Automatic Document Scanning

Open Software Project

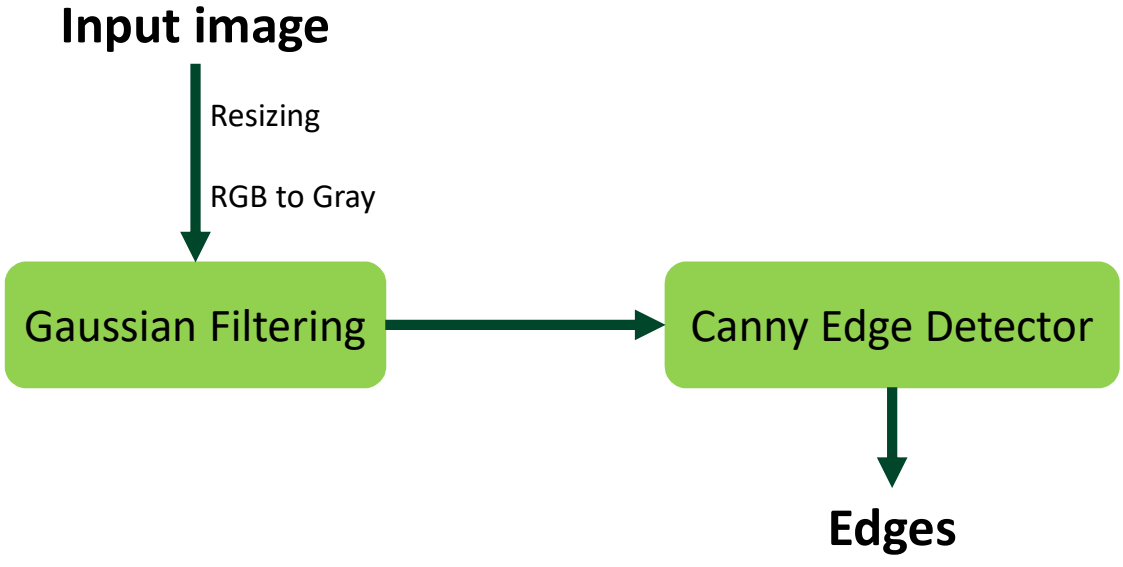
Yujin Hong, Dasom Jang

Outline

- **Step 1** Find Edges with Canny Edge Detector
- **Step 2** Sort regions and select a valid one
- **Step 3** Adjust the valid region within the rectangular output shape
- **Step 4** Make it clear using adaptive thresholding and denoise

