IRCD: an Improved Randomized Circle Detection

IRCD is an improved version of randomized circle detection (RCD) [1] for single detection. For the former, fewer parameters need to be set manually. The flowchart of the proposed IRCD is given as
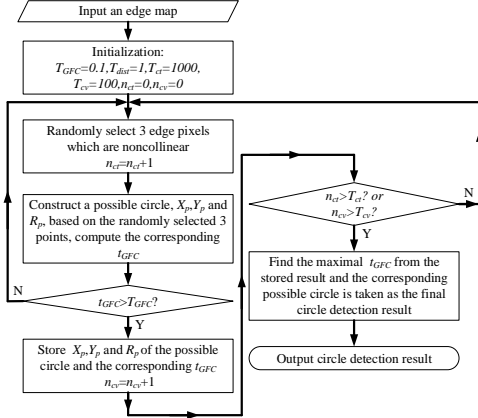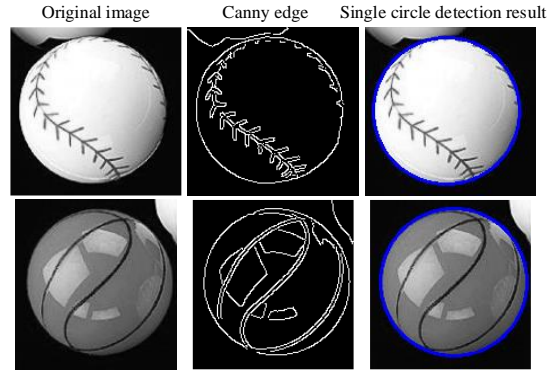

Fig. 1 The flowchart of IRCD

Fig. 2 The results of single circle detection with IRCD

T_{GFC}, T_{ct}, T_{cv} and T_{dist} are thresholds by manually set. X_p, Y_p and R_p denote the central x, y coordinates and radius of a possible circle. More details about the proposed IRCD algorithm can be obtained in literature [2].

In this given example, the basic processes are:

Input image -> step 1: image filtering -> step 2: canny edge detection -> step 3: single circle detection with IRCD –> Output the result of circle detection.

The tested images, canny edge detection and results of single circle detection with IRCD are shown in Fig. 2. The experiments are done on a computer equipped with an Intel(R) Core(TM) i5-4210U (1.7-2.4G) CPU, 6 GB of RAM, and the Windows 10 64-bit operating system, the average consumed time of the 1000 repeating implementation for each tested images (the resolutions of these two tested images are 143x151 and 152x150) is about 9.81ms including the whole processes: load image, image filtering, canny edge detection and circle detection.

References：

[1] T. C. Chen and K. L. Chung, "An efficient randomized algorithm for detecting circles," Computer Vision and Image Understanding, vol. 83, no. 2, pp. 172–191, 2001.

[2] X. Zhou, Y. Wang, Q. Zhu, J. Mao, C. Xiao, X. Lu, H. Zhang, "A surface defect detection framework using visual attention model and wavelet transform for glass bottle bottoms," IEEE Transactions on Industrial Informatics. [under review](https://****), pp. **, 2019.