

# Automatic Document Scanner

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Dasom Jang

# Outline

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**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**

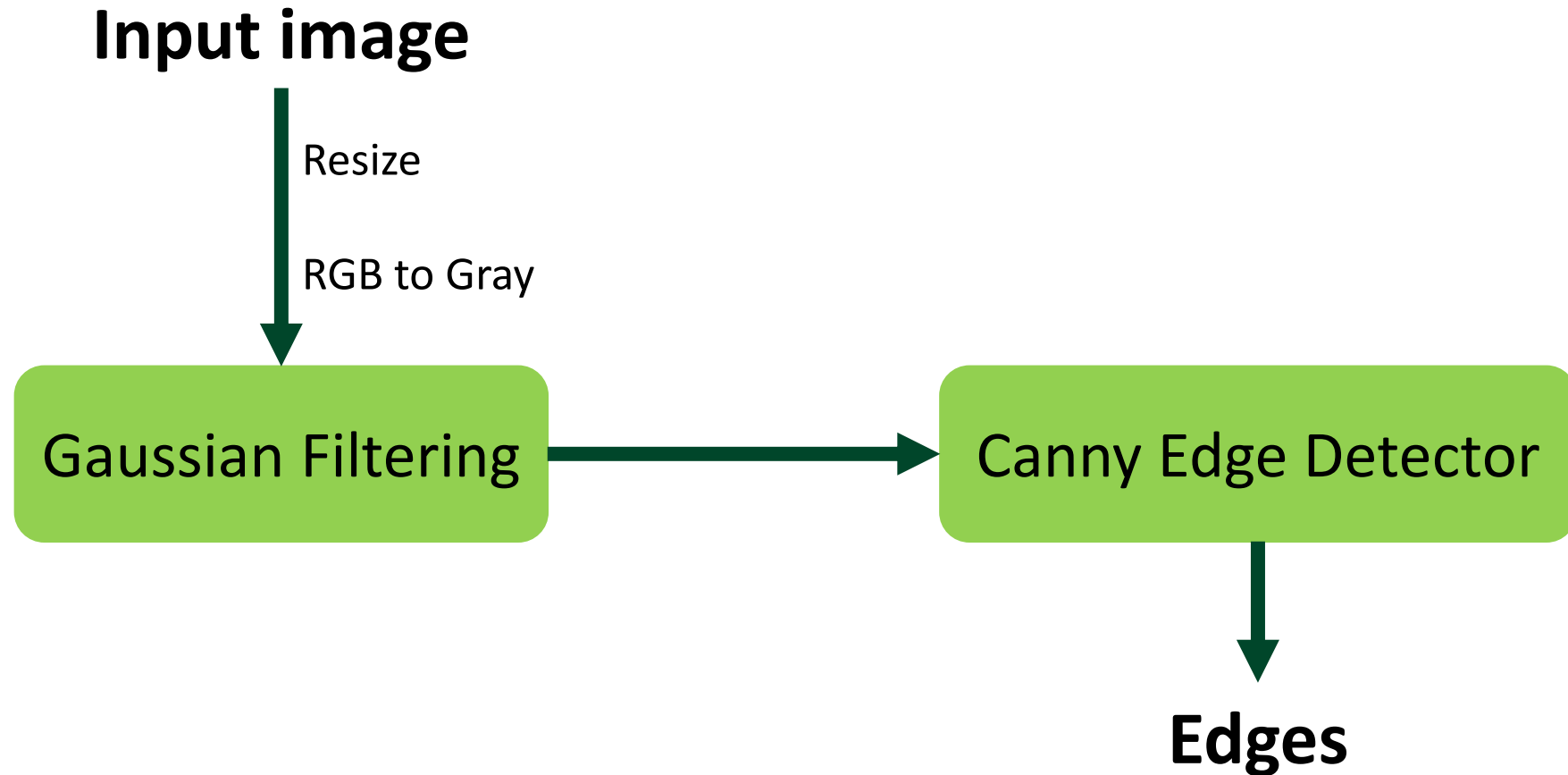
**Step 4**

**Make it clear using adaptive thresholding and denoising**

**Step 1**

# Edge Detection

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## Step 1