Step 1

Edge Detection



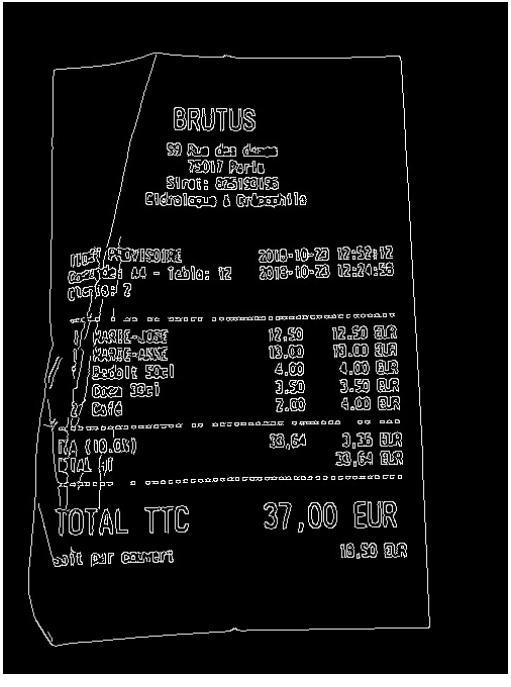
Step 1

Edge Detection

```
#Read the image
img=cv2.imread('input_1.jpg')

#Image resizing if needed
# -> When an image was too big or too small,
    #when an image resized too much, it makes a strange output.
if(img.shape[1]>1000 or img.shape[0]>1000):
    r=1000.0 / img.shape[1]
    dim=(1000, int(img.shape[0] * r))
    img=cv2.resize(img, dim, interpolation = cv2.INTER_AREA)
if(img.shape[1]<500 or img.shape[0]<500):
    r=500.0 / img.shape[1]
    dim=(500, int(img.shape[0] * r))
    img=cv2.resize(img, dim, interpolation = cv2.INTER_AREA)

#It shows the resized original image.
cv2.imshow('INPUT',img)

#Find edges
gray=cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
gray=cv2.GaussianBlur(gray,(5,5),0)
edge=cv2.Canny(gray,50,150)
```

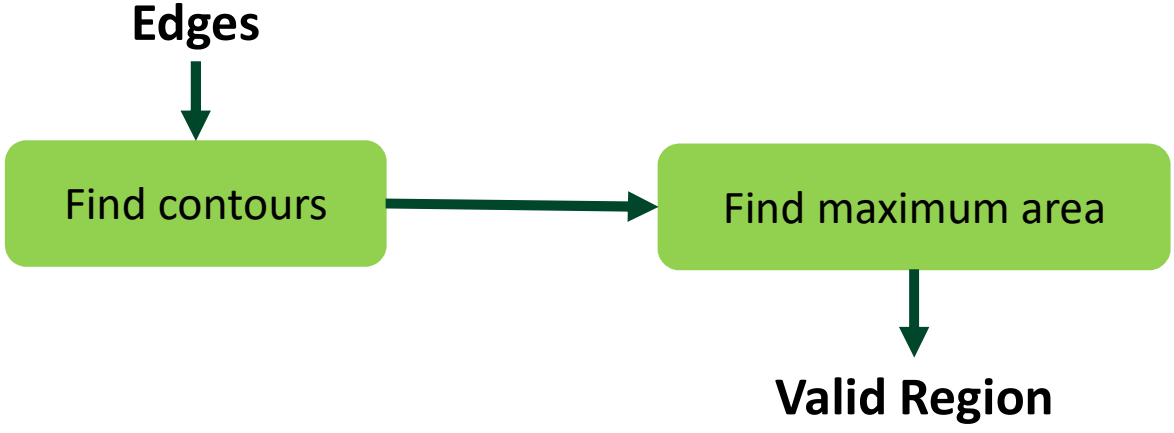
Step 1

Edge Detection



Step 2

Selecting a region



Step 2

Selecting a region

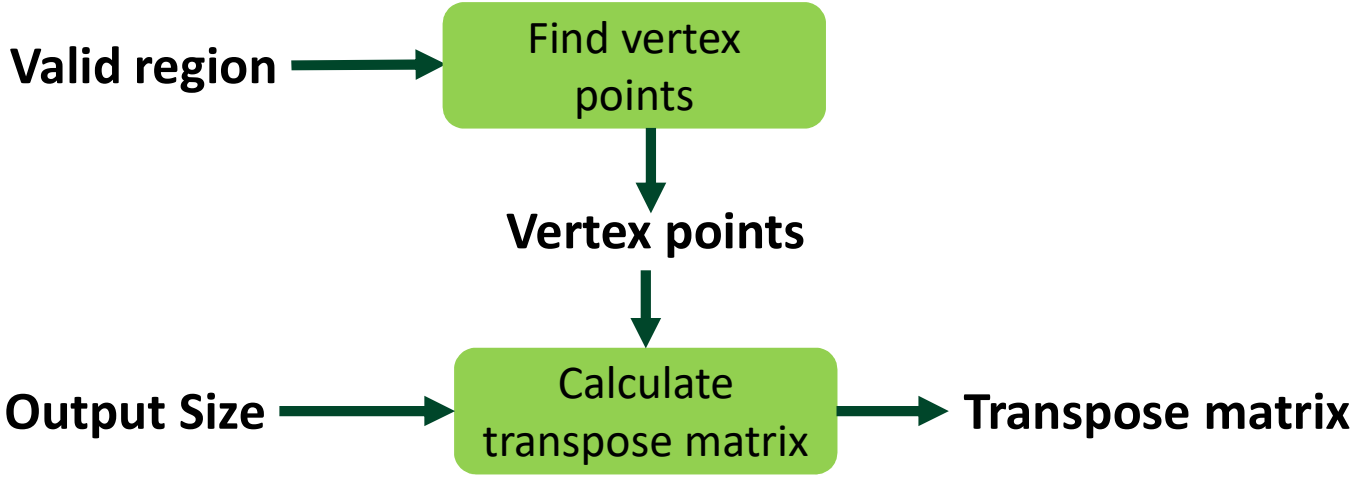
```
#Finding and drawing contours
contours,_=cv2.findContours(edge.copy(), cv2.RETR_EXTERNAL, cv2.CHAIN_APPROX_SIMPLE)
#                                        outermost among contours
#                                        return the points that can draw contour lines only
cv2.drawContours(img,contours,-1,[0,255,0],2)

#It shows the resized grayscale image with contours found above
#cv2.imshow('Contours',img)

#Find the part of the document in the image by contours
n=len(contours)
max_area=0
pos=0

for i in contours:
        area=cv2.contourArea(i)
        if area>max_area:
                max_area=area
                pos=i
```

