
Subject: Re: Any suggestions for a B&W colour scheme for publication images?
Posted by [R.G.Stockwell](#) on Tue, 25 Sep 2007 14:45:26 GMT

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"Tyler" <hayes.tyler@gmail.com> wrote in message
news:1190730302.624006.228950@d55g2000hsg.googlegroups.com.. .

> Hello All:

>

> I am in the process of submitting some figures to a journal for
> publication (it has been accepted). I intend to save my supervisor
> cash by submitting B&W figures for print, and keep the colour images
> for the electronic version.

I do the same thing. Usually I can just use the default B&W scheme
(loadct,0) and natively create the image that way. Perhaps reducing
the number of contour or shade levels will help the contrast. Or perhaps
adding a contour overlay on top of the image may help.

One trick that sometimes works (but usually doesn't) is to
use your normal color scheme (EOS) but not set the /color keyword to
the ps device command. That seems to directly translate your color scheme
into B&W. The problem, is that distinct colors can get mapped to similar
shades of grey.

Cheers,
bob

Subject: Re: Any suggestions for a B&W colour scheme for publication images?
Posted by [David Fanning](#) on Tue, 25 Sep 2007 14:57:25 GMT

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R.G. Stockwell writes:

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> use your normal color scheme (EOS) but not set the /color keyword to
> the ps device command. That seems to directly translate your color scheme
> into B&W. The problem, is that distinct colors can get mapped to similar
> shades of grey.

Good suggestions. If this doesn't work, I'd also try converting
your RGB color vectors to HSV vectors with COLOR_CONVERT, then

stretching your saturation vector as far as it will go, before converting back and loading into your color table. That's been known to work before, too, although sometimes the saturation is already stretched to the max anyway. (It was in the couple of color tables I just tried.)

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Any suggestions for a B&W colour scheme for publication images?

Posted by [Vince Hradil](#) on Tue, 25 Sep 2007 15:01:34 GMT

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On Sep 25, 9:25 am, Tyler <hayes.ty...@gmail.com> wrote:

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>

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> schemes and the figures turn out great. There is excellent contrast
> between regions, and the positive/negative values are clearly
> distinguished. Sadly, switching the colour scheme to B&W tends to blur
> these crucial distinct regions.

>

> I have tried several values for STRETCH. Perhaps I was not using the
> STRETCH command properly. Does anyone have any suggestions for values
> of STRETCH or GAMMA_CT that have worked for their own publications in
> the past? This problem is only further compounded by the fact that
> XLOADCT seems to not want to load from my IDL script file, so I'm
> limited to what I can do from the within the script.

>

> For what it's worth, I have several figures to convert to B&W, all of
> which have different maximums and minimums. Can I use that knowledge
> to control STRETCH/GAMMA_CT with these values?

>

> I have two example PNG files I can send to anyone if they would like
> to see what I am talking about. Just email me with "GAMMA_CT" in the
> subject heading.

>
> Any ideas are greatly appreciated.
>
> Cheers,
>
> t.

Here's a reference: J. McNames, "An effective color scale for simultaneous color and gray-scale publications," IEEE Signal Processing Magazine, Vol. 23, No. 1, January 2006, pp. 82-87. (pdf: http://bsp.pdx.edu/Publications/2006/SPM_McNames.pdf)

