

Re: Sub-pixel accuracy for line detection.

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  - *Date:* Fri, 21 Apr 2006 17:54:48 GMT
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"X t l a n" <[xtlan@interia.pl](mailto:xtlan@interia.pl)> wrote in message  
[news:e27f40\\$jpg\\$1@xxxxxxxxxxxxxxxxxxx](mailto:news:e27f40$jpg$1@xxxxxxxxxxxxxxxxxxx)

Hello everybody.

Recently I've been dealing with algorithms for sub-pixel line extraction.  
One of them is available at:  
[http://www.lgi2p.ema.fr/~montesin/PublicationsPS/scia97\\_subpixel.ps.gz](http://www.lgi2p.ema.fr/~montesin/PublicationsPS/scia97_subpixel.ps.gz)

Could you tell me please, how you understand sub-pixel line extraction and what particular meaning is carried by the "shifting coefficient" for applied above Gaussian filter pulse response? Is that also a sub-pixel location of pixel in an image? I understand reason why filter is shifted but I also can imagine situation when a 1px width line is captured by a camera and fitted just between two columns of pixels with the following coordinates:  $x$  and  $x+1$ . If brightness of the line is equal to 255 (all its pixels) and background amounts to 0, all pixels in columns (described by coordinates  $x$  and  $x+1$ ) will amount to 127 and 127 (the most likely). In that case each of  $x$  and  $x+1$  pixel column will get a half of energy carried by brightness of the line (in fact: blurred line). On the assumption that the line is a part of natural picture (e.g. forest), how can I claim that this is in fact 1px width line and its brightness amounts to 255 while it could be 2px width line acquired with its actual brightness around 127? Any ideas, how should I understand a sub-pixel accuracy term?

Regards,  
Peter.

Hi Peter,

You can't tell the difference between the two cases you presented. Subpixel algorithms always need an edge model to figure out a subpixel position. The whole idea is that the image of an edge has some known grayscale distribution across several pixels (two, at a minimum) and that subpixel positions can be calculated by "fitting" the observed grayscale distribution to the model.

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In some cases you might be able to derive your edge model from other parts of the image. Say you have an edge running across a large part of the image and you know the edge should be of constant width and grayscale then perhaps you can form a model based on the width at the point with the maximum intensity.

Andrew