JavaScript와 Tensorflow.js로 배우는 머신러닝

Day 2

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Preparing the datasets

As part of this library, we've included scripts to download several popular image datasets (listed below) and convert them to slim format.

Dataset	Training Set Size	Testing Set Size	Number of Classes	Comments
Flowers	2500	2500	5	Various sizes (source: Flickr)
Cifar10	60k	10k	10	32x32 color
MNIST	60k	10k	10	28x28 gray
ImageNet	1.2M	50k	1000	Various sizes
VisualWakeWords	82783	40504	2	Various sizes (source: MS COCO)

Pre-trained Models

Model	TF-Slim File	Checkpoint	Top-1 Accuracy	Top-5 Accuracy
Inception V1	Code	inception_v1_2016_08_28.tar.gz	69.8	89.6
Inception V2	Code	inception_v2_2016_08_28.tar.gz	73.9	91.8
Inception V3	Code	inception_v3_2016_08_28.tar.gz	78.0	93.9
Inception V4	Code	inception_v4_2016_09_09.tar.gz	80.2	95.2
Inception-ResNet-v2	Code	inception_resnet_v2_2016_08_30.tar.gz	80.4	95.3
ResNet V1 50	Code	resnet_v1_50_2016_08_28.tar.gz	75.2	92.2
ResNet V1 101	Code	resnet_v1_101_2016_08_28.tar.gz	76.4	92.9
ResNet V1 152	Code	resnet_v1_152_2016_08_28.tar.gz	76.8	93.2
ResNet V2 50^	Code	resnet_v2_50_2017_04_14.tar.gz	75.6	92.8
ResNet V2 101^	Code	resnet_v2_101_2017_04_14.tar.gz	77.0	93.7
ResNet V2 152^	Code	resnet_v2_152_2017_04_14.tar.gz	77.8	94.1
ResNet V2 200	Code	TBA	79.9*	95.2*
VGG 16	Code	vgg_16_2016_08_28.tar.gz	71.5	89.8
VGG 19	Code	vgg_19_2016_08_28.tar.gz	71.1	89.8
MobileNet_v1_1.0_224	Code	mobilenet_v1_1.0_224.tgz	70.9	89.9
MobileNet_v1_0.50_160	Code	mobilenet_v1_0.50_160.tgz	59.1	81.9
MobileNet_v1_0.25_128	Code	mobilenet_v1_0.25_128.tgz	41.5	66.3
MobileNet_v2_1.4_224^*	Code	mobilenet_v2_1.4_224.tgz	74.9	92.5
MobileNet_v2_1.0_224^*	Code	mobilenet_v2_1.0_224.tgz	71.9	91.0
NASNet-A_Mobile_224#	Code	nasnet-a_mobile_04_10_2017.tar.gz	74.0	91.6
NASNet-A_Large_331#	Code	nasnet-a_large_04_10_2017.tar.gz	82.7	96.2
PNASNet-5_Large_331	Code	pnasnet-5_large_2017_12_13.tar.gz	82.9	96.2
PNASNet-5_Mobile_224	Code	pnasnet-5_mobile_2017_12_13.tar.gz	74.2	91.9

