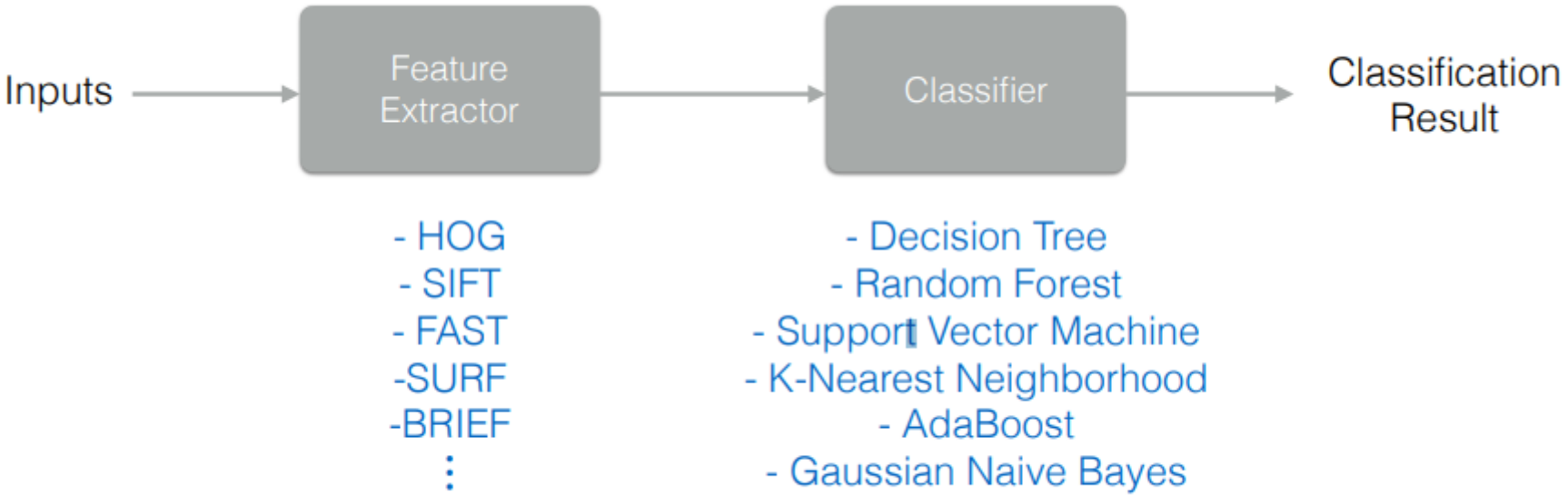
04

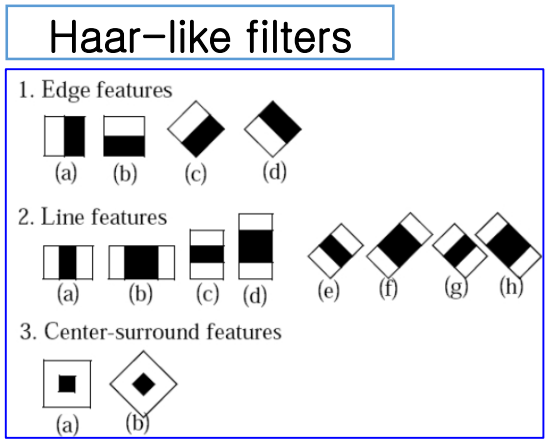
CNN

Classic Classifier Systems



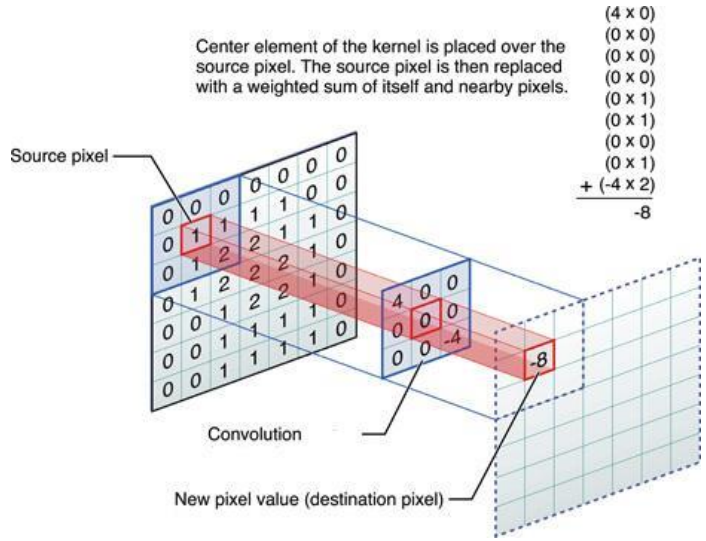
Classic Classifier Systems

Adaptive boosting(Adaboost)



[Figure Ref] https://nhannguyen95.github.io/coursera-deep-learning-course-4-week-1/