# Edge Detection

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

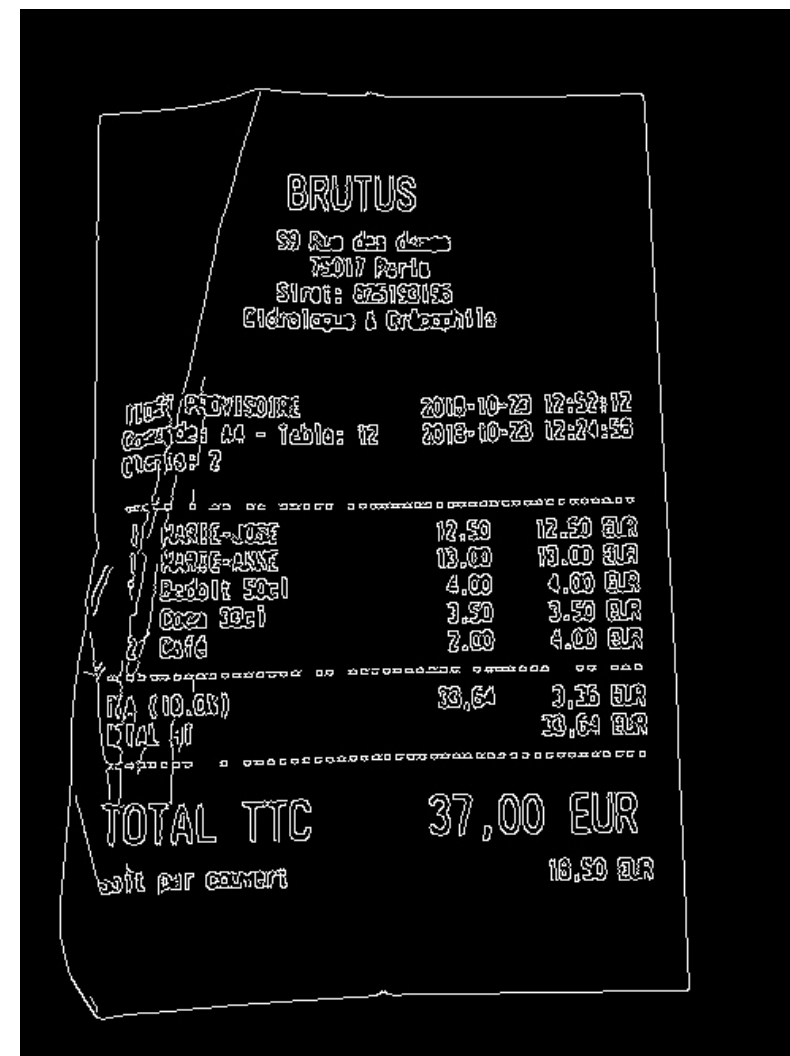
#Image resizing if needed
# -> When an image was too big or too small,
#when an image resized too much, it makes a strange output.
if(img.shape[1]>1000 or img.shape[0]>1000):
    r=1000.0 / img.shape[1]
    dim=(1000, int(img.shape[0] * r))
    img=cv2.resize(img, dim, interpolation = cv2.INTER_AREA)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

