

- b) constructing lines corresponding to all of said each detected point,
- c) obtaining peaks at the point (θ,b) that corresponds to collinear sets of said each detected point P_i , and
- d) determining a position for said each detected point P_i through equations of corresponding lines, wherein the computation for determining lines and curves during image detection is obtained by calculating:

$$b=kx_i-y_i \tag{5}$$

K times for each detected point, wherein $K=\Delta/R$ and R is the resolution for θ estimation;

rotating and shifting said template before matching said template to said test pattern so that said anchor lines align with the detected long lines, enabling detection within said test pattern; and

comparing said template to said test pattern to determine whether said anchor lines exit within said test pattern.

7. An image detection system, using line detection information of collinear sets of detected points, comprising:

means for trading a detector off-line with example images wherein a template is generated by recording an image pattern of said example images similar to a test pattern to be detected;

means for identifying anchor lines within said template;

means for detecting long lines from collinear sets of detected points in the test patterns using a line detection method as follows:

- a) building a 2-D array indexed by (θ,b) wherein a line, represented by an equation:

$$y=x\tan\theta-b$$

is constructed for each detected point $P_i=(x_i,y_i)$ as:

$$b=kx_i-y_i$$

in a kb-plane and wherein $k=\tan \theta$, for $\phi+\Delta<\theta<\phi-\Delta$, wherein φ is the edge orientation of the local edge and Δ is a preset parameter determined by the accuracy of the local edge orientation estimation,

- b) constructing lines corresponding to all of said each detected point,

- c) obtaining peaks at the point (θ,b) that corresponds to collinear sets of said each detected point P_i , and

- d) determining a position for said each detected point P_i through equations of corresponding lines; wherein the computation for determining lines and curves during image detection is obtained by calculating:

$$b=kx_i-y_i$$

K times for each detected point, wherein $K=\Delta/R$ and R is the resolution for θ estimation;

means for rotating and shifting said template before matching said template to said test pattern so that said anchor lines align with the detected long lines enabling detection within said test pattern; and

means for comparing said template to said test pattern to determine whether said anchor lines exist within said test pattern.

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