issue that should be resolved is how to use the two new parameters, σ^2 and σ_w^2, as explained in the algorithm. For further simplification, with some approximation, σ_w^2 can be eliminated from the algorithm with a minor adjustment in the update equation for σ^2.

Let $y(-1) = 0, \sigma_w^2 = \sigma_v^2,$ and $\sigma^2 = \sigma_v^2,$

Start by setting $k = 0$

LOOP: for k do the following:

$$K = \frac{\sigma^2 + \sigma_w^2}{\sigma^2 + \sigma_w^2 + \sigma_v^2}$$

$$y(k) = Kx(k) + (1 - K)y(k - 1)$$

if $D = \dfrac{|x(k) - y(k-1)|}{\sigma_v} \geq \Gamma$

$\sigma_w^2 = \sigma_v^2$

$\sigma^2 = \sigma_v^2$

else

$\sigma_w^2 = K^2\sigma_v^2$

$\sigma^2 \leftarrow (1 - K)\sigma^2 + \sigma_w^2$

end-if

If finished go to **END** otherwise:

Increment k, $k \leftarrow k + 1$, and go to **LOOP**

END

For future development, new approaches should be considered, both for filtering and motion estimation. These approaches should include median filtering, cluster filtering, and wavelet decomposition of images. The next step, in improving the temporal filter, would be the use of temporal median filter, in real time, not for the filtering purposes, but for the motion detection. This of course will increase the hardware requirement for the temporal filtering.

DISCLAIMER AND NOTE

The views expressed herein are those of the author and are not to be construed as official or reflecting the views of the Commandant, the U.S. Coast Guard, the Department of Homeland Security, or any agency of the U.S. Government.

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