

Summary of the differences between sfrmat3 and sfrmat2
Peter D. Burns, 2 July 2020

1. Default weighting for computing luminance image records is (r,g,b) [0.213 0.715 0.072], as per ITU-R Recommendation BT.709 weighting. For sfrmat2 it was [0.3 0.6 0.1]
2. Rotation of horizontal edge so it is vertical is done based on the image data, rather than the dimensions of the ROI. The function rotatev2 is called instead of rotatev.
3. Limiting of the number of lines used (for a vertical ROI) to an integer number of (npix*line slope) as per ISO algorithm. This was not done in sfrmat2.
4. Correction of sampling interval for the super-sampled edge profile normal to the detected edge. This usually results in a small correction, so the final sampling is greater than 25% of the input data sampling.
5. The SFR is compensated for the finite difference filter approximation to the first derivative. The correction factor is restricted to a value of 10 or less, to limit noise amplification.
6. Sampling efficiency is computed, by comparing the 10% SFR bandwidth, to the half-sampling (Nyquist) frequency. This is expressed as a %, clipped at 100%. This is described in, P. D. Burns and D. Williams, Sampling Efficiency in Digital Camera Performance Standards, *Proc. SPIE-IS&T Electronic Imaging Symposium*, SPIE vol. **6808**, 680805, 2008.

Update on 2 July 2020

7. Correction of plotted half-sampling (Nyquist) frequency. This introduced a small error for near-vertical or horizontal edges, but is more important when applied to a wider range of edge angles. The computed sampling efficiency should be more accurate too.