
Subject: Re: MORPH_XYZ and values keyword

Posted by [Karsten Rodenacker](#) on Thu, 26 Jun 2003 06:24:13 GMT

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Hi, I have slightly changed your Morphtest example into Morphtest1 with two parameters, extension and type. You should play around with extension and gen_sphere type. You will see, that the flat value structuring element (STE) does not show considerable differences to the simple STE. However the last example shows some influences of value STE.

Flat STE controls local extension, value STE controls value extension (and function shape).

To learn to understand morphological operations morph_tophat is IMHO not the best routine. Since it is simply the difference between original and opened array, I have replaced it by open and close, the ingredients for bright and dark tophat.

Simply run Morphtest1 will open 4 windows with different parameters showing opening and closing.

Regards
Karsten

Ben Tupper schrieb:

> Karsten Rodenacker wrote:

>

>> Hallo, maybe some information concerning VALUE keywords. Let ste the

>> structuring element and val the values array.

>> 1. Only val*(ste ne 0) is of importance!

>> 2. As far as I know are the val values subtracted or added from the

>> input data before the max or min according erode or dilate is

>> performed. Hence, flat value arrays do not make sense.

>> 3. I attach two routines (for 1-d morphological filtering) for

>> illustration. gen_sphere to generate the value array and mm_filter to

>> apply a sequence of increasing filter steps. Unluckily the routines

>> are not documented. Maybe they are comprehensible without further words.

>>

>

>

> Thanks Karsten,

>

> This helps very much. I'm still not clear on why a flat-topped VALUES

> do not make sense. Here's what I get from the online docs for ERODE

> and DILATE. They don't look symmetric to me - so it seems like a

> flat-topped kernel would have a meaningful effect. But, I'm new at this

> and feeling like I'm on pretty thin ice.

>

```

>
> Erode... result = min(Image) - VALUE
> "Each pixel of the result is the minimum of Image less the corresponding
> elements of VALUE."
>
> Dilate... result = max(Image + VALUE)
> "Each pixel of the result is the maximum of the sum of the corresponding
> elements of VALUE and the Image pixel value. "
>
> The Tophat filter is supposed to be...
> result = (Erosion followed by Dilation) - OriginalImage
>
> I have mocked up an 1-d example (below) using your gen_sphere routine.
> It looks to me like I might be better off *not* using the VALUES anyway.
>
> Just type morphtest from the command line. The top plot is the tophat
> without values specified. The second is with the fat-topped (the VALUES
> structure is shown hovering over the plot on the right.) And the last
> is using a non-flat-topped structure (also shown at hovering at right.)
>
> Thanks,
> Ben
>
>
> *****begin code
> function gen_sphere, rad, TYPE=typ
>
>   if not keyword_set(typ) then typ=0
>   case typ of
>     1:v = sqrt(rad^2-(rad-findgen(rad*2+1))^2)
>     2:v = rad^2-(rad-findgen(rad*2+1))^2
>     3:v = 0.05/(1.+sqrt(rad^2-(rad-findgen(rad*2+1))^2))
>     4:v = 0.05/(1.+rad^2-(rad-findgen(rad*2+1))^2)
>     5:v = rad-sqrt(rad^2-(rad-findgen(rad*2+1))^2)
>     6:v = rad^2-(rad-findgen(rad*2+1))^2
>     -1:v = replicate(1.0,rad*2+1)
>   else: v = rad-abs(-findgen(rad*2+1)+rad)
>   ENDCASE
>   mv = max(v)
>   IF mv GT (rad+1) THEN v = v/mv*(rad+1)
>   return, v
> end
>
>
>
>
> Pro MorphTest
>

```

```

> x = [19,19,21,23,24,23,22,21,20,19,20,20,19,17,15,$
> 13,11,11,12,14,17,21,24,25,24,23,21,21,23,26,29,30,27,$
> 22,17,12,10,10,12,14,16,19,20,21,20,17,12,8,$
> 4,3,3,6,10,14,19,23,26,27,28,29,29,29,27,$
> 23,19,16,14,14,16,18,19,19,18,15,13,11,7,$
> 4,1,0,0,3,6,10,12,12,11,8,5,2,1,1,4,7,11,14,17,20,23,27]
>
>
> n = 10
>
> old_p = !P
> !P.CharSize = 2
> !P.Multi = [0,1,3]
>
> Dim = get_Screen_Size()
> Window, /Free, ys = dim[1]*0.9
> plot, x, title = 'orig with simple tophat'
> oplot, thick = 2, $
>   morph_tophat(x, [0, replicate(1,n-1), 0])
>
> plot, x, title = 'orig with tophat values set with flat top'
> values = [0, replicate(9,n-1),0]
> oplot, thick = 2, $
>   morph_tophat(x, [0, replicate(1,n-1), 0], values = values )
> oplot, Indgen(n+1) + 80, values + 10, thick = 2
>
>
> plot, x, title = 'orig with tophat values set with rounded top'
> values = gen_sphere(n/2)
> oplot, thick =2, $
>   morph_tophat(x, [0, replicate(1,n-1), 0], values =values )
> oplot, Indgen(n+1) + 80, values + 10, thick = 2
>
> !P = old_p
> End
> *****end code
>

```

Pro MorphTest1, n, t

```

x = [19,19,21,23,24,23,22,21,20,19,20,20,19,17,15,$
13,11,11,12,14,17,21,24,25,24,23,21,21,23,26,29,30,27,$
22,17,12,10,10,12,14,16,19,20,21,20,17,12,8,$
4,3,3,6,10,14,19,23,26,27,28,29,29,29,27,$
23,19,16,14,14,16,18,19,19,18,15,13,11,7,$
4,1,0,0,3,6,10,12,12,11,8,5,2,1,1,4,7,11,14,17,20,23,27]

```

```
if n_params() eq 0 then n = 10
if n_params() le 1 then t = 1
```

```
old_p = !P
!P.CharSize = 2
!P.Multi = [0,1,3]
```

```
Dim = get_Screen_Size()
Window, /Free, ys = dim[1]*0.9
plot, x, title = 'orig with simple open/close'
oplot, thick = 2, $
    morph_open(x, [0b,replicate(1b,n-1),0b],/gray)
oplot, thick = 1, linest=1, $
    morph_close(x, [0b,replicate(1b,n-1),0b],/gray)
```

```
plot, x, title = 'orig with open/close values set flat top'
values = [0b, replicate(byte(n-1),n-1),0b]
oplot, thick = 2, $
    morph_open(x, [0b, replicate(1b,n-1), 0b], values = values )
oplot, thick = 1, linest=1, $
    morph_close(x, [0b, replicate(1b,n-1), 0b], values = values )
oplot, Indgen(n+1) + 80, values + 10, thick = 2
```

```
plot, x, title = 'orig with open/close values set with gen_sphere'
values = gen_sphere(n/2, typ=t)
oplot, thick =2, $
    morph_open(x, [0b, replicate(1b,n-1), 0b],values =values )
oplot, thick =1, linest=1, $
    morph_close(x, [0b, replicate(1b,n-1), 0b],values =values )
oplot, Indgen(n+1) + 80, values + 10, thick = 2
```

```
!P = old_p
End
for i=6,12,2 do morphtest1,i,1
end
```

File Attachments

1) [MorphTest1.pro](#), downloaded 98 times