Classic Classifier Systems



얼굴 | 배경

10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0

6x6

*

1	0	-1
1	0	-1
1	0	-1

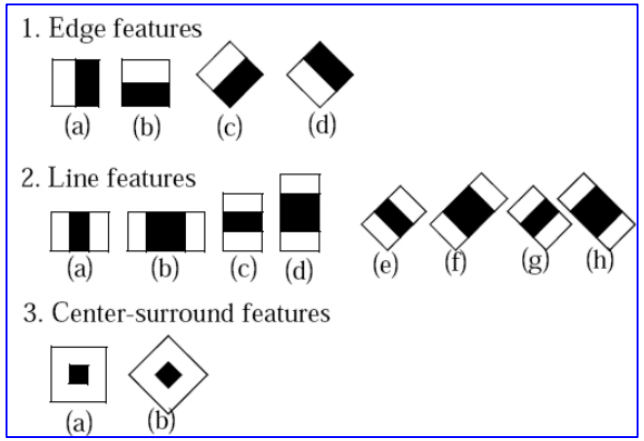
3x3

=

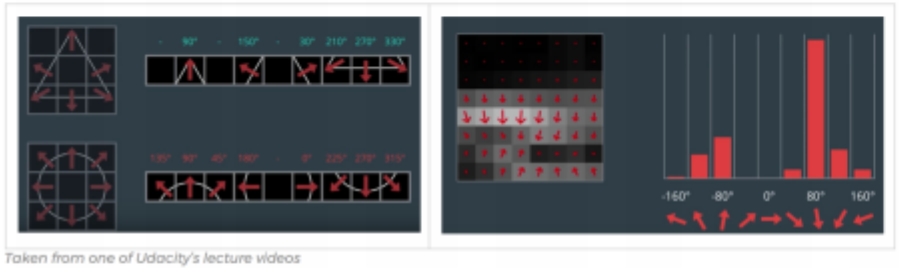
얼굴 라인

0	30	30	0
0	30	30	0
0	30	30	0
0	30	30	0

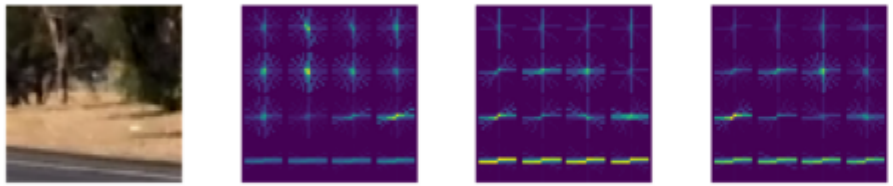
*



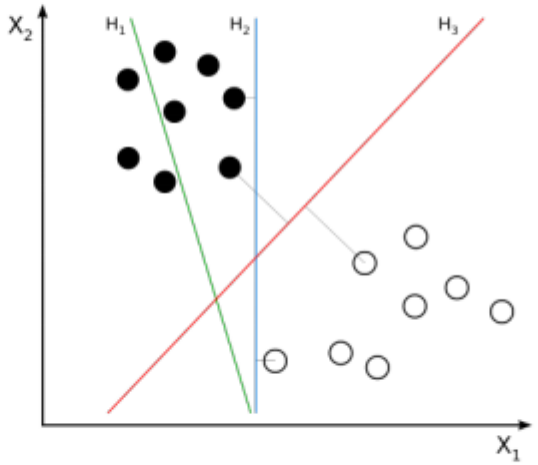