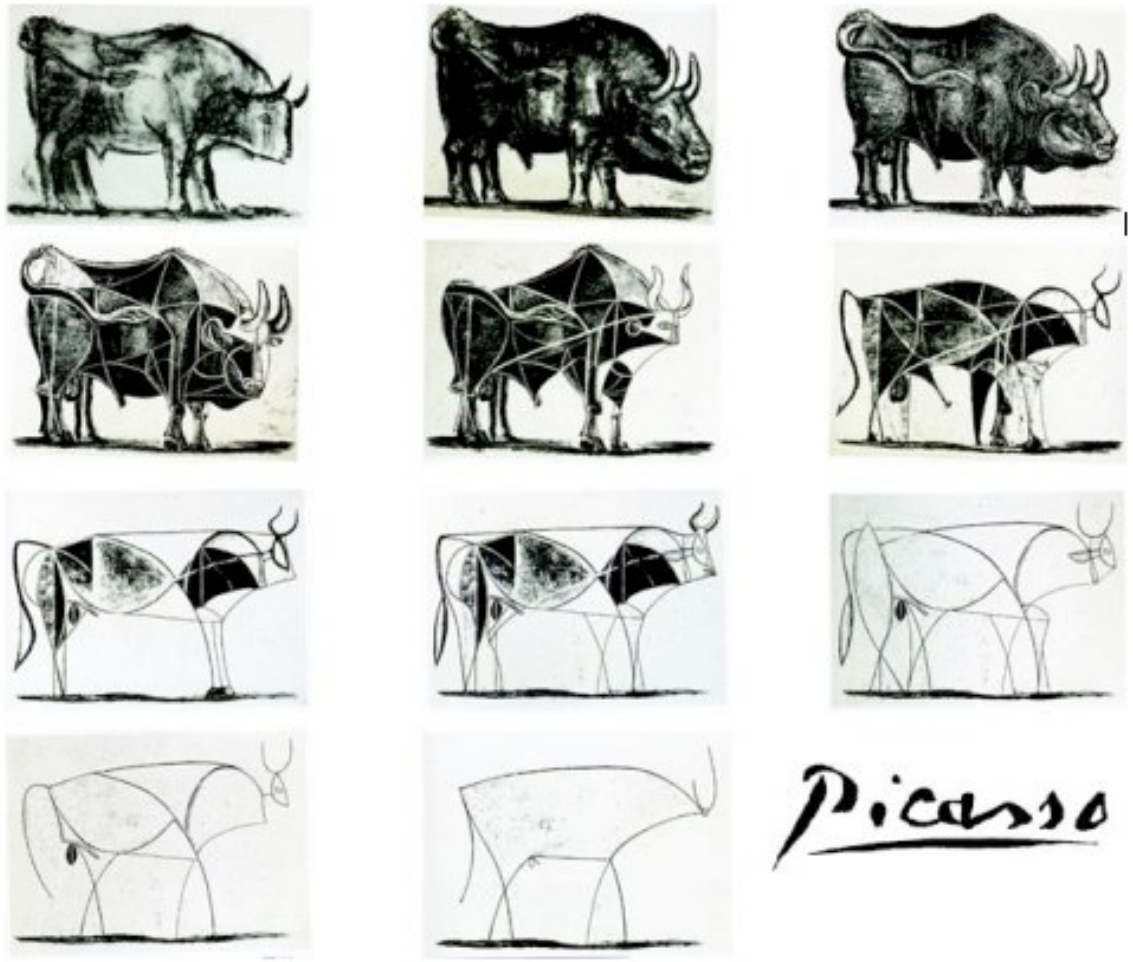
Top-1 accuracy is the conventional accuracy: the model answer (the one with highest probability) must be exactly the expected answer.

Top-5 accuracy means that *any* of your model 5 highest probability answers must match the expected answer.
For instance, let's say you're applying machine learning to object recognition using a neural network. A picture of a cat is shown, and these are the outputs of your neural network:

- Tiger: 0.4
- Dog: 0.3
- Cat: 0.1
- Lynx: 0.09
- Lion: 0.08
- Bird: 0.02
- Bear: 0.01

Using top-1 accuracy, you count this output as **wrong**, because it predicted a tiger.
Using top-5 accuracy, you count this output as **correct**, because cat is among the top-5 guesses.

◈ 추상화 (Abstract)



Pablo Picasso, Bull (plates I - XI) 1945

LOT 13 B | PROPERTY FROM A DISTINGUISHED PRIVATE COLLECTION

Pablo Picasso (1881-1973)

Buste de femme (Dora Maar)

