

# Presentation of the Final Project

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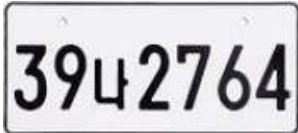




2018.06.15



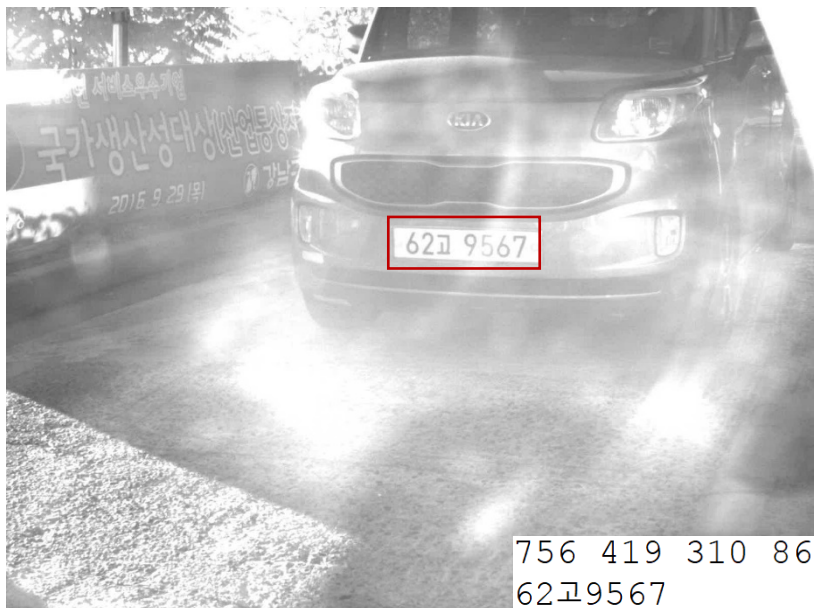
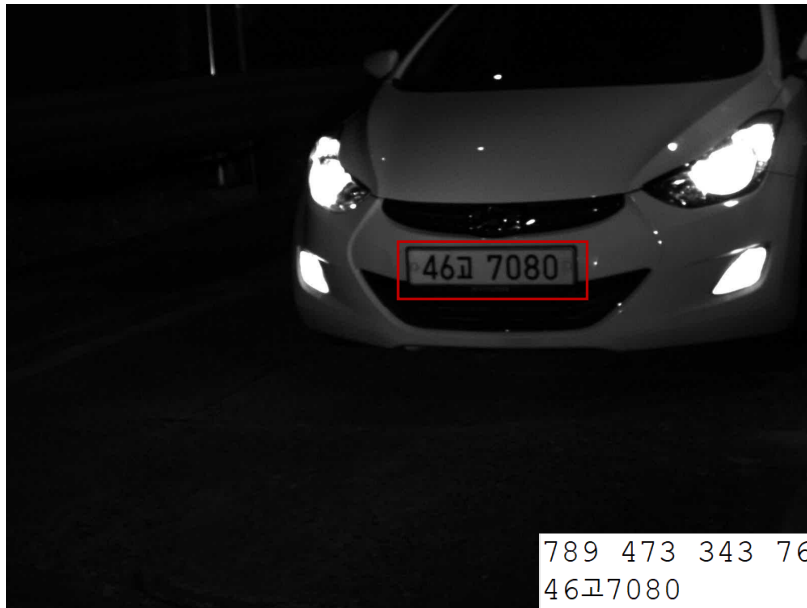
# Dataset