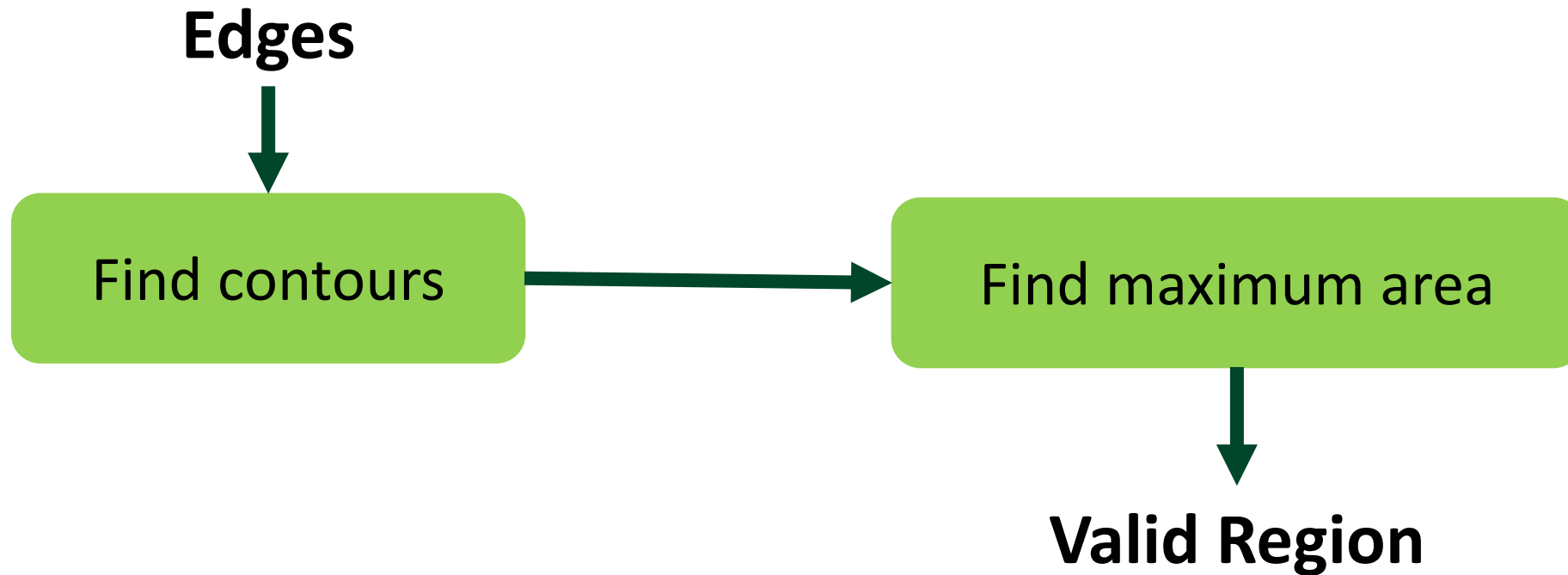
# Edge Detection



**Step 2**

## Selecting a region

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## 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