I translated the matlab code here:

```
function hyperbola, nc, ymaxaxa=ymaxaxa

  if n_elements(ymaxaxa) eq 0 then ymaxaxa=0.95

  a = sqrt( (1.0-ymaxaxa)^2 / (1.0-(1.0-ymaxaxa)^2) )
  xvals = findgen(nc)
  xs = 2.0 * xvals/float(nc-1) - 1.0 ; scale from -1 to 1
  nx = n_elements(xvals)

  y = 1.0 - sqrt(xs^2+a^2)/sqrt(1.0+a^2)
  y = y>0.0

  return, y
end

function triangle, nc

result = findgen(nc/2)/float(nc/2-1)
result = [result,reverse(result)]

return, result
end

function colorspiral, nc, np, palname, smin=smin, twosided=twosided

if n_elements(smin) eq 0 then smin=0

;nc=128
;np=2

wn = sqrt(3.0/8.0) * hyperbola(nc)
a12 = asin(1.0/sqrt(3.0))
a23 = !pi/4.0
```

```

if keyword_set(twosided) then begin
    t = sqrt(3.0)*findgen(nc/2)/float(nc/2-1)
    t = [-reverse(t),t]
    wn = [reverse(wn),wn]
endif else begin
    t = sqrt(3.0)*findgen(nc)/float(nc-1)
endelse

r0 = abs(t)
g0 = wn * cos((t-sqrt(3.0)/2.0)*np*2.0*pi/sqrt(3.0))
b0 = wn * sin((t-sqrt(3.0)/2.0)*np*2.0*pi/sqrt(3.0))

pm, 3, 3
plot, r0, g0
plot, r0, b0
plot, g0, b0

rgpol = cv_coord(from_rect=transpose([[r0],[g0]]),/to_polar)
rg1 = cv_coord(from_polar=[rgpol[0,*]+a12,rgpol[1,*]],/to_rect)
r1 = reform(rg1[0,*])
g1 = reform(rg1[1,*])
b1 = b0

plot, r1, g1
plot, r1, b1
plot, g1, b1

rbpol = cv_coord(from_rect=transpose([[r1],[b1]]),/to_polar)
rb2 = cv_coord(from_polar=[rbpol[0,*]+a23,rbpol[1,*]],/to_rect)
r2 = reform(rb2[0,*])
g2 = g1
b2 = reform(rb2[1,*])

plot, r2, g2
plot, r2, b2
plot, g2, b2

spiral = bytscl([r2,g2,b2])

;smin = 0
smax = nc-smin-1

spiral = congrid(spiral[smin:smax,*],nc,3)

openw, lun, palname+'.pal', /get_lun
printf, lun, palname
for i=nc-1, 0, -1 do printf, lun, string(format='("#",3z2.2)',spiral[i,
0],spiral[i,1],spiral[i,2])

```

free_lun, lun

return, spiral
end

Subject: Re: Any suggestions for a B&W colour scheme for publication images?
Posted by [Vince Hradil](#) on Tue, 25 Sep 2007 15:03:59 GMT
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On Sep 25, 10:01 am, hradilv <hrad...@yahoo.com> wrote:
> On Sep 25, 9:25 am, Tyler <hayes.ty...@gmail.com> wrote:
>
>
>
>> Hello All:
>
>> I am in the process of submitting some figures to a journal for
>> publication (it has been accepted). I intend to save my supervisor
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>> I have tried several values for STRETCH. Perhaps I was not using the
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>
>> I have two example PNG files I can send to anyone if they would like
>> to see what I am talking about. Just email me with "GAMMA_CT" in the
>> subject heading.
>
>> Any ideas are greatly appreciated.
>
>> Cheers,
>
>> t.

```

>
> Here's a reference: J. McNames, "An effective color scale for
> simultaneous color and gray-scale publications," IEEE Signal
> Processing Magazine, Vol. 23, No. 1, January 2006, pp. 82-87.
(pdf:http://bsp.pdx.edu/Publications/2006/SPM_McNames.pdf)
>
> I translated the matlab code here:
>
> function hyperbola, nc, ymaxaxa=ymaxaxa
>
> if n_elements(ymaxaxa) eq 0 then ymaxaxa=0.95
>
> a = sqrt( (1.0-ymaxaxa)^2 / (1.0-(1.0-ymaxaxa)^2) )
> xvals = findgen(nc)
> xs = 2.0 * xvals/float(nc-1) - 1.0 ; scale from -1 to 1
> nx = n_elements(xvals)
>
> y = 1.0 - sqrt(xs^2+a^2)/sqrt(1.0+a^2)
> y = y>0.0
>
> return, y
> end
>
> function triangle, nc
>
> result = findgen(nc/2)/float(nc/2-1)
> result = [result,reverse(result)]
>
> return, result
> end
>
> function colorspiral, nc, np, palname, smin=smin, twosided=twosided
>
> if n_elements(smin) eq 0 then smin=0
>
> ;nc=128
> ;np=2
>
> wn = sqrt(3.0/8.0) * hyperbola(nc)
> a12 = asin(1.0/sqrt(3.0))
> a23 = !pi/4.0
>
> if keyword_set(twosided) then begin
>   t = sqrt(3.0)*findgen(nc/2)/float(nc/2-1)
>   t = [-reverse(t),t]
>   wn = [reverse(wn),wn]
> endif else begin
>   t = sqrt(3.0)*findgen(nc)/float(nc-1)