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# License Plate Type

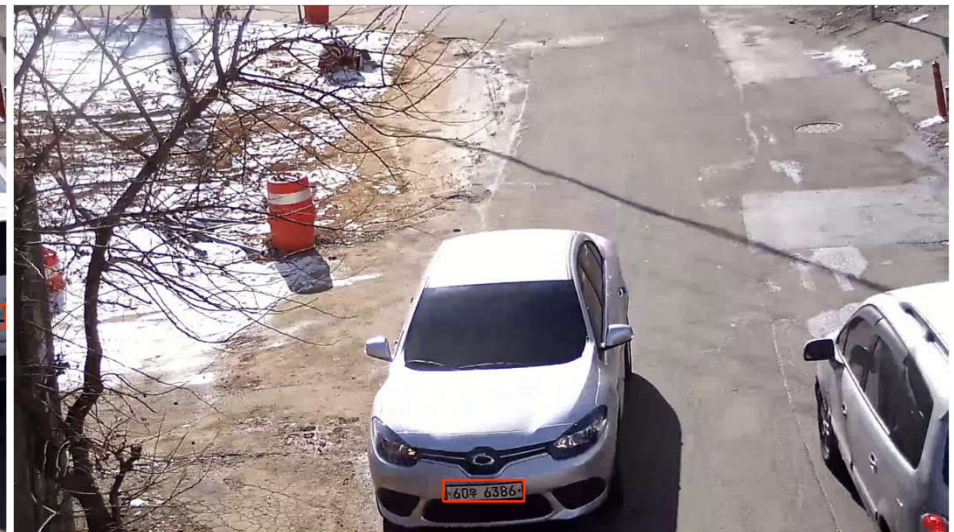
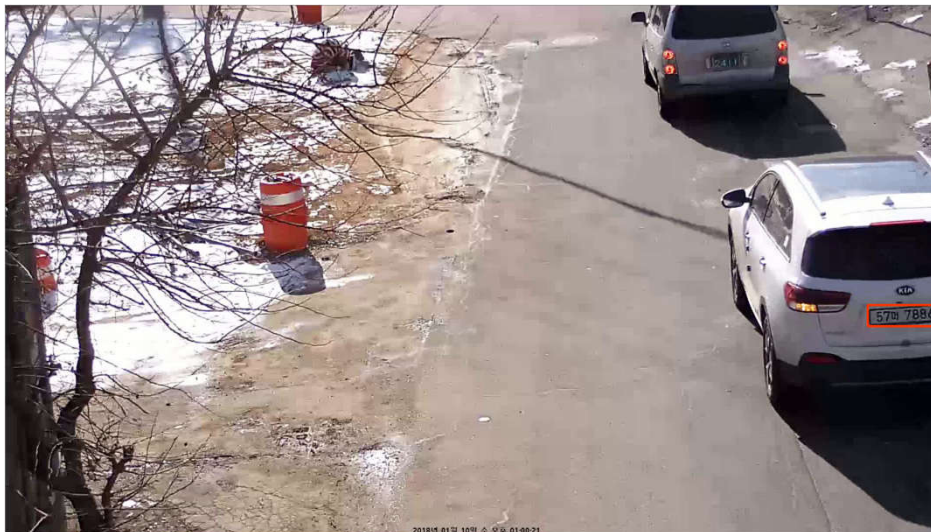
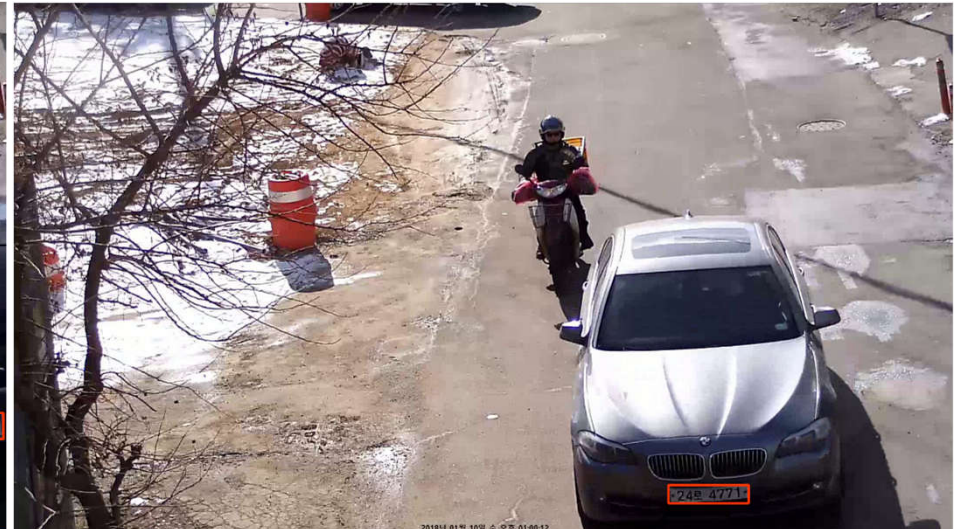
Type	License Plate	Type
1		P1
2		P2
3		P3
4		P4
5		P5
6		P6

