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Abstract
Ellipse is the fundamental geometrical form that usually appears in images. Traditionally, Hough transform is the commonly used method to detect ellipse in computer vision and image processing. Hough transform has the advantage that not to be interfered by discontinuous edges or noise. However, the slow computing speed and the high storage capacity limit the application of this method.
In this thesis, an incomplete elliptic object detection based on genetic algorithm is proposed. This method applies the geometrical property that five points would compose an ellipse to construct a chromosome in genetic algorithm. The convex hull constructed by these five points is further used to determine whether it could compose a complete ellipse or not. The least-square method is applied to calculate the approximated ellipse. The ellipse location is changed during the convergence process by the crossover and mutation operators.
The proposed method can detect various numbers of ellipses in image. The computing speed is faster than Hough transform. On the other hand, the incomplete ellipses can also be detected by adjusting the convergence condition.
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