Price realised

USD 22,647,500

Estimate

USD 18,000,000 - USD 25,000,000

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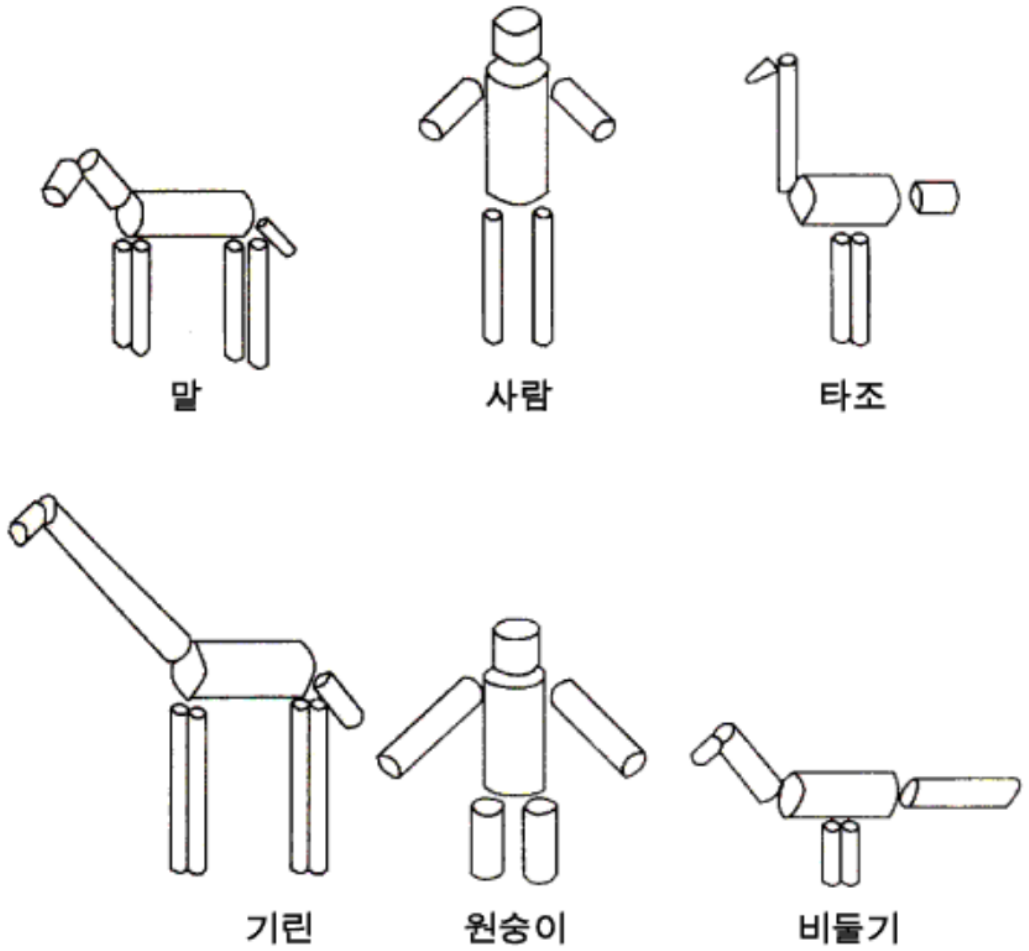
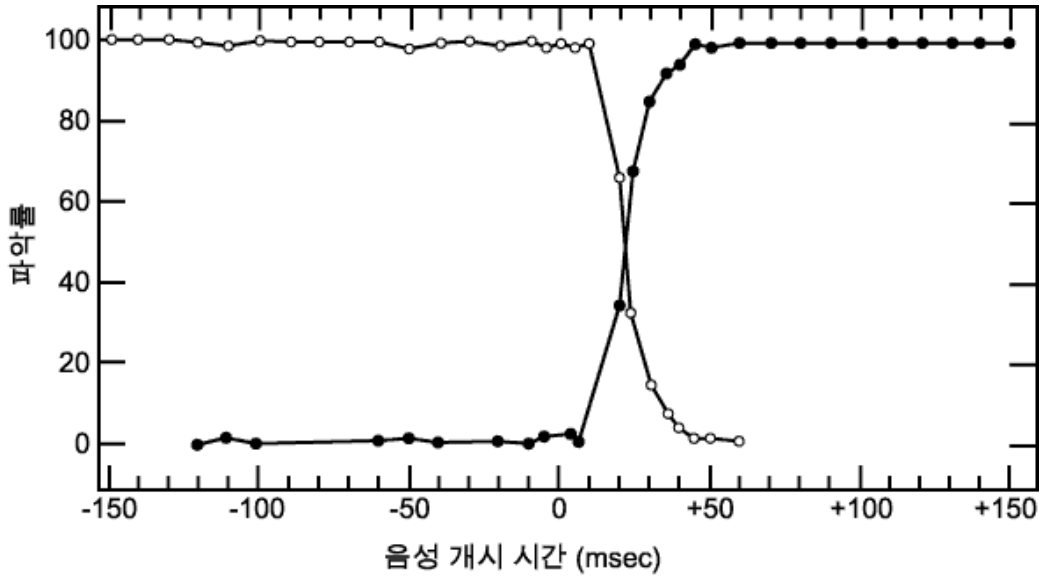
◈ 사람의 물체(시각) 재인 방식



