Any other pixel needing an interpolated value for Ca may be processed in a similar manner. Furthermore, each pixel needing an interpolated value for Cb may also be processed in a similar way with the roles of Ca and Cb reversed. When this step is done, every pixel has a luminance and two chrominance values, and the interpolation process is complete.

For each pixel the conversion to red, green, and blue values (see RGB values block **36**, FIG. **2**) is accomplished by the following equations:

$$R + V + 2^{*}Ca + Cb$$

$$G + V - Cb$$

$$B + V - 2^{*}Ca + Cb$$

The present invention is applicable to a digital color image value originally obtained from an image sensor or the like and has color image pixels aligned in rows and columns to define repeating kernels having diagonal pixels with sufficient information to permit luminance estimation the digital image having at least three separate color values but only one color value for each image pixel location. For example, the so-called Bayer array generally takes the format shown in FIG. **8**A. With this format, there is insufficient luminance (i.e., green) information along certain diagonals labeled as b, d, and f of FIG. **8**A. With other diagonals, there is complete information. They are labeled a, c, and e. The array pattern shown in U.S. Pat. No. 5,631,703 has sufficient information (i.e., magenta and green values or cyan and yellow values) along all its diagonals (e.g., a–e of FIG. **8**B) and so is especially suitable for use with the present invention.

The present invention can be embodied in a computer program stored on a computer readable product such as, for example, magnetic storage media, such as a magnetic disk (for example, a floppy disk), magnetic tape, optical disks, optical tape, or machine readable memory.

The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

PARTS LIST	
2	input section
4	recording section
10	exposure section
12	image sensor
13	color filter array
14	output diode
16	A/D converter
18	image buffer
20	control processor
22	digital signal processor
24	removable memory card
26	connector
28	processing buffer
30	display panel
32	luminance values block
36	luminance section
38	chroma section
40	select best luma interpolation
42	blur block
44	correction block
46	luminance block
48	classification block

-continued

PARTS LIST	
52	partial block
54	complete block

What is claimed is:

1. 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 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 values for each image pixel, comprising:

means for storing the digital image;

processor means operative with said storing means and responsive to said stored measured digital color image values for computing low frequency luminance values;

means responsive to the computed low frequency luminance values for obtaining Laplacian second-order and gradient values in at least two image orientations from neighboring image pixels;

means for combining the Laplacian second-order and the gradient values to define a value for each image pixel in the kernel 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; and

means responsive to the preferred orientation and the measured digital image for estimating a portion of the color specification for each corresponding image pixel.

2. 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 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 values for each image pixel, comprising:

means for storing the digital image;

processor means operative with said storing means and responsive to said stored measured digital color image values for computing low frequency luminance values;

means responsive to the computed low frequency luminance values for obtaining Laplacian second-order and gradient values in at least two image orientations from neighboring image pixels;

means for combining the Laplacian second-order and the gradient values 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; and

means responsive to the preferred orientation and the measured digital image for estimating the luminance value for each corresponding image pixel.

3. The apparatus of claim **1** wherein there are at least two possible selected orientations which include horizontal and vertical.

4. The apparatus of claim **1** wherein there at least four possible selected orientations which include horizontal, vertical, and first and second diagonals.

5. The apparatus of claim **4** further including means for selecting the smallest classifier which determines the selected orientation and corresponds to the predictor.