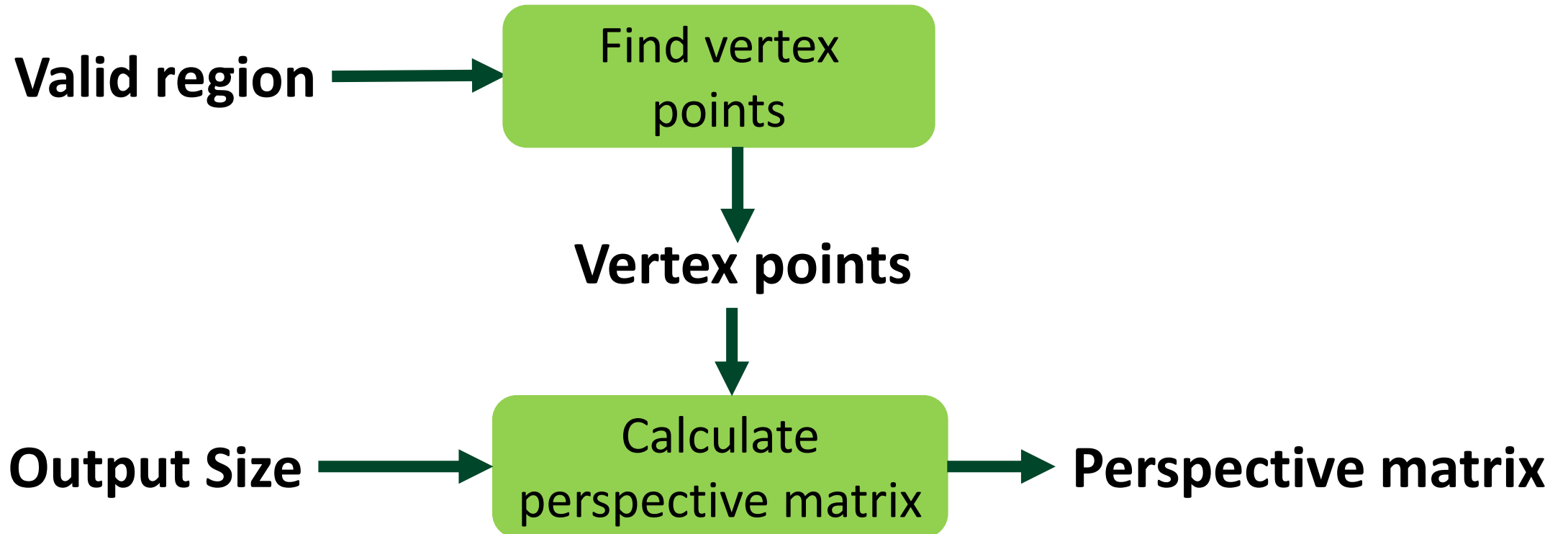




**Step 3**

# Adjusting : using perspective matrix

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**Step 3**

# Adjusting : using perspective matrix

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### Step 3

## Adjusting: using perspective 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 perspective matrix



Step 4

# Revision : sharpening

Fitted Image



Unsharp Masking



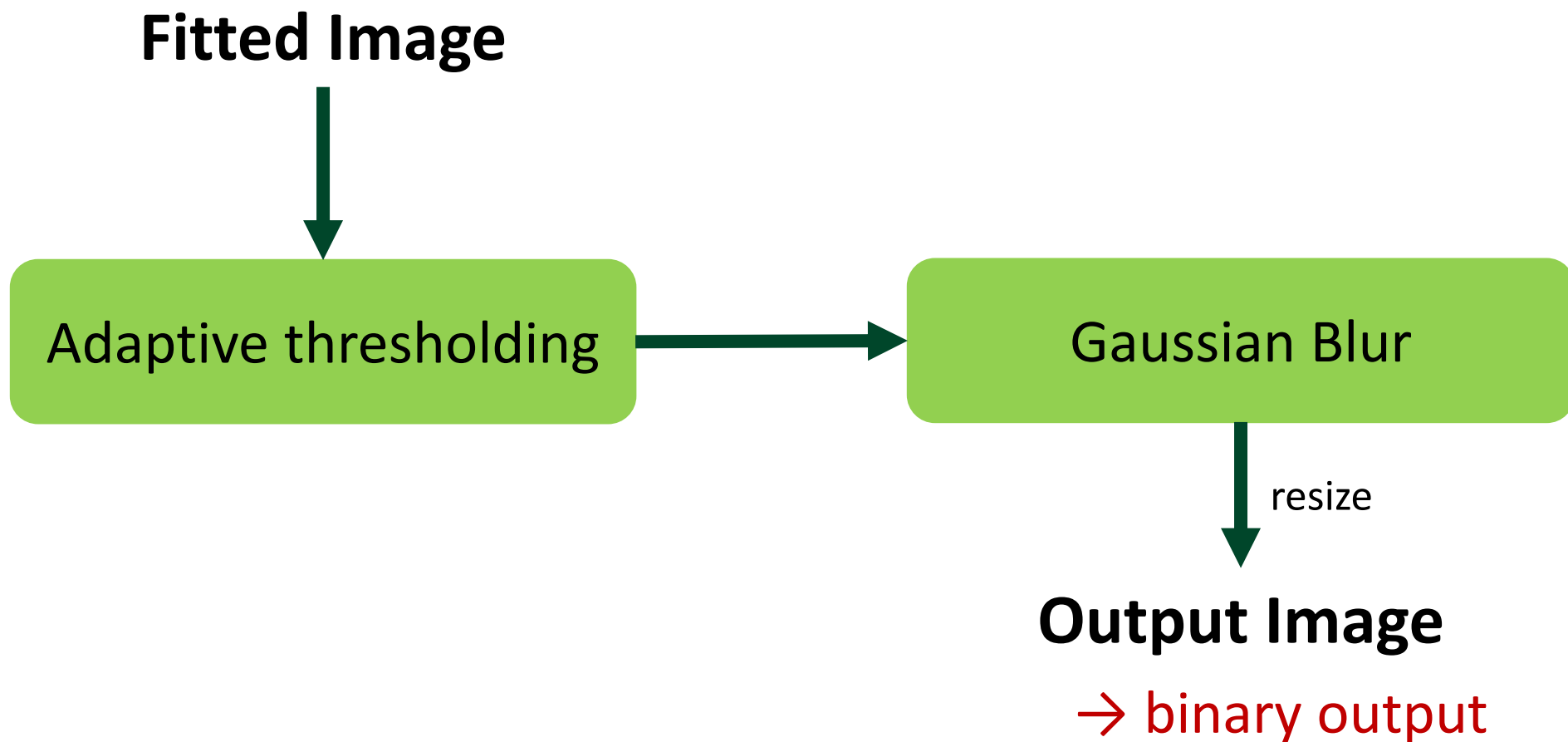
resize

Output Image

→ grayscale output

## 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)
```

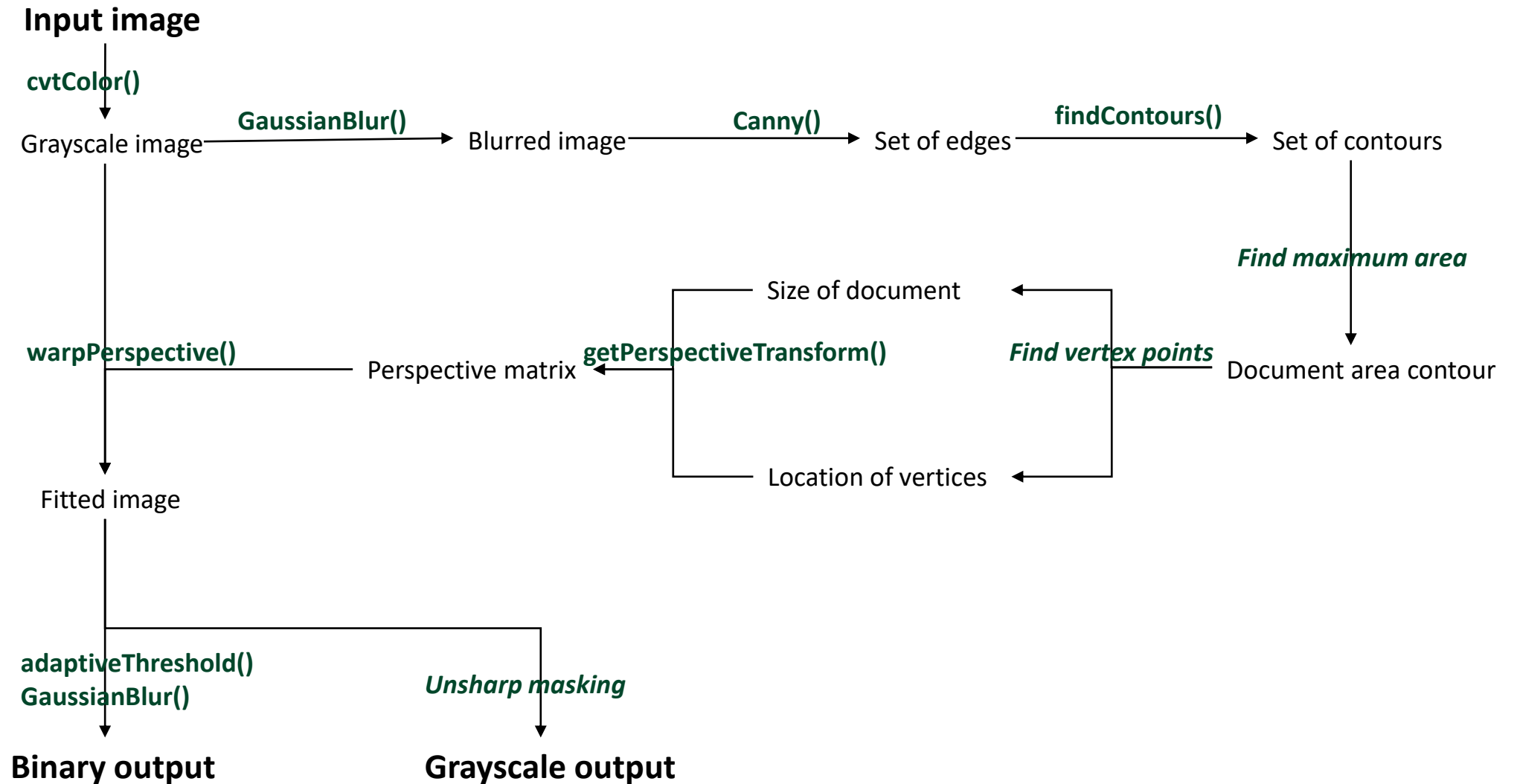


## Step 4

# Revision : thresholding and softening



# Abstract



# 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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THANK YOU

# Results

- 주의!
- être à qqn
- penser à qqn
- faire attention à qqn
- tenir à qqn
- s'adresser à qqn
