property value. However, other embodiments may singularly use a mean value, or just a variance value in calculation of the texture property value. Again, the exact calculation or formulae pertaining to the texture property value can vary, and is intermediate, as long as an appropriate texture feature map is utilized that characterizes verification sections of the scanned image in terms of texture. The principles taught in the present invention are equally applicable regardless of the precise calculation and implementation of the texture property value.

[0132] In order to provide a further degree of resolution in calculating the texture property value, an additional embodiment of the present invention utilizes a second texture feature map having a second texture feature value for each verification section in the texture property value calculation. The use of two texture feature maps reduces variability in the calculation, as now it utilizes two distinct texture feature aspects relating to the scanned image.

[0133] Similar to the first texture feature map, the second texture feature map can be a gray level feature map having gray levels as the second texture feature value for each verification section, a contrast feature map having contrast values as the second texture feature value for each verification section, or a halftone feature map having halftone values as the second texture feature value for each verification section. Again, the exact type or format of the second texture feature map and corresponding second texture feature value is intermediate, as the teachings of the present invention are equally applicable for any type of second texture map implemented.

[0134] Shape Property Value Determination **160**

[0135] Shape property value determination **160** focuses on calculating a shape property value for each of the identified objects. The shape property value will then be compared to known values corresponding to valid monetary banknotes to verify whether the shape of the relevant object agrees with that of the valid monetary banknote.

[0136] The specific formulae for calculating the shape property value can vary according to a number of embodiments. In one embodiment, the shape property value for each object simply comprises determining an area of the object. This may include utilizing four corners of the object to determine the area of the object. Other embodiments can additionally include: determining a distance between center points of two different diagonal lines within the object, determining lengths of two parallel lines within the object, determining an inner product using four angles within the object, and determining a ratio of a width of the object and a height of the object.

[0137] Although the exact calculation of the shape property value can vary according to different embodiments, its exact representation is intermediate, as the teachings of the present invention are equally applicable for any calculation for shape property value implemented.

[0138] Object Removal **170**

[0139] With texture property values and shape property values determined for each object, the object removal **170** focuses on removing objects that do not correspond to a valid monetary banknote. This is accomplished by further removing texture sections from the texture decision map corresponding to objects, which do not have a texture property value within a first predetermined range, and a shape property value within a second predetermined range.

[0140] In the preferred embodiment of the invention, the first predetermined range corresponds to valid texture property values of valid monetary banknotes. The second predetermined range corresponds to valid shape property values of valid monetary banknotes. Therefore, should an identified object have both a texture property value and shape property value within the above valid ranges (both corresponding to a valid monetary banknote), its corresponding texture sections are left in the texture decision map to verify a location of valid monetary banknote within the scanned image. Otherwise, if either the texture property value or shape property value of the object are not within the above respective ranges, their corresponding texture sections are removed from the texture decision map.

[0141] FIG. **27** illustrates an example of object removal **170** according to the present invention. **27** (*a*) illustrates a texture decision map with three identified objects. Although texture property values are calculated for all three objects, it is evident that the smaller objects on the left, and below, clearly do not correspond with that of a valid monetary banknote. In **27**(*b*), the smaller objects described above are removed upon Object removal **170**, as they do not have shape property values within the second predetermined range that corresponds to a typical shape of a valid monetary banknote.

[0142] A process flow chart for the verification method for determining areas within an image corresponding to monetary banknotes is presented in FIG. **28**. Provided that substantially the same result is achieved, the steps of process **2800** need not be in the exact order shown and need not be contiguous, that is, other steps can be intermediate. The method comprises:

[0143] Step **2810**: Divide the image into a plurality of verification sections

[0144] Step **2820**: Generate a banknote boundary map having border sections corresponding to a boundary of monetary banknotes within the image

[0145] Step **2830**: Generate a texture decision map having texture sections, the texture sections each having a texture value within a valid range according to a valid monetary banknote

[0146] Step **2840**: Determine a number of objects in the texture decision map by removing texture sections in the texture decision map that correspond to the border sections in the banknote boundary map

[0147] Step **2850**: Calculate a texture property value for each object according to a texture feature map having a texture feature value for each verification section

[0148] Step **2860**: Calculate a shape property value for each object

[0149] Step **2870**: Remove texture sections from the texture decision map corresponding to objects that do not have the texture property value within a first predetermined range and the shape property value within a second predetermined range

[0150] FIGS. **29** and **30** illustrate a complete step-by-step verification process as detailed above. In both cases, a texture decision map **1000** and banknote boundary map **1002** are derived from a scanned image **1001**. Information from these two maps **1000**, **1002** are combined in object determination to identify and isolate potential objects **1004** relating to banknote locations. Shape property values and texture property values are then determined for each object **1004**. In object removal **1006**, objects **1004** not having