친숙한 물체들을 기본 원통 형태로 분할한 것. (Marr & Nishihara. 1978)

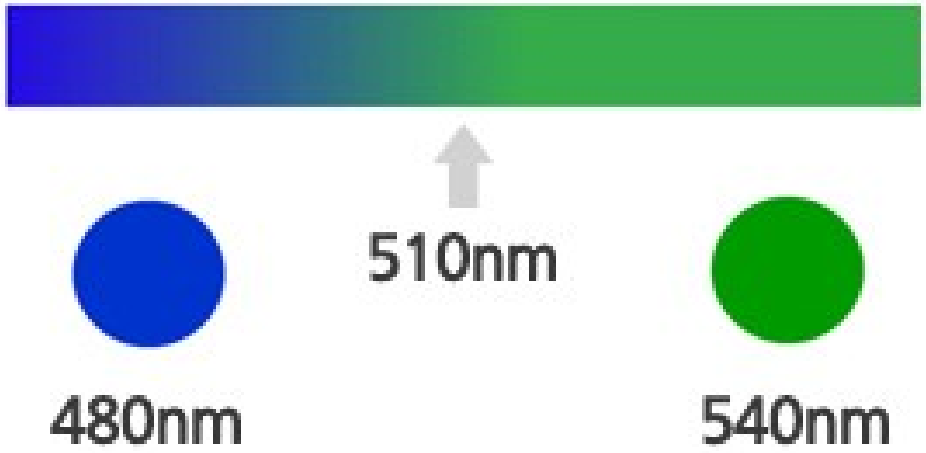
◈ 범주화 지각은 사람의 기본적 속성

소리 (Sound)



사람들은 음소들이 하나의 연속적 차원에서 다르더라도 이들이 별개의 범부에서 유래한다고 지각하는 경향이 있다.

