

- (g) classifying pixels in the color image into plural representative color regions associated with the plural representative colors, with the aid of the lookup table, thereby dividing an image region of the color image into the plural representative color regions; and
- (h) performing inspection of the circuit board using at least one of the divided plural representative color regions.

**19.** A method in accordance with claim 18, wherein each composite distance index includes a sum of an angle index and a corresponding distance index.

**20.** A method in accordance with claim 18, wherein each composite distance index includes a product of an angle index and a corresponding distance index.

**21.** A method in accordance with claim 18, wherein the step (e) includes the step of relating each arbitrary individual color to one of the plural representative colors that gives a minimum value of the composite distance indices.

**22.** An apparatus for inspecting a circuit board, comprising:

- a camera unit configured to capture a color image of the circuit board;
- a representative color setter configured to set a plurality of representative colors;
- an angle index calculator configured to calculate plural angle indices for each pixel color in the color image, the plural angle indices for a pixel color representing angles between an individual color vector of the pixel color and representative color vectors of the plurality of representative colors in a predetermined color space of at least two dimensions;
- a distance index calculator configured to calculate plural distance indices for each pixel color in the color image, the plural distance indices for a pixel color representing distances between the pixel color and the plural representative colors in the color space;
- a composite distance processor configured to calculate plural composite distance indices for each pixel color in the color image based on the distance indices and the angle indices, the plural composite distance indices being associated with the plurality of representative colors, respectively;

a color region divider configured to classify pixels in the color image into plural representative color regions associated with the plural representative colors according to the composite distance indices, thereby dividing an image region of the color image into the plural representative color regions; and

an inspection unit configured to perform inspection of the circuit board using at least one of the divided plural representative color regions.

**23.** An apparatus in accordance with claim 22, wherein each composite distance index includes a sum of an angle index and a corresponding distance index.

**24.** An apparatus in accordance with claim 22, wherein each composite distance index includes a product of an angle index and a corresponding distance index.

**25.** An apparatus in accordance with claim 22, wherein the color region divider assigns each pixel to one of the plural representative color regions that gives a minimum value of the composite distance indices.

**26.** An apparatus for inspecting a circuit board, comprising:

- a camera unit configured to capture a color image of the circuit board;
- a lookup table that has an arbitrary individual color as input and a color number indicating one among plural representative colors as output; and
- a color region divider configured to obtain a representative color number for each pixel color in the color image with the aid of the lookup table, and to classify each pixel in the color image into one of plural representative color regions associated with the plural representative colors according to the representative color numbers, thereby dividing an image region of the color image into the plural representative color regions; and
- an inspection unit configured to perform inspection of the circuit board using at least one of the divided plural representative color regions.

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