Traffic Light Classification using Convolution Neural Network

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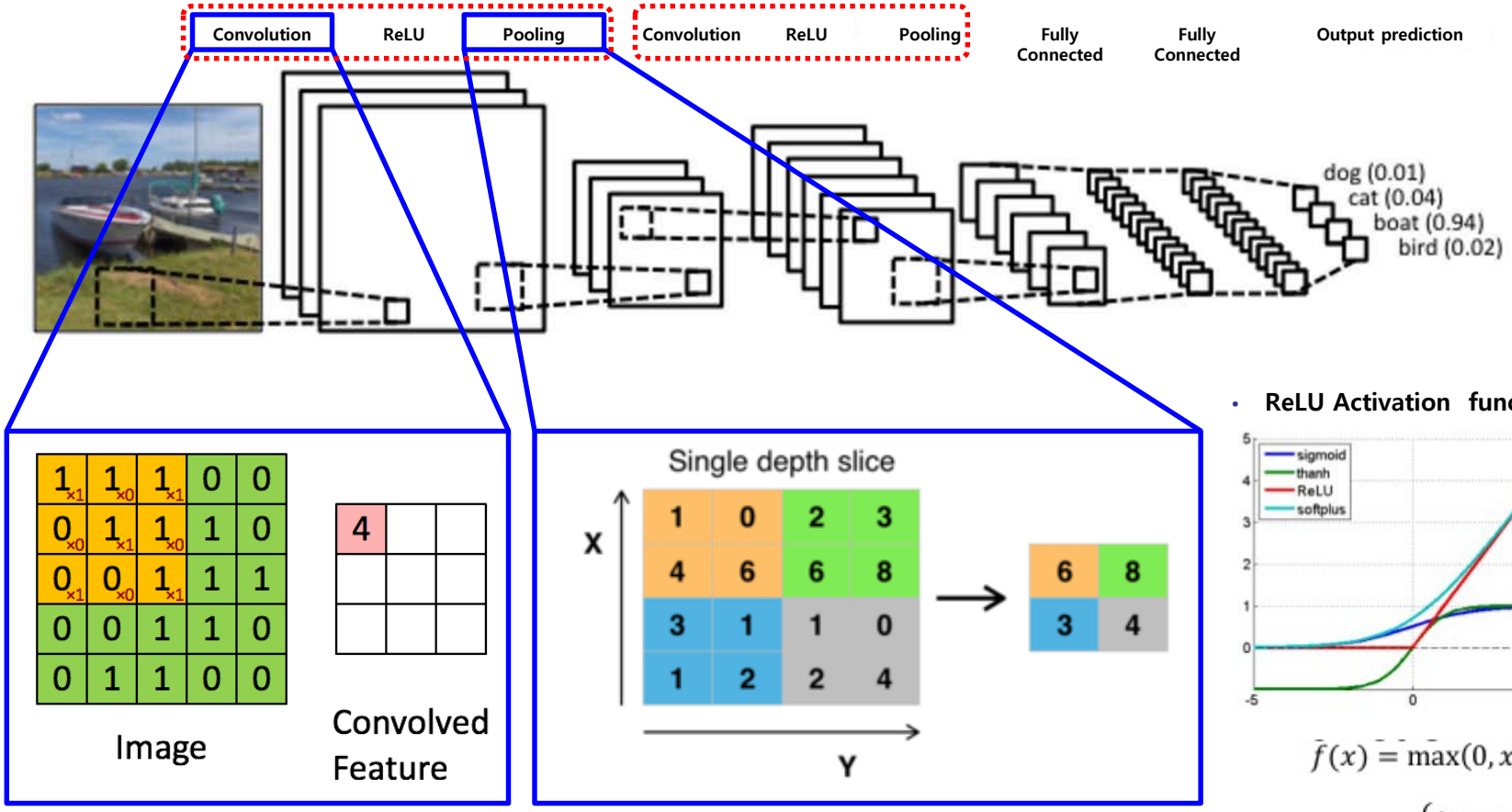
Contents

1. Convolutional Neural Network

1) Convolutional Neural Network(CNN)

- In machine learning, a CNN is a type of feed-forward artificial neural network in which the connectivity pattern between its neurons is inspired by the organization of the animal visual cortex
- The convolution layer is mainly composed of three layers (Convolution layer, Pooling layer, Fully connected layer)

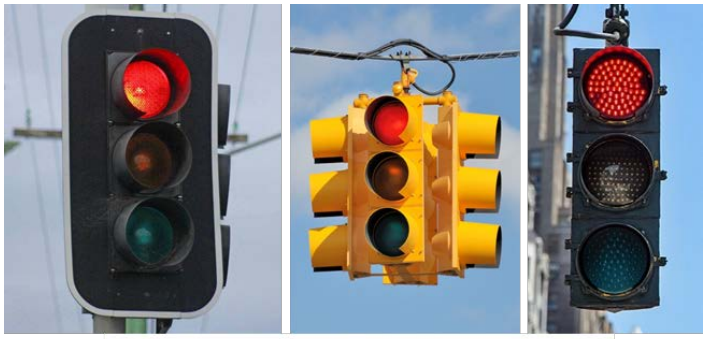


- **ReLU Activation function**

$$f(x) = \max(0, x)$$

$$f'(x) = \begin{cases} 1, x \geq 0 \\ 0, x < 0 \end{cases}$$

2. Dataset generate



Generate dataset
based on each signal

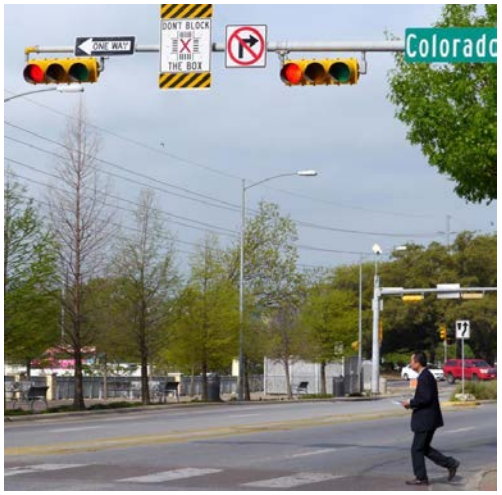
- The shapes of the traffic lights vary, and the existing data sets are traffic light data used in foreign countries.
- We need data that matches the environment in Korea.

- The traffic light data will be collected through the image of the black box attached to the vehicle.
- We will design a virtual road environment and collect traffic light data using simulation platform

3. Development Environment

4. Conclusion

▪ China



▪ USA

▪ Korea

Detection of traffic lights for domestic road environment using Convolution Neural Network

5. 참여 역할 및 개발 계획

- 세부 기술 개발 사항

- 차량 장착된 전방 카메라 센서 기반 신호등 검출 및 신호등 색 분류 진행
- 신호등 검출 부분은 개발 진행 상황에 따라 개발 유무 결정

- 참여 역할

- 박유상 : Neural Net Model 구성 및 학습
- 손원일 : Traning/Test data set 수집 및 Data Argumentation

	개발 계획			
	1주차 (~5/25)	2주차 (~6/1)	3주차 (~6/8)	4주차 (~6/13)
신경망 구성	Neural Net Model ▪ VGG16 ▪ AlexNet ▪ Etc ..	Neural Net Model ▪ Neural Net 모델 구성 ▪ Tensorflow 사용	Neural Net Model ▪ Neural Net 학습	Neural Net Model ▪ Neural Net 검증 ▪ 성능 개선
학습 데이터	Data Set ▪ Data Argumentation 조사	Data Set ▪ Data Set 수집 ▪ Data Argumentation		

Thank you