Step 2

Selecting a region

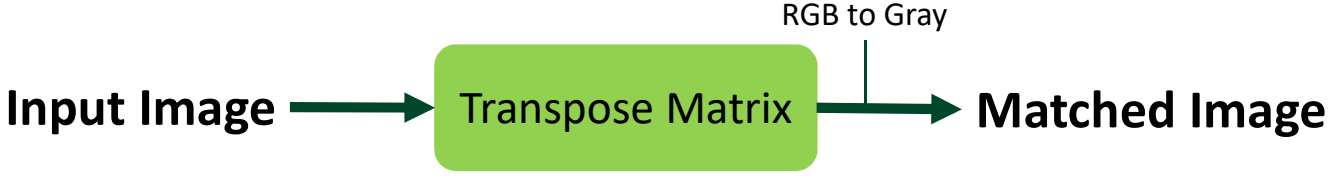
Step 3

Adjusting : using transpose matrix



Step 3

Adjusting : using transpose matrix



Step 3

Adjusting: using transpose matrix

```
# Find the corners of the object and the dimensions of the object
peri=cv2.arcLength(pos,True)
approx=cv2.approxPolyDP(pos,0.02*peri,True)
size=img.shape
w,h,arr=transform(approx)
# transform() :return the corners and the dimensions of the object

# Make a scanned document with perspective transformation
pts2=np.float32([[0,0],[w,0],[0,h],[w,h]])
pts1=np.float32(arr)
M=cv2.getPerspectiveTransform(pts1,pts2)

image=cv2.cvtColor(dst,cv2.COLOR_BGR2GRAY)
dst=cv2.warpPerspective(img,M,(w,h))
```

Step 3

Adjusting : using transpose matrix

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99 Rue des dames
75017 Paris
Siret: 825193196
Cidrologue & Crêpophile

TICKET PROVISOIRE 2018-10-23 12:52:12
Commande: A4 - Table: 12 2018-10-23 12:24:58
Clients: 2

1	MARIE-JOSE	12.50	12.50 EUR
1	MARIE-ANNE	13.00	13.00 EUR
1	Badoit 50cl	4.00	4.00 EUR
1	Coca 33cl	3.50	3.50 EUR
2	Café	2.00	4.00 EUR
TVA (10.0%)		33,64	3,36 EUR
TOTAL HT			33,64 EUR