Classic Classifier Systems



Taken from one of Udacity's lecture videos



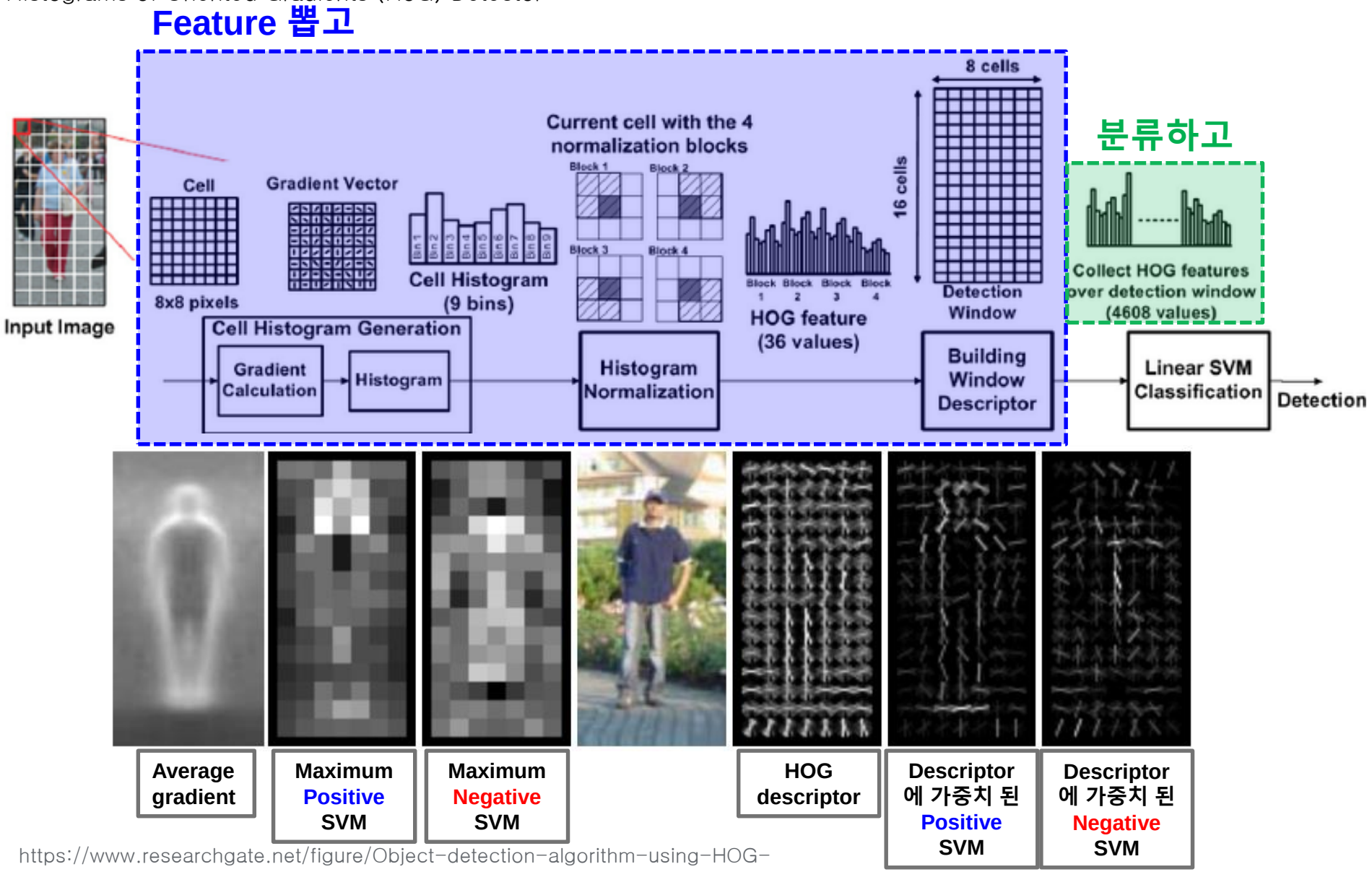
HOG features



SVM Classifier

Classic Classifier Systems

Histograms of Oriented Gradients (HoG) Detector



https://www.researchgate.net/figure/Object-detection-algorithm-using-HOG-features_fig2_267868361