# Images





# CCTV Data (457 Test Samples)



# Metrics for Final Project

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# Final Project

## Subject:

- License Plate Recognition (LPR)



## Deep Learning Platform:



- Four teams used Keras with TensorFlow backend.
- One team utilized Openalpr library and one team adopt Opencv (python) library.

# Definition of the Score

$$Score = Score_{park} + Score_{cctv} + 0.1 \times (100 - PT_{park}) + 0.1 \times (100 - PT_{cctv})$$

$$PT = msec./image(average)$$

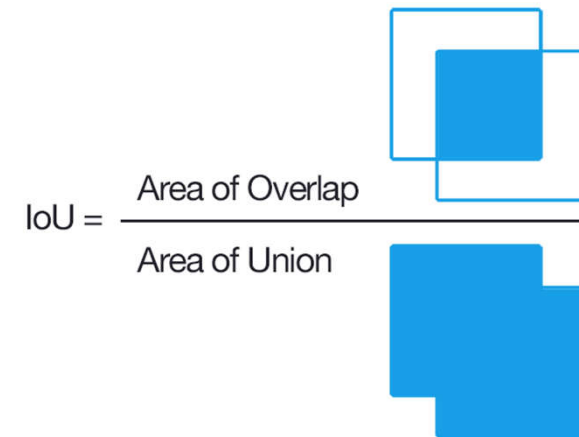
$$Score_i = Accuracy_{det} + Accuracy_{rec} \quad (i = park \text{ or } cctv)$$

$$Accuracy_{det} = \frac{1}{n} \sum_{i=0}^{n-1} \frac{\#TP_{det} - \#FP_{det}}{\#GT} \times 100\%$$

$$Accuracy_{rec} = \frac{1}{n} \sum_{i=0}^{n-1} \frac{\#TP_{rec}}{\#GT} \times 100\%$$








**(-inf, 420]**

- PT: average processing time of the model (unit: msec.)
- $\#TP_{det}$ : number of true positive for detection
- $\#FP_{det}$ : number of false positive for detection
- $\#TP_{rec}$ : number of true positive for recognition
- $\#GT$ : number of ground-truth



- $TP_{det}$ :  $IoU \geq \theta, \theta=0.7$
- $FP_{det}$ :  $IoU < \theta$

**Wrong!**

<b>GT:</b> 3	7	구	5	1	8	5
						
<b>PR:</b> 3	7	조	5	1	8	5



# Competition Results

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15 mins. Presentation

5 mins. Q & A

# Competition Results (Ranking 6)



Team	parking				cctv				Total
	Det acc (%)	Rec acc (%)	PT (ms)	Score	Det acc (%)	Rec acc (%)	PT (ms)	Score	
1									
2									
3									
4									
5									
6 강영묵, 박형근	96.49	0.00	1106.94	-4.20	7.10	0.00	1194.71	-102.38	-106.58
None 공선식, 진수민	None	None	None	None	None	None	None	None	None

Parking: #285

CCTV: #451

# Competition Results (Ranking 5)



Team	parking				cctv				Total
	Det acc (%)	Rec acc (%)	PT (ms)	Score	Det acc (%)	Rec acc (%)	PT (ms)	Score	
1									
2									
3									
4									
5 김대근, 최동희	22.81	16.49	575.37	-8.24	2.00	0.00	825.02	-70.51	-78.75
6 강영묵, 박형근	96.49	0.00	1106.94	-4.20	7.10	0.00	1194.71	-102.38	-106.58
No ne 공선식, 진수민	None	None	None	None	None	None	None	None	None