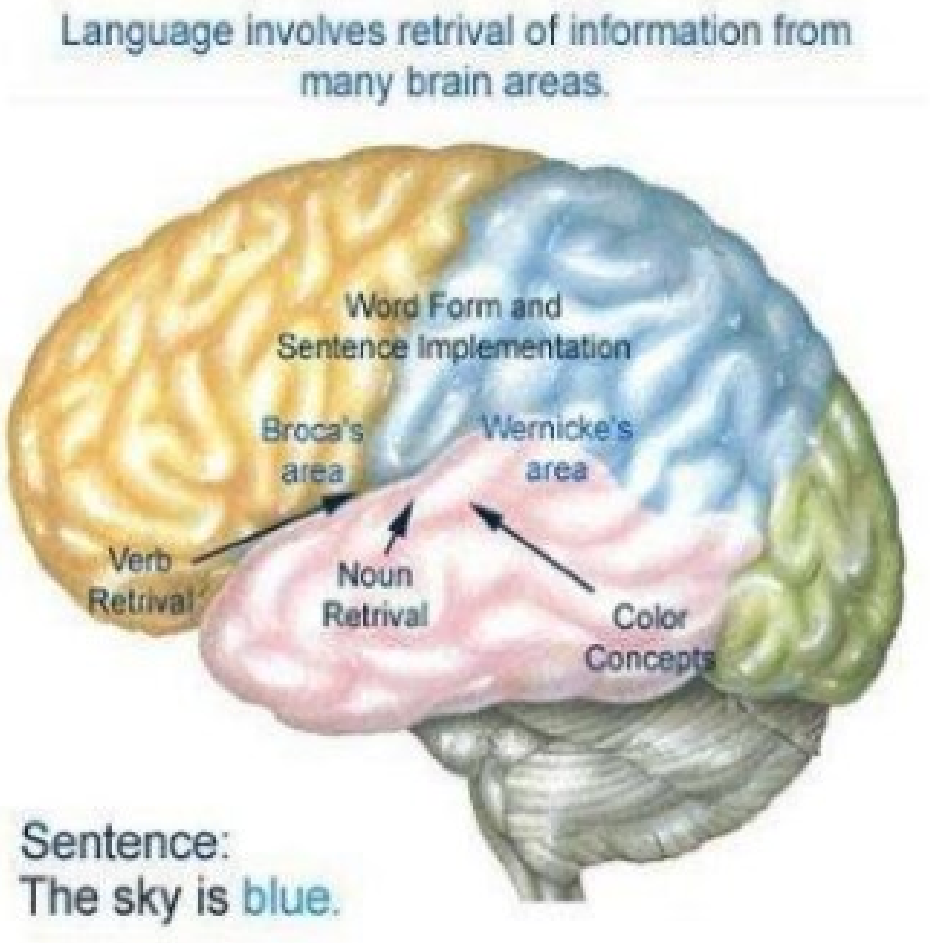
색깔 (Color)



510nm에서 540nm로 변화할 경우 여전히 같은 색에 있다고 생각하지만 480nm로 변화하면 우리는 전혀 다른 범주의 색으로 느끼게 된다.

THE "LAD" (Chomsky, 1965)

- The language acquisition Device (LAD) is a postulated organ of the brain that is supposed to function as a congenital device for learning symbolic language (i.e., language acquisition).



사람은 누구나 태어나면서부터 언어를 쉽게 터득할 수 있도록 언어습득장치(LAD)를 가지고 태어난다.

Innate Knowledge of Language

The Language Acquisition Device

'Universal Grammar'

Input → LAD → Final State

(Primary Linguistic Data)

