

# Assignment 4

Sung Soo Hwang

# Assignment 4

- Develop a program that 1) displays canny edges regions and 2) draws lines corresponding to lanes of a video

## 1) Display canny edges

- Read 'Road.mp4'
- Set left\_roi and right\_roi
  - LT and RB of left\_roi: (200,400) , (600,600)
  - LT and RB of right\_roi: (600,400), (1000,600)
- For each ROI, display canny edges
  - Use cvtColor to make a gray-scale image
    - Use CV\_BGR2GRAY
  - Use blur function with mask size as 5X5
  - For Thresholds for canny, use 10 and 60

# Assignment 4

- Display two windows
  - 'Left canny', 'Right canny'
  - Use namedWindow and moveWindow for locating the windows
    - Example
      - `namedWindow("Left canny");`
      - `moveWindow("Left canny", 200, 0);`
      - `imshow("Left canny", canny_left);`
      - → Locate the window whose name is 'Left canny' to (200,0)
  - Locate 'Left canny' to (200,0) and 'Right canny' to (600,0)

# Assignment 4

## 2) Draw lines corresponding to lanes

- Use left\_roi and right\_roi defined in assignment 5
- Perform line filtering and line merging
  - Line filtering: Use angle information of lines
    - Left\_roi: Use lines whose angle is between 30 and 60 degrees
    - Right\_roi: Use lines whose angle is between 120 and 150 degrees
  - Line merging
    - Take average of rho and theta of filtered lines
    - After line merging there should be one left-line and one right-line
- The color of lines should be red
- Each line should be reached to the boundary of a frame

# Assignment 4

- Display one window
  - 'Frame'
  - Display frames that are between 0~20 seconds
  
- Overall, your program should display 3 windows.
  - 2 canny edges windows
  - 1 line filtering/merging window

# Exercise 5

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How should we change 3rd and 4th parameter to obtain fewer (more accurate edges) edges?

```
Void Canny(InputArray image, OutputArray edges, double  
threshold1, double threshold2, int apertureSize=3, bool  
L2gradient = false)
```

# Exercise 5

How should we change the 5th parameter to obtain more lines?

```
void HoughLines(InputArray image, OutputArray lines,  
double rho, double theta, int threshold, double srn=0,  
double stn=0 )
```



# Exercise 5

We are going to perform edge linking using Hough transform. Edge extraction is already done, and there exist  $N$  edge points in a binary image. We subdivide  $\rho\theta$ -space into accumulator cells by  $Y$  and  $X$  sections, respectively. Then, what is the maximum value that accumulator cells can have after the Hough transform?

# Exercise 5

Obtain the magnitude of gradient of the pixels in bold in the input image by using two kinds of Sobel mask. When you calculate magnitude of gradient, use  $\text{mag}(\nabla f) = |g_x| + |g_y|$ .

Input	Sobel mask1	Sobel mask 2																																											
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