```

```

> endelse
>
> r0 = abs(t)
> g0 = wn * cos((t-sqrt(3.0)/2.0)*np*2.0*pi/sqrt(3.0))
> b0 = wn * sin((t-sqrt(3.0)/2.0)*np*2.0*pi/sqrt(3.0))
>
> pm, 3, 3
> plot, r0, g0
> plot, r0, b0
> plot, g0, b0
>
> rgpol = cv_coord(from_rect=transpose([[r0],[g0]]),/to_polar)
> rg1 = cv_coord(from_polar=[rgpol[0,*]+a12,rgpol[1,*]],/to_rect)
> r1 = reform(rg1[0,*])
> g1 = reform(rg1[1,*])
> b1 = b0
>
> plot, r1, g1
> plot, r1, b1
> plot, g1, b1
>
> rbpol = cv_coord(from_rect=transpose([[r1],[b1]]),/to_polar)
> rb2 = cv_coord(from_polar=[rbpol[0,*]+a23,rbpol[1,*]],/to_rect)
> r2 = reform(rb2[0,*])
> g2 = g1
> b2 = reform(rb2[1,*])
>
> plot, r2, g2
> plot, r2, b2
> plot, g2, b2
>
> spiral = bytscl([[r2],[g2],[b2]])
>
> ;smin = 0
> smax = nc-smin-1
>
> spiral = congrid(spiral[smin:smax,*],nc,3)
>
> openw, lun, palname+'.pal', /get_lun
> printf, lun, palname
> for i=nc-1, 0, -1 do printf, lun, string(format='("#",3z2.2)',spiral[i,
> 0],spiral[i,1],spiral[i,2])
> free_lun, lun
>
> return, spiral
> end

```

Oops, forgot to mention that you can remove the plot commands

(diagnostics) and also that I write out the palette for use with AFNI. But you get the idea.

Subject: Re: Any suggestions for a B&W colour scheme for publication images?
Posted by [David Fanning](#) on Tue, 25 Sep 2007 15:05:23 GMT

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David Fanning writes:

- > Good suggestions. If this doesn't work, I'd also try converting
- > your RGB color vectors to HSV vectors with COLOR_CONVERT, then
- > stretching your saturation vector as far as it will go, before
- > converting back and loading into your color table. That's been
- > known to work before, too, although sometimes the saturation
- > is already stretched to the max anyway. (It was in the couple
- > of color tables I just tried.)

I suppose you could try doing various log and power transformations on the saturation vector. Here are a list of programs you can find on my web page that might come in handy:

GMASCL
LOGSCL
ASINCSCL
CLIPSCL
GAUSSSCL

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Any suggestions for a B&W colour scheme for publication images?
Posted by [Tyler](#) on Tue, 25 Sep 2007 15:07:41 GMT

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Wow! That was some quick response.

Thanks everyone for your suggestions. I will be trying them out directly :)

Cheers,

t.

Subject: Re: Any suggestions for a B&W colour scheme for publication images?

Posted by [Steve Eddins](#) on Tue, 25 Sep 2007 15:30:35 GMT

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hradilv wrote:

> On Sep 25, 9:25 am, Tyler <hayes.ty...@gmail.com> wrote:

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>>

>> [snip]

>

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> simultaneous color and gray-scale publications," IEEE Signal
> Processing Magazine, Vol. 23, No. 1, January 2006, pp. 82-87. (pdf:
> http://bsp.pdx.edu/Publications/2006/SPM_McNames.pdf)

I had a bit of correspondence with McNames about this article. It turns out that his formulas assume a relationship between RGB and gray scale that isn't quite accurate enough to get a fully monotonic scale in gray.

An alternative idea to plot a path through $L^*a^*b^*$ space, as I described here:

<http://blogs.mathworks.com/steve/2006/05/09/a-lab-based-uniform-color-scale/>

Since I don't know IDL, I can't provide a translation :-), but if you have a way to convert between sRGB and $L^*a^*b^*$, the rest of the math is straightforward.

--

Steve Eddins

<http://blogs.mathworks.com/steve>