- s'intéresser à qqn

→ 강세형 인칭대명사

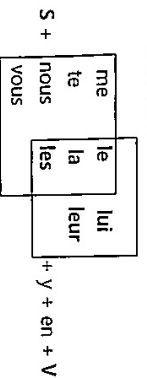
• Je parle à Marie. → Je lui parle.

• Je pense à Marie. → Je pense à elle.

• Je téléphone à Marie. → Je lui téléphone

• Je m'adresse à Marie. → Je m'adresse à elle.

## 보아인칭대명사



COD/COI   COD   COI

하루같이 일하는 아내!!  
Donne-le moi: voyez  
Ne me le donne pas

## COD, COI 순서

- Donne-le-moi.
- Ne me le donne pas.

• Je te prête ma voiture. → Je te la prête.

Tu rends l'ordinateur à Jean.  
→ Tu le lui rends.

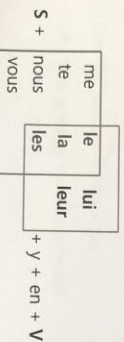
## 주의!

- être à qqn
- penser à qqn
- faire attention à qqn
- tenir à qqn
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X

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# Results



We are **GOPIC**

## Dear Valued Homestay Families

We are **GOPIC** and we provide cheap and safe ride from your home to the airport service to students. We believe that you are the best partners for **GOPIC**, now and for the future. As such, we would like to extend an offer to you and your household. Homestay families will receive \$10 for every booking from your home to the airport. Your opinions are important to us. If you have any questions or comments please call us at 416-855-3940 or 647-637-1831. You can also e-mail us at [info@gopic.ca](mailto:info@gopic.ca).

Thank you for your confidence and support.

Sincerely,

Team **GOPIC**

## HOW GOPIC WORKS WITH HOMESTAY FAMILIES

- Introduce **GOPIC**'s services to students when they need an AIRPORT DROP OFF service
- ✈ To Pearson Airport: \$60.00 (Includes 2 Passengers)
- Extra Passenger: \$10.00/person



Call us at 416-855-3940 or 647-637-1831

With pickup request **Date/Time & Address**

[www.gopic.ca](http://www.gopic.ca) tel: 416-855-3940 email: [info@gopic.ca](mailto:info@gopic.ca)  
office: #301-100 Sheppard Ave West Toronto ON M2N1M6

***Thank You***