TOTAL TTC 37,00 EUR
Soit par couvert 18,50 EUR

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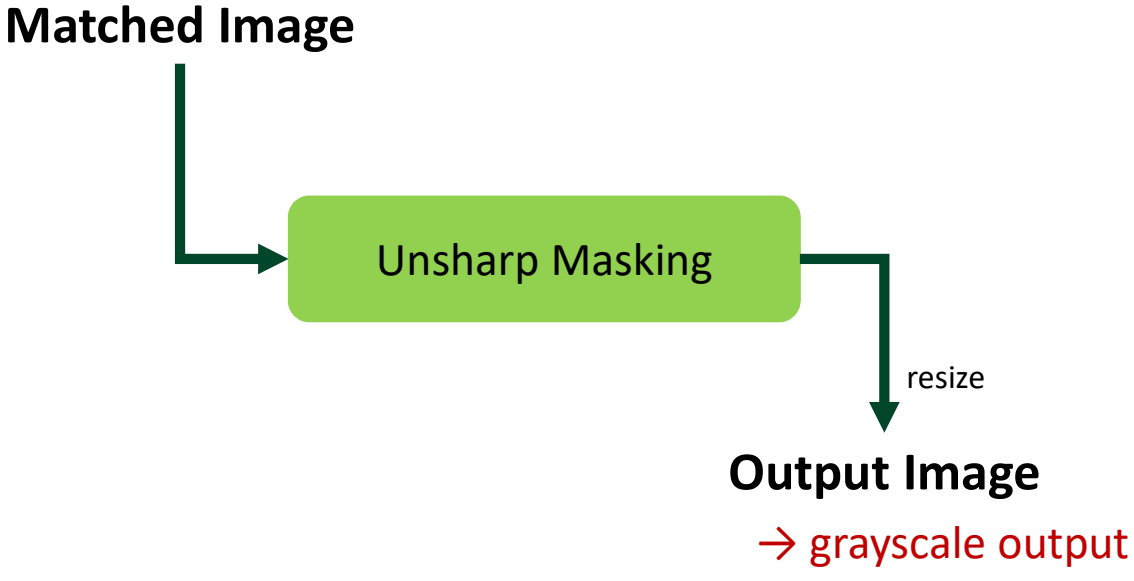
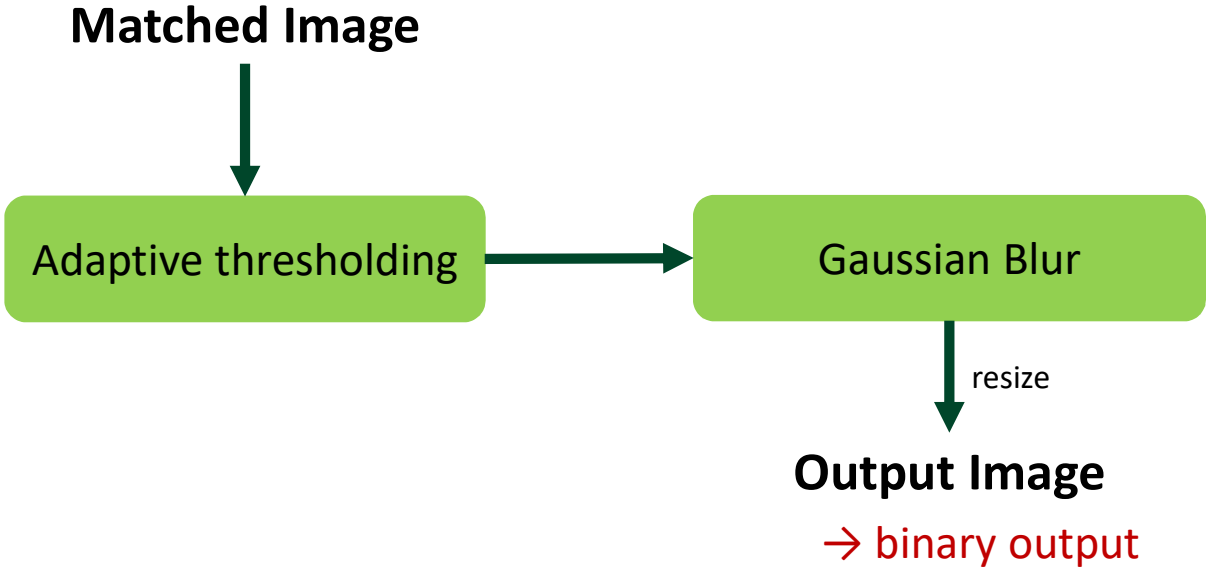
Step 4