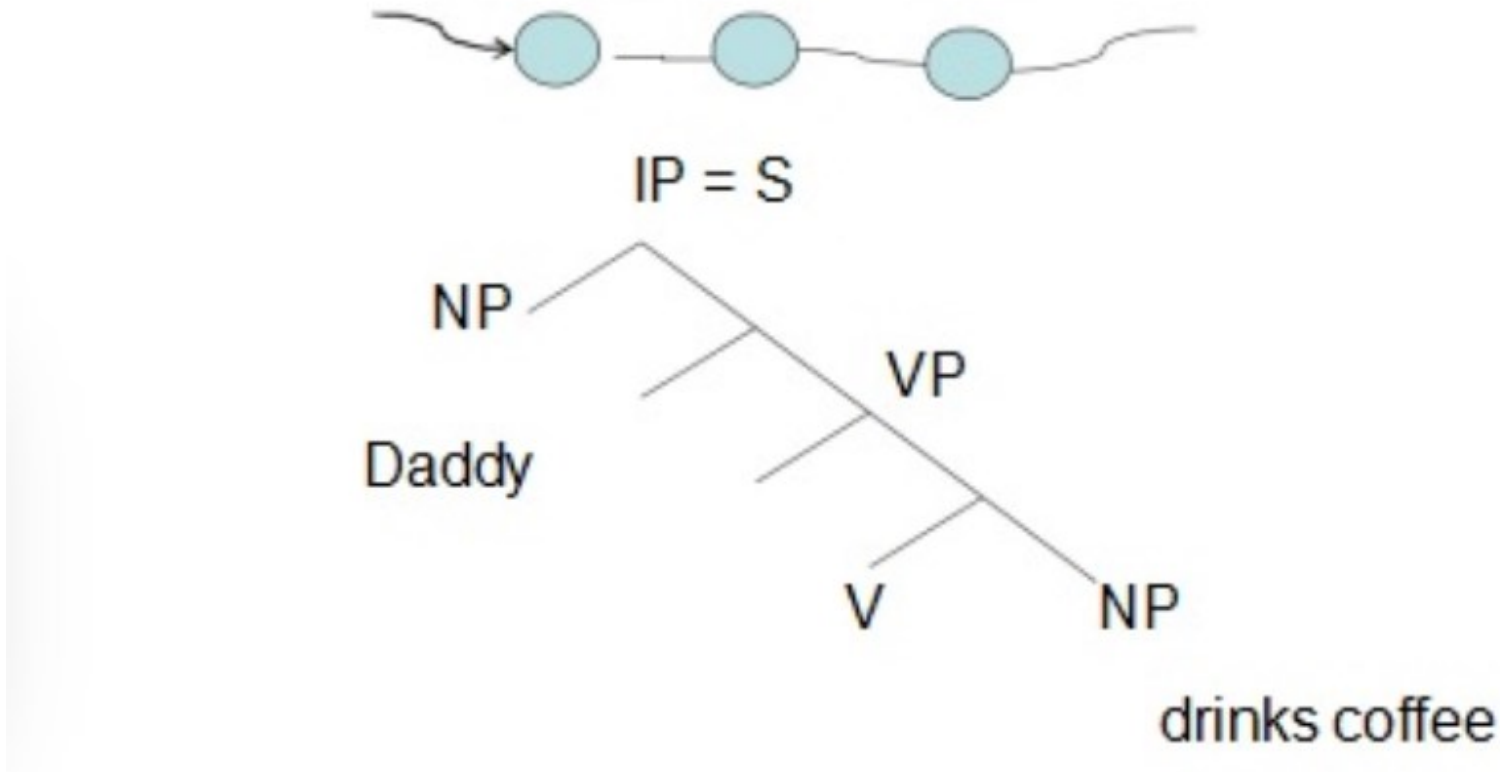
↑

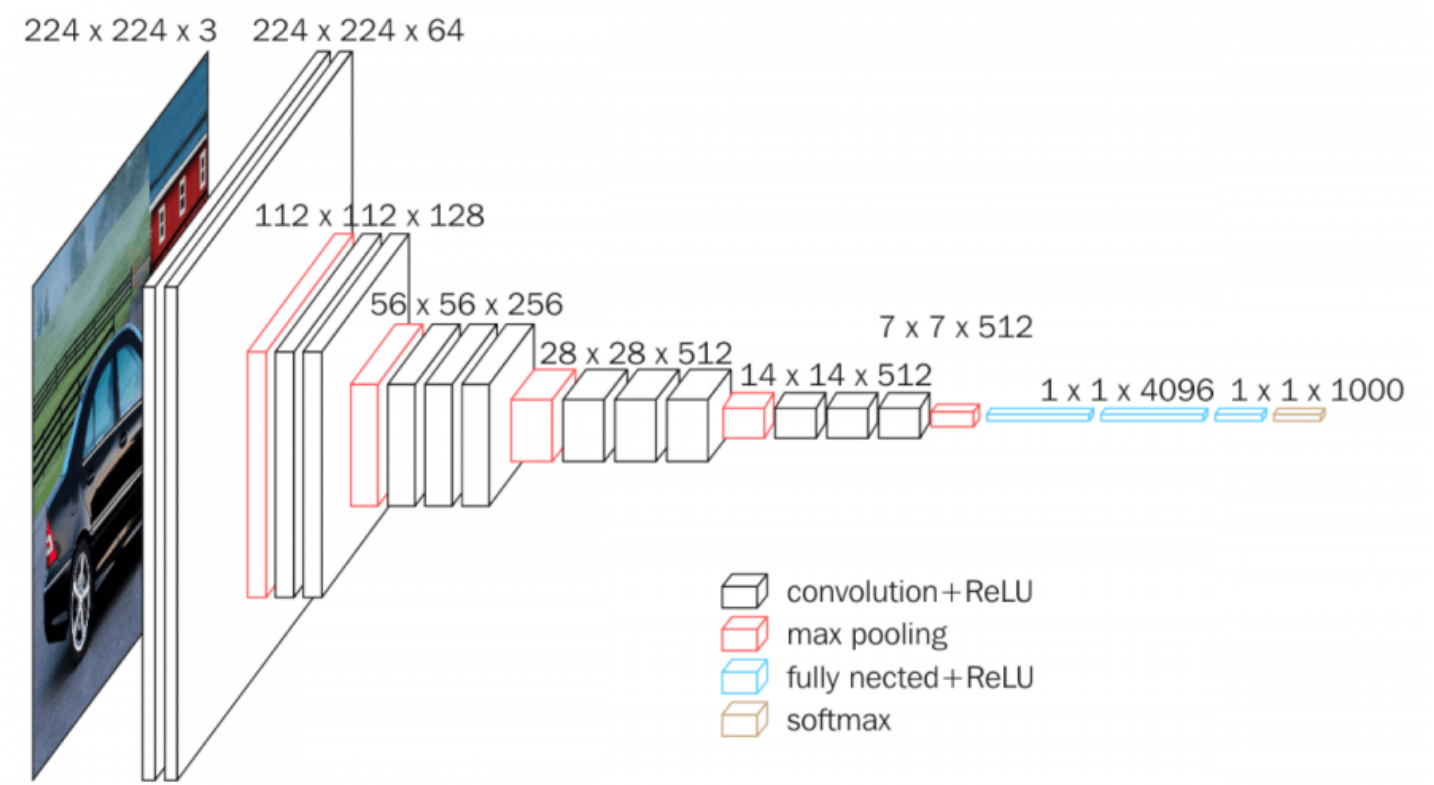
The Mental Grammar for a particular language

