

# Barcode Detection and Decoding

## Code

Git repository: [https://github.com/Arthicha/Barcode\\_Detection\\_and\\_Decoding.git](https://github.com/Arthicha/Barcode_Detection_and_Decoding.git)

### Running an example

Install required python modules (standard modules, such as numpy opencv, not included)

```
pip install -r requirement.txt
```

Run an example file

```
python example.py
```

## Function

Locate in barcode\_reader.py

Function name	Input	Output
<b>bardetect(img)</b>	Img: rgb image with one barcode	barcode -> cropped image of barcode coord -> coordinate of the barcode (upper left) imgs -> list of intermediate images
<b>bardecodde(img)</b>	Img: cropped image of one barcode	code -> decoded information thresholded_code -> image of binarized barcode

## Method/step

- Get input image



Fig: an example of input image

- bardetect function
  - o Sobel gradient: extract line/bar features

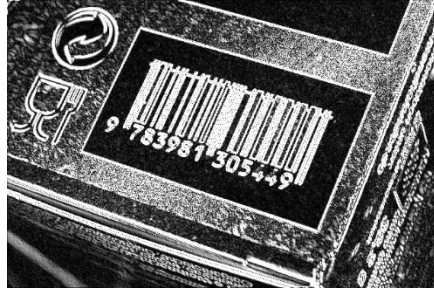


Fig: an example of sobel gradient

- Binarization: perform first thresholding for morphological transformation

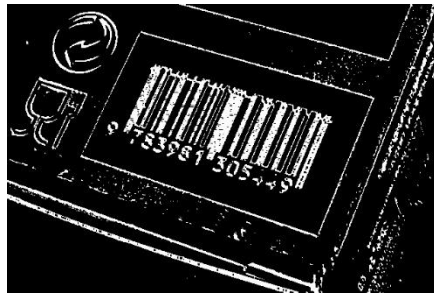


Fig: an example of first binarization

- Morphological transformation: closing operation



Fig: an example of closing operation

- Detection: find contour with maximum area



Fig: an example of detection

- Crop & Warp: crop the barcode according to the detection and before 4-point warp



Fig: an example of 4-point warp

- bardecoding function
  - o Binarization: perform second thresholding (slightly decrease the threshold from 255 to 0 until the barcode is decodable)

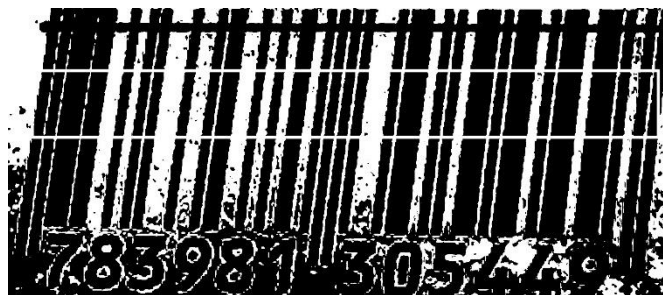


Fig: an example of second binarization

- Barcode decoding: with pyzbar module



Fig. an example of detection and decoding output

## Constraints/Limitations

- High (enough) resolution barcode
- Has only one barcode

- Up to 13 digits?

# Experiment and Result

## Testcase 1

Ground truth	Result
34158 54588	0634158545887



Fig: testcase 1 – input, sobel gradient, first binarization, morphological transformation, detection, crop & warp, second binarization, and barcode decoding (from left to right, top to bottom).

## Testcase 2

Ground truth	Result
0123456789	0123456789



Fig: testcase 2 – input, sobel gradient, first binarization, morphological transformation, detection, crop & warp, second binarization, and barcode decoding (from left to right, top to bottom).



### Testcase 3

Ground truth	Result
165456432135659	541686413216165456432135659



Fig: testcase 3 – input, sobel gradient, first binarization, morphological transformation, detection, crop & warp, second binarization, and barcode decoding (from left to right, top to bottom).

## Testcase 4

Ground truth	Result
9783981305449	9723987305449



Fig: testcase 4 – input, sobel gradient, first binarization, morphological transformation, detection, crop & warp, second binarization, and barcode decoding (from left to right, top to bottom).