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Hamilton, Jr. et al.

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[54] **COMPUTING COLOR SPECIFICATION (LUMINANCE AND CHROMINANCE) VALUES FOR IMAGES**

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[52] **U.S. Cl.** **382/167**; 382/274

[58] **Field of Search** 382/162, 163, 382/164, 165, 166, 167, 173, 176, 180, 181, 190, 195, 209, 224, 225, 226, 227, 229, 232, 243, 248, 254, 266, 274, 275, 276, 277, 278, 279, 280, 281, 286, 293, 299, 300, 308, 312, 317, 318, 319, 321, 324, 241; 348/407, 413, 416, 699, 402; 600/473, 478; 607/89; 356/363, 374; 358/515

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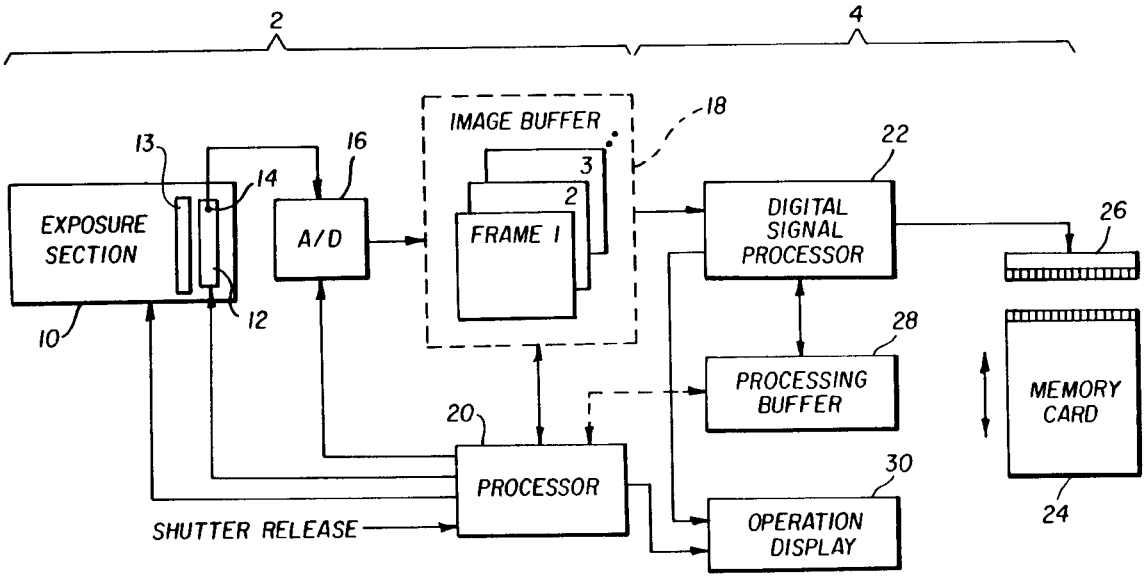
[57] **ABSTRACT**

In apparatus for processing a digital color image value originally obtained from an image sensor or the like having color image pixels aligned in rows and columns having diagonal pixels with sufficient information to permit luminance or chrominance estimation the digital image having at least three separate color values but only one color value for each image pixel location, such apparatus computing the luminance or chrominance values for each image pixel. The apparatus stores the digital image and includes a processor operatively associated with the stored image and responsive to said stored measured digital color image values for computing low frequency luminance or chrominance values. In response to the computed low frequency luminance or chrominance values the Laplacian second-order and gradient values in at least two image orientations are computed from neighboring image pixels. The Laplacian second-order and the gradient values are combined to define a value for each image pixel such that there are sets of values with each value corresponding to a classifier and for selecting a preferred orientation from a group of orientations for the interpolation based upon the classifier. Finally, in response to the preferred orientation and the measured digital image for estimating the luminance or chrominance value for each corresponding image pixel.

19 Claims, 7 Drawing Sheets