

Project Name: Image Parser
File Content: the purpose and functions of this software;
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PURPOSE OF IMAGE PARSER

This program is to identify the digital information from image file. In this stage, I will only consider GIF files. Every GIF file only includes one layer instead of multilayer of animation. In the future, we can extend to JPG, BMP or DICOM. This program will identify three kind of information:

- Point and lines: A figure includes some curves or discrete points in a given coordinate. Though it is easy to get some rough information from the figure, sometimes it is needed to duplicate these data in other coordinates or to compare with other data, so it is important to get the data that the curves or points represent. This program will fulfill this function automatically or manually;
- Area: Some 2D objects can be showed in a 2D field figure, to identify the area and outline of the objects, this program reads the entities based on the grayscale of each pixel. The objects are represented by nodes and elements. To prevent the jagged boundary, an option of smooth is provided. The function to identify contours will also be developed.
- Volume: From 3D CT or MRI data, 3D objects are represented by nodes and elements. To change the resolution, we will use interpolation or condensation of domain data.

FUNCTIONS OF IMAGE PARSER

File:

- Build up a project: File -> New
???A project file .prj file will be named and written. This file will include all operations, from which we can resume the work next time.
Wait!
- Read image file: File -> Open Image
If one file name is given, the file will be read in memory as grayscale for each pixel and showed in the main window. If one directory and file filter are given, all files will be transferred into binary data format of grayscale in temporary data files in the same directory as the project file. The first file will be showed in the main window.
- Read data file: File -> Load Data
If a data file of the image file exists, it can directly be read and showed in main window.
- Write grayscale information into data file: File -> Write Data
If one image file is open in main windows, this function will write the coordinate and grayscale in file as ASCII code.
- Print the displaying information: File -> Print
Print the figure or data.
- Exit this program: File -> Exit

Exit this program.

Edit:

- Cut

Replace the rectangular area drawn by mouse with background color.

- Paste

Copy a image from other image editor

- Replace

Replace the color range with another color

- Invert

Invert the color

View:

- See the interested region: View -> ROI

Select a rectangular region and enlarge that region

Click menu -> Keep mouse left button down and move mouse to select the ROI; release mouse, the ROI will be showed.

- Zoom in or out the figure: View -> Zoom in / out

Enlarge or reduce the total figure

- Zoom in or out the figure: View -> Data

Look at the data of grayscale of the showed pixel

- Zoom in or out the figure: View -> Rotation

Rotate the image around the center

Points

- Select points

Start to select points by mouse

- Checkout points

Save the coordinates of the selected points in a file

- View Data

View the coordinates of the data

Lines

- Select OutLine

Detect the outline of an area which is the closest to the identified point or line

Click the menu. Then use mouse to click one point on the boundary of the objective region, the optimal curve will show on the image. Click the next point, if it is on the optimal curve

- Select Curve

Detect a line including the identified point which may has a thickness, the output line will be the central line.

- Smooth Line

Smooth the selected line

- Checkout points

Save the coordinates of the selected line in a file

- View Data

View the coordinates of the data

XYFigure

- X-Y image -> Set Origin

Click the origin, pop a message box show that origin is set on the marked point.

- X-Y image -> Set XCoord

Click the point, pop a message box, input the real value of X.

- X-Y image -> Set YCoord
Click the point, pop a message box, input the real value of Y.
Then select the points and output coordinates

2D image

- 2D image -> Set XScale
Pop a message box, input the real scale of X pixel.
- 2D image -> Set YScale
Pop a message box, input the real scale of Y pixel.
- 2D image -> Pixel Stat
Show the statistics of the grayscale

Use left button of mouse to select any point on the line, then the line is shown with the number.

- Point out material zones: 2DField -> Define Zone
Define the material zones
- Output grayscale of each pixel: 2DField -> Output Lines
Output the interface between zones
- Mesh the field: 2DField -> Mesh field
Define size of element and mesh the field ->Size; ->Mesh
- Output the mesh: 2DField -> Output Mesh
Write the mesh of nodes and elements in file
- View the mesh: 2DField -> View Mesh
Display the mesh

3D image

- 3D image -> Set XScale
Pop a message box, input the real scale of X pixel.
- 3D image -> Set YScale
Pop a message box, input the real scale of Y pixel.
- 3D image -> Set ZScale
Pop a message box, input the real scale of Z for one slide.
- Output grayscale of each pixel: 3DField -> Output surface
Output the interface between zones
- Mesh the field: 3DField -> Mesh field
Define size of element and mesh the field ->Size; ->Mesh
- Output the mesh: 3DField -> Output Mesh
Write the mesh of nodes and elements in file
- View the mesh: 3DField -> View Mesh
Display the mesh