Subject: Re: connected component labeling problem in a graylevel image without background
Posted by Ben Tupper on Fri, 11 Oct 2002 15:20:40 GMT
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On Thu, 10 Oct 2002 23:07:31 -0500, "Julia" <julia65201@yahoo.com>
wrote:

> Hi, there,
>
> I have a problem here:
> " The problem is like a grayscale photograph of a jar of
> marbles. Each marble is uniformly gray. All the marbles are touching each
> other, so there is no
> background. Two marbles of the same color may not belong to the same
> region.
> I want to give a unique label to each marble/region."
>
> Now I am solving this problem in this way:
> First, use WHERE or HISTOGRAM to get a mask of regions
> at each gray level, and then use LABEL_REGION on each mask.
>
> However, this method is not efficient since it needs to scan the image
> for several times.
>
> Can I do it only in a raster scan of the image?
>
> Any suggestion will be appreciated,
>
> Julia

I just received a personal email from someone with a remarkably
similar question from Missouri. I thought I might put my reply here.

At 09:38 PM 10/10/2002 -0500, you wrote:
> Hello, Ben,
>
> I am doing some stuff of blob coloring now. I searched on the Internet and saw your post. If you can
> take a time to look at my problem, it will be highly appreciate.
>
> " When the label region is used to uniquely mark blobs within an image,
> the edge pixels are all assumed to be zero. I would like to preserve
> those edge pixels AND perform the region labeling."
>
> Now I am encountering the same problem.
> " The problem is like a grayscale photograph of a jar of
> marbles. Each marble is uniformly gray. All the marbles are touching each other, so there is no

> background. Two marbles of the same color may not belong to the same region.
> I want to give a unique label to each marble/region."
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> Now I am solving this problem in this way:
> First, use WHERE or HISTOGRAM to get a mask of regions
> at each gray level, and then use LABEL_REGION on each mask.
>
> However, this method is not efficient since it needs to scan the image
> for several times.
>
> Have you solved this problem? Do you have any suggestion that can do it in a
> raster scan of the image?
>
> I look forward to your reply.
>
> Thanks,
>
> Xiaoying Jin
>

Hi there in the 'Show Me' state!   My brother lives just south of Rolla - near Fort Leonard Wood. I have visited there once and I was just wowed by the geological landscape. Here in New England the landscape is just such dull (but beautiful, too) post-glacial!

Happy to help if I can.

Your problem is a bit different from that I have encountered. In my cases, we had a segmented image of phytoplankton and ever-present debris, too. Each feature (aka blob) has varying gray scale values. It sounds like your marbles have homogeneous gray scale values even though the gray scale value might change from marble to marble.

I'm not sure of the specifics of what you want to do with each feature, but here's what I would pull them out of the image.

Starting with your segmented image (background = 0, foreground = any values other than zero)... which has dimension nx,ny.

Create a blank image that is one pixel wider in each direction than your segmented image. Be sure the extra pixels in the one-pixel-wide-pad are all set to the background value, 0. If you know the images will ALWAYS be the same size, simply make one copy of this and use it repeatedly rather than making this larger image over and over again. You could store this in a pointer, an object, or in a system variable.

```
 padded = bytarr(nx+2, ny+2)
```

Copy your segmented image into the slightly larger image

```
 padded[1:nx-2, 1:ny-2] = segmented
```

Run the padded image through LABEL_REGION

```
 labeled = LABEL_REGION(padded, keywords=keywords)
```

Use HISTOGRAM to get the indices of the color blobs - subset the labeled image at the same time. Capture the reverse indices.

```
 h = HISTOGRAM(labeled[1:nx, 1:ny], reverse_indices = r)
```

Now through the magic of reverse_indices, you can quickly pull out the location of each feature (marble, in this case). I can't recall the syntax off hand (I don't have IDL right here, either), but I do recall an example in the documentation for HISTOGRAM. If that doesn't help, check out David Fanning's web pages.

I'm not sure if that helps or answers your question. I'm not even sure, now that I reread you note, what your question is. This does mean that you have scanned the image at least twice (LABEL_REGION and HISTOGRAM) in addition to any scanning you did to segment the image.

Cheers,
Ben
>