Subject: Re: EXPAND.PRO - needed by CONTTW.PRO
Posted by zawodny on Fri, 11 Sep 1992 19:53:05 GMT
View Forum Message <> Reply to Message

Well it was trivial to implement and results in a cleaner code so here
is the new version of EXPAND. It is fast but my tests cases were not too slow
to begin with.

*_ *_*_*_*_*_*_*_*_*_*
Joseph M. Zawodny (KO4LW) NASA Langley Research Center
zawodny@arbd0.larc.nasa.gov MS-475, Hampton VA, 23681
*_ *_*_*_*_*_*_*_*_*_*


```
;+
; NAME:
; EXPAND
; PURPOSE:
; Array magnification  (CONGRIDI like except that this really works!)
; CATEGORY:
; Z4 - IMAGE PROCESSING
; CALLING SEQUENCE:
; EXPAND,A,NX,NY,RESULT [,MAXVAL=MAXVAL,FILLVAL=FILLVAL]
; INPUTS:
; A Array to be magnified
; NX Desired size of X Dimension
; NY Desired size of Y Dimension
; Keywords:
; MAXVAL Largest good value. Elements greater than this are ignored
; FILLVAL Value to use when elements larger than MAXVAL are encountered.
;  Defaults to -1.
; OUTPUTS:
; RESULT Magnified Floating point image of A array (NX by NY)
; COMMON BLOCKS:
; NONE
; SIDE EFFECTS:
; NONE
; RESTRICTIONS:
; A must be two Dimensional
; PROCEDURE:
; Bilinear interpolation.
; Not really fast if you have to swap memory (eg. NX*NY is a big number).
; OK Postscript users don't forget that postscript pixels are scaleable!
; MODIFICATION HISTORY:
; Aug 15, 1989 J. M. Zawodny, NASA/LaRC, MS 475, Hampton VA, 23665.
; Aug 26, 1992 JMZ, Added maxval and fillval keywords.
; Sep 10, 1992 JMZ, converted to use INTERPOLATE function (tnx Wayne!)
; Please send suggestions and bugreports to zawodny@arbd0.larc.nasa.gov
;-
```

```
pro EXPAND,a,nx,ny,result,maxval=maxval,fillval=fillval

 s=size(a)
 if(s(0) ne 2) then begin
  print,'EXPAND: *** array must be 2-Dimensional ***'
  retall  ; This will completely terminate the MAIN program!!!
 endif

   ; Get dimensions of the input array
 ix = s(1)
 iy = s(2)

   ; Calculate the new grid in terms of the old grid
 ux = (ix-1.) * findgen(nx) / (nx-1.)
 uy = (iy-1.) * findgen(ny) / (ny-1.)

   ; Are we to look for and ignore bad data? (can't use KEYWORD_SET here)
 if(n_elements(maxval) eq 0) then begin
 ; NO
  result = interpolate(a,ux,uy,/grid)
 endif else begin
 ; YES then calculate the indicies and u-arrays
  mx = long(ux)<(ix-2)
  my = long(uy)<(iy-2)
  uxa = ux # replicate(1,ny)
  uya = replicate(1,nx) # uy

 ;Index vectors to A and RESULT arrays
  mxy = (mx # replicate(1L,ny)) + (replicate(long(ix),nx) # my)
  ind = lindgen(nx,ny)

 ; Fill RESULT with fill value, defaulting to -1 if none specified
  if(n_elements(fillval) le 0) then fillval = -1.
  result = replicate(fillval,nx,ny)

 ; Remove those elements which would be utilizing "bad" values from A
 ; Check lower left
  m      = where(a(mxy) le maxval,num)
  if(num eq 0) then goto,out
  mxy    = mxy(m)
  ind    = ind(m)
 ; Check lower right
  m      = where(a(mxy+1) le maxval,num)
  mxy    = mxy(m)
  ind    = ind(m)
 ; Check upper left
  m      = where(a(mxy+ix) le maxval,num)
  mxy    = mxy(m)
```

```
  ind    = ind(m)
 ; Check upper right
  m      = where(a(mxy+(ix+1)) le maxval,num)
  mxy    = mxy(m)
  ind    = ind(m)

 ; Interpolate only the points which will not be the fill value
  result(ind) = interpolate(a,uxa(ind),uya(ind))
 endelse

; Done
return
OUT: ; If we had a problem
print,'Entire input array is greater than MAXVAL, ('+strtrim(maxval,2)+')'
return
end
```
