Subject: Re: Fill in a logic image: possible in IDL ?
Posted by John-David T. Smith on Sun, 15 Apr 2001 02:27:01 GMT
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jsilva@ci.uc.pt wrote:
>
> Hello
> I have a grayscale image (512 x 512 x 1 byte from medical TAC).
> I applied a threshold to have a logic mask and tried to do a fill in that mask
> in order to remove some background. Most of languages have a fill command, like
> FILL in draw programs that FILLs the image starting in X,Y (user defined)
> coordenations.
> I search throw IDL commands and I never found any FILL command (or identical
> command).
> As most of languages (eg MATLAB and many others) have a FILL (BWFILL in MATLAB,
> as morphologic operation), did I miss the FILL in IDL or there isn?t any FILL in
> IDL?
> I tried to use POLYFILL but my mask is very irregular, not being possible to
> apply a POLYFILL in a predefined region.
> Any commend on this subject is welcome?
>
> level=100
> mask= (image LE level) ; TAC of lungs (from TAC) with many irregularities
> ; FILL to ?fill? mask starting (eg) in 1,1 pixel coordination
>
> jsilva @ ci.uc.pt

Unless I've misunderstood, it's probably easier than you think:

mask=where(image LE level,cnt)
if cnt gt 0 then image[mask]=background

or, if you know for sure there are some elements in the mask, you can
just do:

image[where(image LE level)]=background

Notice that here mask is just a list of indices. You can use multiple
masks in one of two (or more) ways, e.g.:

1. immask=image LE level AND image GE otherlevel AND otherim eq 1
   mask=where(immask ne 0)
2. mask=where(image LE level)
   mask=mask[where(image[mask] GE otherlevel)]
   mask=mask[where(otherim[mask] eq 1)]

In case 1, you compute all the comparisons on all the elements of image, and AND them all together. In case 2, you examine only those elements which survived the previous test, paring down mask at each step. Both forms have their advantages. But getting used to lists of indices as masks or collections of pixels in IDL is vital.

Good luck,

JD

P.S. Here's one other method which doesn't use subscripts, more in line with your original idea:

```
mask=image LE level
image=image*(mask)+background*(mask eq 0)
```

Subject: Re: Fill in a logic image: possible in IDL ?
Posted by Ivan Zimine on Sun, 15 Apr 2001 09:28:14 GMT
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Jose Silva wrote:
>
> Hello
> I have a grayscale image (512 x 512 x 1 byte from medical TAC).
> I applied a threshold to have a logic mask and tried to do a fill in that
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> in order to remove some background. Most of languages have a fill command,
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> MATLAB, as morphologic operation), did I miss the FILL in IDL or there isn?t
> any FILL in IDL?

IDL> ?search2d

--
Ivan Zimine | ivan.zimine@physics.unige.ch
Dpt. of Radiology | (+41 22) 372 70 70
Geneva University Hospitals |

Subject: Re: Fill in a logic image: possible in IDL ?

Posted by jsilva on Sun, 15 Apr 2001 14:58:43 GMT
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Hello

example (see the Computer Tomography lung image in
http://www.ci.uc.pt/pessoal/jsilva/idl_fill.jpg)
Thanks in advance for any suggestion.
Jose Silva
Physics Dep., FCTUC, Portugal

In article <3AD969AE.1A198238@physics.unige.ch>, Ivan Zimine says...
>
> Jose Silva wrote:
>>
>> Hello
>> I have a grayscale image (512 x 512 x 1 byte from medical TAC).
>> I applied a threshold to have a logic mask and tried to do a fill in that
>> mask
>> in order to remove some background. Most of languages have a fill command,
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>> MATLAB, as morphologic operation), did I miss the FILL in IDL or there isn?t
>> any FILL in IDL?
>
> IDL> ?search2d

Subject: Re: Fill in a logic image: possible in IDL ?
Posted by John-David T. Smith on Sun, 15 Apr 2001 19:10:48 GMT
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jsilva@ci.uc.pt wrote:
>
> Hello
> To explain what I?m trying to do about a FILL in a logic image, I give an
> example (see the Computer Tomography lung image in
> http://www.ci.uc.pt/pessoal/jsilva/idl_fill.jpg)
> Thanks in advance for any suggestion.
> Jose Silva
> Physics Dep., FCTUC, Portugal

OK, I think I see now... you want to do blob coloring, aka "fill" from your favorite paint program. The IDL function label_region works well for this. It's quite simple. The JHU library contains two example programs for this, but I'll summarize:

```
labels=label_region(image LE level)
image[where(labels eq labels[x,y])]=fill
```

OK, so what does this do? label_region finds continuous blobs of non-zero values, and gives them a non-zero "ID". You find the ID of seed pixel (x,y), and where that blob exists in the array, then setting this region to whatever fill value you like.

Note that all edge pixels are considered to be in no region (label_region returns zero there). This seems dumb to me... one workaround is to fill dummy rows and columns on the exterior with 1's. You should probably also test that the region exists, or else you'll end up filling all the pixels in no region. e.g.

```
if labels[x,y] ne 0 then ...
```

Another JHU program illustrates the flexibility of this method... since you can make masks in many ways, you can label all sorts of interesting things like boundary regions... the inverse of the former problem:

```
labels=label_region(image ne boundary)
```

or even

```
labels=label_region(image gt bmax OR image lt bmin)
```

Here we label all areas bordered by boundary values in some range.

Search2D can do this too, but I think label_region gives more flexibility. Since it just finds regions of non-zero value in a mask, you can conceive of doing all sorts of cool things. Here are a few interesting challenges:

1. Region of strictly decreasing value from a seed pixel. Or try increasing.

2. Region contiguous to seed pixel which is within 10% of the full data range to it.

3. Region contiguous to seed pixel with values in the nearest Nth percentile (think histogram).

4. Region contiguous to seed pixel which alternate even to odd.

etc.

Good luck,

JD

Subject: Re: Fill in a logic image: possible in IDL ?
Posted by Ivan Zimine on Mon, 16 Apr 2001 16:41:52 GMT
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jsilva@ci.uc.pt wrote:
>
> Hello
> To explain what I?m trying to do about a FILL in a logic image, I give an
> example (see the Computer Tomography lung image in
> http://www.ci.uc.pt/pessoal/jsilva/idl_fill.jpg)
> Thanks in advance for any suggestion.
> Jose Silva
> Physics Dep., FCTUC, Portugal
>

```
mask = byte(median(image gt 50, 9))
roi = search2d(mask, 0, 510, 0, 0)
msk1 = mask*0b
msk1[roi] = 1
roi = search2d(mask, 27, 32, 0, 0)
msk2 = mask*0b
msk2[roi] = 1

back_mask = msk1 or msk2
image_mask = 1 - back_mask
```

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Ivan Zimine | ivan.zimine@physics.unige.ch
Dpt. of Radiology | (+41 22) 372 70 70
Geneva University Hospitals |
