first color **510**, a second color **520** and a third color **530**, from which the median and width values can be extracted for each color. As properties of color histograms are well known to those involved in the related art, further discussion is omitted for brevity.

[0079] With color histogram data extracted for each decision section, a color vector can then be constructed for each decision section **1130** according to the extracted data. The color vector provides a convenient representation of color information for each decision section. One embodiment utilizes a six dimensional space vector to summarize key data points extracted from the color histogram of the decision section, described below as:

[0080] color vector [width of 1^{st} color] [width of 2^{nd} color] [width of 3^{rd} color] [median of 1^{st} color]

[0081] [median of 1^{st} color−median of 2^{nd} color] [median of 1^{st} color−median of 3^{rd} color]

[0082] The use of differences between median values in the 5^{th} and 6^{th} array is to reduce total memory space constraints. When using RGB histograms, it is noted that the median values are within a local proximity to each other. If required, the median values of the 2^{nd} and 3^{rd} colors can be extracted from the above when the median of the 1^{st} color is known.

[0083] After defining color vectors for each decision section, each color vector is then compared to a color lookup table to determine a probability of the decision section corresponding to a valid monetary banknote **1140**. The probability that the decision section corresponds to monetary banknotes is calculated according to the frequency of occurrence in the lookup table.

[0084] The color lookup table is created by dividing an image of a valid monetary banknote into a number of table sections. As with previous descriptions, the table sections can be isolated, independent, or overlapping according to the specific embodiment of the present invention, and can be similar to that shown in FIG. **2** and FIG. **3**, respectively. The configuration of the table sections can also have shift or rotational variations according to a desired training format for the color lookup table, with multiple levels of mapping also possible.

[0085] Color histogram data is then extracted for each table section of the valid monetary banknote, with a color vector assigned for each table section of the valid monetary banknote based on the respective color histogram data. A frequency of occurrence is then counted for each assigned color vector of the valid monetary banknote.

[0086] If the probability of the decision section corresponding to monetary banknotes exceeds a first predetermined threshold, in step **1150**, it is then selected a color section. This step is repeated for all decision sections until their status as a color section has been confirmed. Therefore, at this stage, color sections are merely decision sections having color vectors with an acceptable frequency of occurrence in comparison with a valid monetary banknote.

[0087] Surrounding section examination then follows in **1160**. The surrounding section examination is a more global approach from the previous steps. Using the probability information from the decision section examination in **1140**, probabilities of surrounding sections of each color section are examined.

[0088] First, a comparison of color vectors for surrounding sections to each color section is performed in **1160**, with reference to the color lookup table. An average probability for the surrounding sections corresponding to monetary banknotes is then determined. Similar to the previous step, an average probability for surrounding sections corresponding to monetary banknotes is calculated according to the frequency of occurrence of the surrounding section color vectors in the lookup table in step **1170**. If the average probability is greater than a second predetermined threshold, in step **1180**, then the corresponding probable section is selected as a bill section for use in the next step.

[0089] FIG. **12** is used to provide an illustrative example for this step. In this embodiment, the color section is identified as the center section **1212**. Surrounding sections **1214** encompass the color section **1212**. The color vectors identified for the surrounding sections **1214** are compared against the color lookup table to determine an average probability of the surrounding sections corresponding to monetary banknotes. If the average probability is greater than the second predetermined threshold, then the color section **1212** is selected as a bill section.

[0090] Although FIG. **12** illustrates the surrounding sections **1214** forming a circumference outside of the color section **1212**, variations and alternate embodiments may illustrate different configurations, which still obey the teachings of the present invention. For example, the surrounding sections can be arranged in an overlapping, rotational, disjoint, offset, or shifted manner. In all such cases, the present invention method is equally applicable to maintain its desired functional goals.

[0091] Once bill sections are determined in step **1180**, a pixel level approach is implemented to examine pixels within each bill section. This is performed in the pixel level examination of step **1190**. The main purpose of this step is to check whether most of the pixels come from the same type of banknote. Pixels contained within the bill sections are compared with a pixel lookup table to determine matching pixels. Matching pixels are defined according to the frequency of occurrence of the color histogram data of the pixels in the pixel lookup table. If matching pixels are discovered within a bill section, the method **1100** acts to record the location of the matching pixels on the color binary decision map in step **1192** as probable sections corresponding to the monetary banknote. Therefore, the general color binary decision map is generated.

[0092] Regarding the pixel lookup table, it is similar to the color lookup table as it is created by extracting color histogram data for pixels of a valid monetary banknote. A frequency of occurrence for different values of color histogram data for pixels of the valid monetary banknote is then counted. It is this frequency of occurrences, along with the color histogram data of relevant pixels, which is used to determine a matching pixel.

[0093] Although the color binary decision map (step **430**, FIG. **4**) has been generated through the description above, it is roughly tuned due to uncertainties in image quality, background discrepancies, and noise effects. An example of this is illustrated through FIG. **13**. FIG. **13** is an exemplary illustration showing results various stages of binary decision map generation. The left hand image is an original image containing a monetary banknote. The center image shows the output after the bill sections have been determined (where the surrounding sections have been examined for color identification). The right hand image shows the probable sections, where matching pixels are identified in the color process map.