method returns a list containing the names of the files which end with .xml in the directory given by path. The names of the xml files were then put in a list.
2. Then I parsed each xml file and got the objects within the file. Each xml file contained one or more necrosis objects and one area object. After getting the objects, I got all the points and their respective x, y coordinates which I used to find the area of each object. Shoelace formula was used to calculate the area of the object that formed a polygon shape.
3. Consider the polygon below



The procedure for finding the area of the polygon is as explained below:

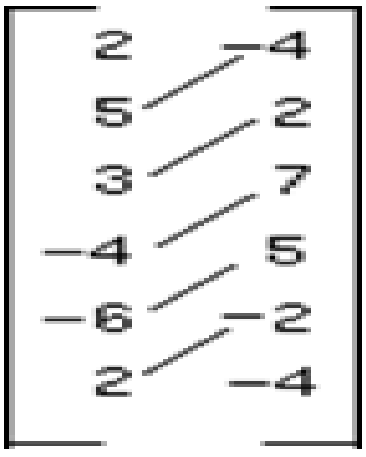
$$\begin{bmatrix} 2 & -4 \\ 5 & 2 \\ 3 & 7 \\ -4 & 5 \\ -6 & -2 \\ 2 & -4 \end{bmatrix}$$

Select a vertex and travel around the pentagon ending with the starting point. Write a matrix of the coordinates of the path including both the starting and ending coordinates.



Determine the sum of all "\" products:

(2 *2) + (5*7) + (3*5) + (–4 *–2) + (–6 *– 4)
= 4 + 35 + 15 + 8 + 24
= 86



Determine the sum of all "/" products:

(5 *–4) + (3*2) + (–4*7) + (–6*5) + (2*– 2)
= –20 + 6 – 28 – 30 – 4
= – 76

Determine the absolute value of the difference of the "\" products and "/" products:

Absolute ((86) – (–76))

= Absolute (162)

= 162

Take $\frac{1}{2}$ of the absolute value

= $\frac{1}{2}$ (162) = 81 area of pentagon

4. Methods Used

[8] .def loopThroughFolder (self):

This method loops through a folder with a specified path, it collects all files with a .xml extension and puts them in a list .It returns names of all the xml files in the folder.

[19] .def areas (self):

Here I parse the xml document, get the x, y coordinates of the necrosis part and the whole image.
Returns all image details list which includes all the image name, area of the necrosis, and area of the whole image.

[93] .def writetofile (self):

Writes the image name, area of the whole image and the necrosis part. It does not return anything.

5. Citations

xml.dom.minidom

os.listdir ()