Revision : sharpening



Step 4

Revision : thresholding and softening



Step 4

Revision : thresholding and softening

```
# Make the document clear with adaptive thresholding using moving averages
# and make letters smoother by Gaussian blurring
image=cv2.adaptiveThreshold(image, 255, cv2.ADAPTIVE_THRESH_MEAN_C, cv2.THRESH_BINARY, 7, 12)
image=cv2.GaussianBlur(image,(3,3),0)

image = cv2.resize(image,(w,h),interpolation = cv2.INTER_AREA)

#It shows the final output image (the scanned document)
cv2.imshow('OUTPUT',image)

#Save the final output image (the scanned document) and finish
cv2.imwrite('output.jpg',image)
```

Step 4

Revision : thresholding and softening

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Results

Main Street Restaurant
6332 Business Drive
Suite 528
Palo Alto California 94301
575-1628095

Fri 04/07/2017 11:36 AM

Merchant ID: 9hqjxvufdr
Terminal ID: 11111

Transaction ID: #e6d598ef
Type: CREDIT

PURCHASE
Number: XXXXXXXXXXXX0041
Entry Mode: Swiped
Card Type: DISCOVER

Response: APPROVED
Approval Code: 819543

Sub Total USD$ 25.23
Tip: 3.78

Total USD$ 29.01

Thanks for supporting
local business!

THANK YOU

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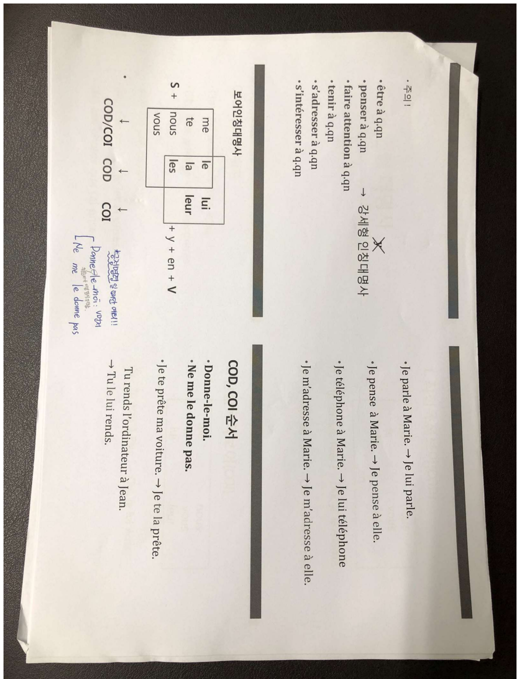

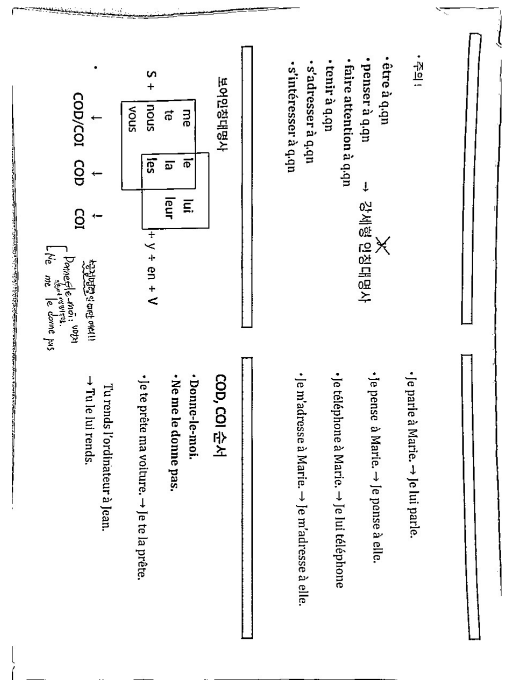

Results

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•Extra Passenger: $10.00/person
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With pick up request Date / Time & Address
www.gopic.ca tel: 416-855-3940 email: info@gopic.ca
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Thank You