

An Efficient Shape-Based Round Object Detection

A method is introduced to detect round objects based on their boundary shape. It can also be generalized to other special forms. The presented algorithm is inspired from histogram of oriented gradients (HOG, Dalal and Triggs 2005).

The method is structured in five stages starting with calculation of image gradient. Using non-maxima-suppression, the edges are thinned and so normalized. A so called "Orientation Histogram Integral Image" is then built based on the orientation of the gradient vector of each pixel. This accelerates the search algorithm. In the next stage an overlapped binary search recursively scans the pyramid down and finds the best-fitting box around the candidate objects using edge orientation statistics from the histogram integral image. Final results are once more filtered using further statistical criteria.