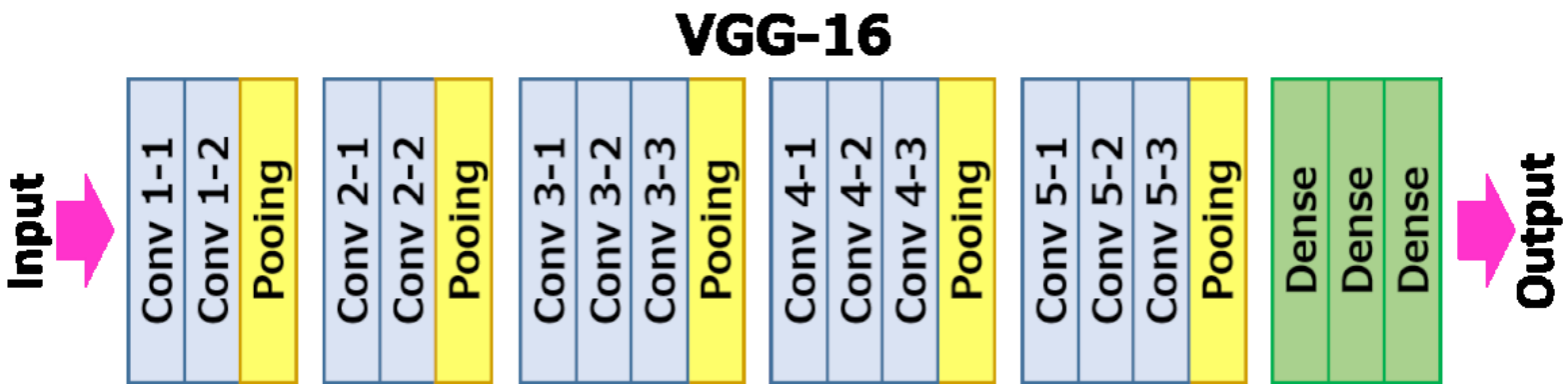
Computational System

UG gives us sentence representations that are hierarchical, not linear

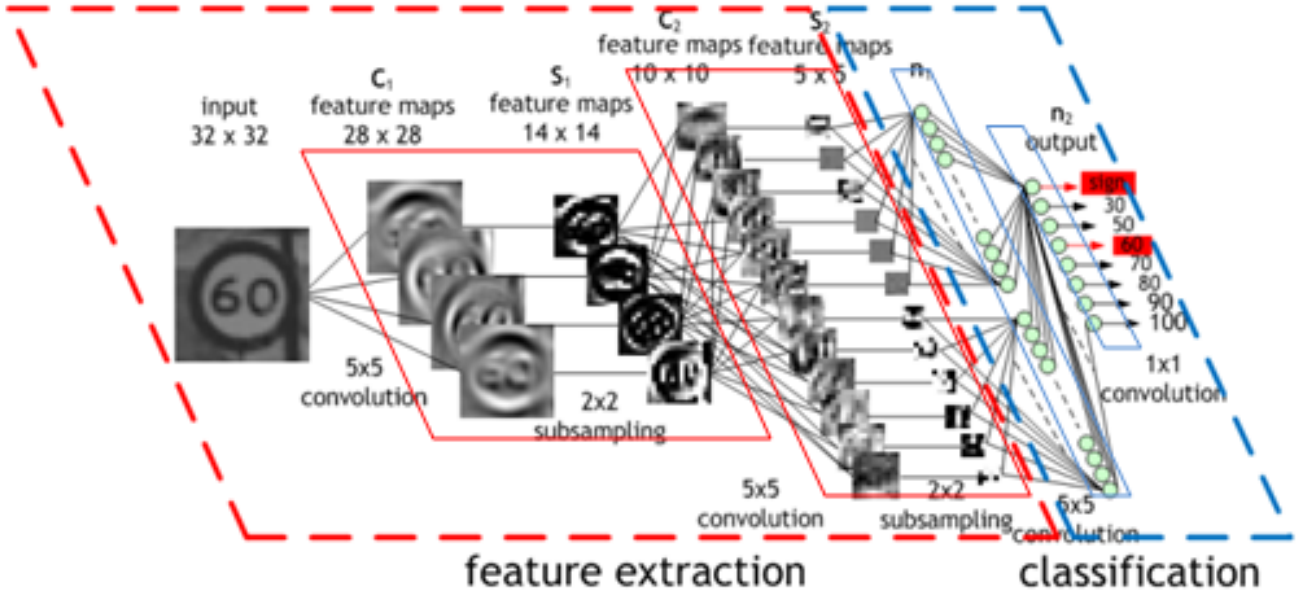
'Daddy drinks coffee'







https://neurohive.io/en/popular-networks/vgg16/



https://github.com/raghakot/keras-resnet

ResNet 1,000 classification

http://blog.creation.net/mxnet-part-5-vgc16-resnet152

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Transfer Learning 1

https://wikibook.co.kr/transfer-learning/

https://github.com/Transfer-Learning-with-Python/handson-Code/blob/master/Chapter05/practice_chapter5.ip

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Transfer Learning 2

C:₩Users₩heine₩Desktop₩교원그룹₩교원그룹(실습)₩Transfer_Learning₩statefarm_distracted_driver_detection

Stanford-Dogbreeds: A Transfer Learning Tutorial

https://www.kaggle.com/jingw222/stanford-dogbreeds-a-transfer-learning-tutorial

http://www.immersivelimit.com/tutorials/create-coco-annotations-from-scratch

COCO annotations are inspired by the Common Objects in Context (COCO) dataset.

"COCO is a large-scale object detection, segmentation, and captioning dataset. COCO has several features: Object segmentation, Recognition in context, Superpixel stuff segmentation, 330K images (>200K labeled), 1.5 million object instances, 80 object categories, 91 stuff categories, 5 captions per image, 250,000 people with keypoints."

Gaussian Process Regression in TensorFlow Probability

https://www.tensorflow.org/probability/examples/Gaussian_Process_Regression_In_TFP

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소프트웨어를 아는 자가 미래를 연다!