

Rapid interactive image segmentation



This rapid interactive image segmentation tool allows users to quickly and accurately extract objects of interest from images.

To extract an object, the user needs only scribble on a few pixels inside the desired object, and then scribble on a few pixels outside the desired object. From this the application will find and extract the relevant object, providing

feedback to the user in real-time.

For more complex natural imagery, the initial boundary may need further refinement. The user can iteratively refine the object boundary by marking more areas as 'object' and 'background' with the mouse.

The software is capable of handling objects with complex boundaries, multiple-part objects, and objects with internal holes.

The software integrates several state-of-the-art segmentation algorithms into a consistent user interface. The user is free to select the algorithm that best suits their needs, or to experiment with different algorithms to determine which is most effective for a particular situation.

Benefits

- ◆ Intuitive, scribble-driven interface
- ◆ Iterative refinement of object boundary
- ◆ Efficient, real-time feedback
- ◆ Full featured UI, including support for algorithm selection, algorithm configuration, zoom-in/zoom-out, brush size configuration, undo/redo, and multiple views
- ◆ Well-documented SDK for developers

Applications

- ◆ Medical imaging
- ◆ Object selection for photo editing
- ◆ Object selection for recognition applications
- ◆ Object selection for image search engines

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Potential applications

In digital photography and image editing, the tool allows rapid user-assisted object selection and extraction, and is therefore useful in photo manipulation scenarios where specific regions of the image must be edited.

A typical use-case in query-by-example based image and video search systems involves a user searching for a particular object in a scene. To enable this, the user requires some way of choosing the object of interest in the scene. The interactive segmentation tool provides a solution, allowing the user to quickly and accurately specify this region in a few mouse clicks.

Machine vision and object recognition systems often require a ground truth dataset upon which they can be trained. Building such a dataset by manually delineating objects is both tedious and time consuming. The interactive segmentation tool allows creating this kind of ground truth with minimal effort.

Computer assisted medical diagnosis applications often require practitioners to isolate first the relevant structure before analysis can be applied. The interactive segmentation tool is ideal for these applications.

Benefits

The tool has a modern, intuitive, full-featured user interface. It supports scribble-driven object extraction and iterative boundary refinement with real-time feedback. It supports online algorithm selection and configuration, zoom in/zoom out, brush size configuration, and undo/redo. It also supports multiple view modes, allowing visualization of the segmentation in various ways.

The tool uses an extensible plug-in ecosystem, making it simple for developers to add new algorithms to the tool. It has a well-documented developer SDK, and provides sample code for developing new plug-ins. The included algorithms have been extensively evaluated and compared.

The tool supports many common image file formats, including JPG, PNG, BMP, GIF, and TIFF. It allows exporting image segmentations as object masks, HTML image maps, and semi-transparent PNG files. The tool is multi-platform, running on Windows, Linux, and Mac OS X.

Technology status

- ◆ Technology development is now mature
- ◆ Application runs on Windows, Mac OS X, and Linux
- ◆ Extensively user tested
- ◆ Supports many image file formats, including JPG, PNG, BMP, GIF, and TIFF. Export object mask, HTML image maps, and transparent PNGs.
- ◆ Extensible, plug-in architecture for segmentation algorithms
- ◆ Segmentation algorithms scientifically evaluated and compared

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