

such and as heretofore explained, it is the most likely median value in slow moving, or stationary, areas of the frame sequence. Consequently, grain-noise suppression is obtained in such areas.

The adaptive component generator 30 generates an interframe difference signal defined by equation (3), and a comparator 90 compares the difference signal output by the generator 30 to a threshold T that is separately input to the comparator 90. The output of the comparator 90 is a control signal 92 for controlling the operation of an output multiplexer 100. The current sample value $x(n)$ and the median value $y(n)$ are input to the multiplexer 100, and the output 102 of the adaptive hybrid filter is taken from the output of the multiplexer 100.

In operation, when the interframe difference signal (absolute value) output by the generator 30 is less than or equal to the predetermined threshold T, then the control signal 92 sets the multiplexer 100 to pass the median value $y(n)$ through to the filter output 102. This condition is obtained when the current frame, compared to the preceding frame, does not show evidence of fast-moving image. Consequently, the grain suppression benefit of the recursive component 60 is allowed to influence the output signal 102, and the median of the current value $x(n)$, the preceding value $x(n-1)$, and the recursive component $y'(n)$ is chosen. When the interframe difference signal is greater than the threshold T, the control signal 92 is inactive, and the current value $x(n)$ passes through the multiplexer 100 without change to become the filter output 102. This condition is obtained when a fast moving image generates a brief (impulsive) interframe difference signal characteristic of a rapidly changing signal level, particularly when a pixel registers a sudden signal excursion due to movement that is unseen in the temporally-preceding pixel, i.e., the image is moving faster than the frame rate of the system.

The invention has been described in detail with particular reference to a presently preferred embodiment, but it will be understood that variations can be affected within the spirit and scope of the invention. For instance, the window of the median filter may include more than the current and preceding frames; likewise,

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the output of the filter could be a function of a group, block, or area of pixels in each frame, rather than a single pixel for each frame. Of course, such modifications increase complexity. The invention was also described in connection with a sample data system. In a typical sampled system, the data would also be digitized. The sample producer 20, for example, could be part of analog-to-digital conversion. In a digital system, each of the component blocks in the Figure would be clocked to reset and control timing throughout the overall circuit.

What is claimed is:

1. Median filter apparatus, comprising:
 - a source of input signals obtained from successive frames of a motion image;
 - means for recursive-filtering said input signals;
 - means for generating a control signal from an interframe difference between input signals from successive frames;
 - means responsive to said input signals for producing successive sets of samples representing said input signals, each set including at least a current sample from a current frame, a spatially-corresponding sample from a preceding frame, and a recursive sample derived from said recursive-filtering means;
 - means for median-filtering said successive sets of samples to produce a median sample; and means responsive to said control signal for selecting either said median sample or said current sample as the output of the median filter.
2. Median filter apparatus as claimed in claim 1 wherein the control signal generating means compares the interframe difference to a threshold and produces a predetermined control signal if the difference is less than the threshold.
3. Median filter apparatus as claimed in claim 2 wherein said selecting means responds to said predetermined control signal by outputting the median sample.
4. Median filter apparatus as claimed in claim 2 wherein said selecting means outputs the current sample if the interframe difference is greater than the threshold.

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