Parking: #285

CCTV: #451

# Competition Results (Ranking 4)



Team	parking				cctv				Total
	Det acc (%)	Rec acc (%)	PT (ms)	Score	Det acc (%)	Rec acc (%)	PT (ms)	Score	
1									
2									
3									
4 석예찬, 윤형진, 황지수	50.53	0.00	91.67	51.36	14.86	0.00	49.29	19.93	71.29
5 김대근, 최동희	22.81	16.49	575.37	-8.24	2.00	0.00	825.02	-70.51	-78.75
6 강영목, 박형근	96.49	0.00	1106.94	-4.20	7.10	0.00	1194.71	-102.38	-106.58
None 공선식, 진수민	None	None	None	None	None	None	None	None	None

Parking: #285

CCTV: #451

# Competition Results (Ranking 3)



Team	parking				cctv				Total
	Det acc (%)	Rec acc (%)	PT (ms)	Score	Det acc (%)	Rec acc (%)	PT (ms)	Score	
1									
2									
3 배성현, 성현기, 한형진	50.18	0.00	50.02	55.17	77.83	0.00	89.67	78.86	134.03
4 석예찬, 윤형진, 황지수	50.53	0.00	91.67	51.36	14.86	0.00	49.29	19.93	71.29
5 김대근, 최동희	22.81	16.49	575.37	-8.24	2.00	0.00	825.02	-70.51	-78.75
6 강영목, 박형근	96.49	0.00	1106.94	-4.20	7.10	0.00	1194.71	-102.38	-106.58
No ne 공선식, 진수민	None	None	None	None	None	None	None	None	None

Parking: #285

CCTV: #451



# Competition Results (Ranking 2)



Team	parking				cctv				Total
	Det acc (%)	Rec acc (%)	PT (ms)	Score	Det acc (%)	Rec acc (%)	PT (ms)	Score	
1									
2 김동현, 박재원, 김동민	73.33	44.91	75.08	120.74	70.51	48.17	164.56	112.22	232.96
3 배성현, 성현기, 한형진	50.18	0.00	50.02	55.17	77.83	0.00	89.67	78.86	134.03
4 석예찬, 윤형진, 황지수	50.53	0.00	91.67	51.36	14.86	0.00	49.29	19.93	71.29
5 김대근, 최동희	22.81	16.49	575.37	-8.24	2.00	0.00	825.02	-70.51	-78.75
6 강영목, 박형근	96.49	0.00	1106.94	-4.20	7.10	0.00	1194.71	-102.38	-106.58
No ne 공선식, 진수민	None	None	None	None	None	None	None	None	None

Parking: #285

CCTV: #451

# Competition Results (Ranking 1)




Team	parking				cctv				Total
	Det acc (%)	Rec acc (%)	PT (ms)	Score	Det acc (%)	Rec acc (%)	PT (ms)	Score	
1 임현호, 안수진	90.88	90.53	91.48	182.26	77.38	79.36	76.81	159.06	341.32
2 김동현, 박재원, 김동민	73.33	44.91	75.08	120.74	70.51	48.17	164.56	112.22	232.96
3 배성현, 성현기, 한형진	50.18	0.00	50.02	55.17	77.83	0.00	89.67	78.86	134.03
4 석예찬, 윤형진, 황지수	50.53	0.00	91.67	51.36	14.86	0.00	49.29	19.93	71.29
5 김대근, 최동희	22.81	16.49	575.37	-8.24	2.00	0.00	825.02	-70.51	-78.75
6 강영목, 박형근	96.49	0.00	1106.94	-4.20	7.10	0.00	1194.71	-102.38	-106.58
No ne 공선식, 진수민	None	None	None	None	None	None	None	None	None

Parking: #285

CCTV: #451

# How to Become a Good DL Engineer

- Machine Learning course
  - Deep Learning school
  - PhD student process
    - Read papers (how to get a idea?)
    - Replicate results (how to get a idea?)
  - Dirty work
    - Going on internet, downloading data, cleaning data or download a piece of codes, tuning parameters to see what happened, or debugging to check why it overflow, or optimize database, hacking GPU kernel to make it faster
- Great Researchers
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Note: some experts only do the dirty work

**Thank you for your attention!**