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Detection of Ellipse

WU Zihan

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Project Target

To detect ellipses in the images/videos.

Figure: Input

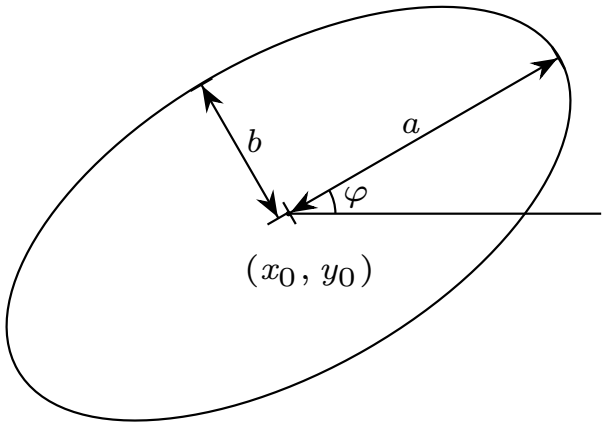
Figure: Output

Ellipse

To describe an ellispe we need 5 parameters:

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0, \text{where } B^2 - 4AC < 0.$$

Or in another way, we need the coordinates of ellipse's center (x_0, y_0), semi-major/semi-minor axes (a, b), and a rotation angle (φ).



Two major ways

Hough Transform

- Slow
- Sacrifice accuracy for efficiency

Edge Following

- Derived from Arc-support LS
- use greyscale image (gradient)
- Greedy for efficiency

Methods

- Detect the arc segements
- Form to acrs
- Predict the 5 parameters for ellipses
- Co-cluster
- Validation