Classic Classifier Systems

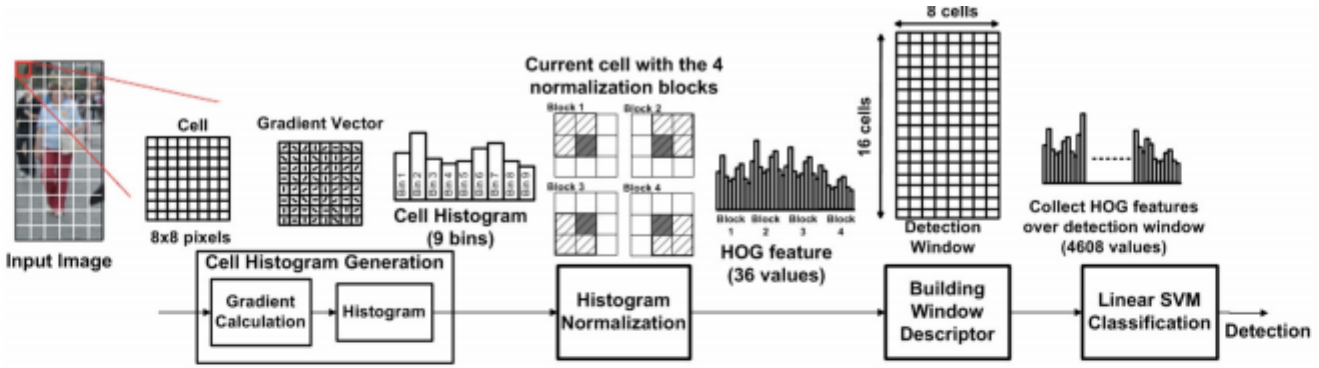


Fig. 2: Object detection algorithm using HOG features.

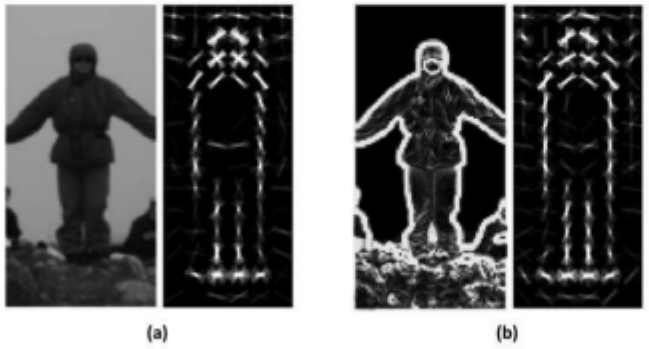
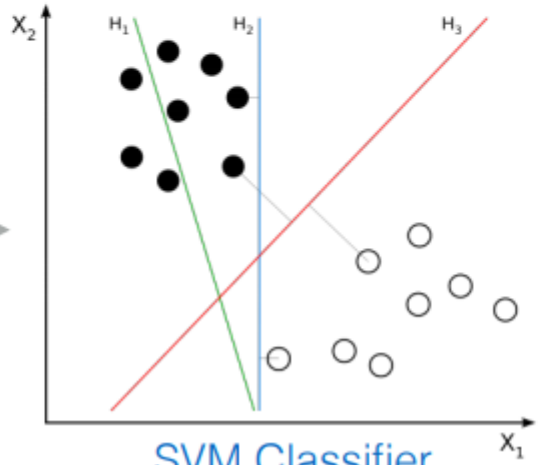


Fig. 9: Pedestrian image in (a) original and (b) gradient representations. Image is taken from INRIA person dataset [1].

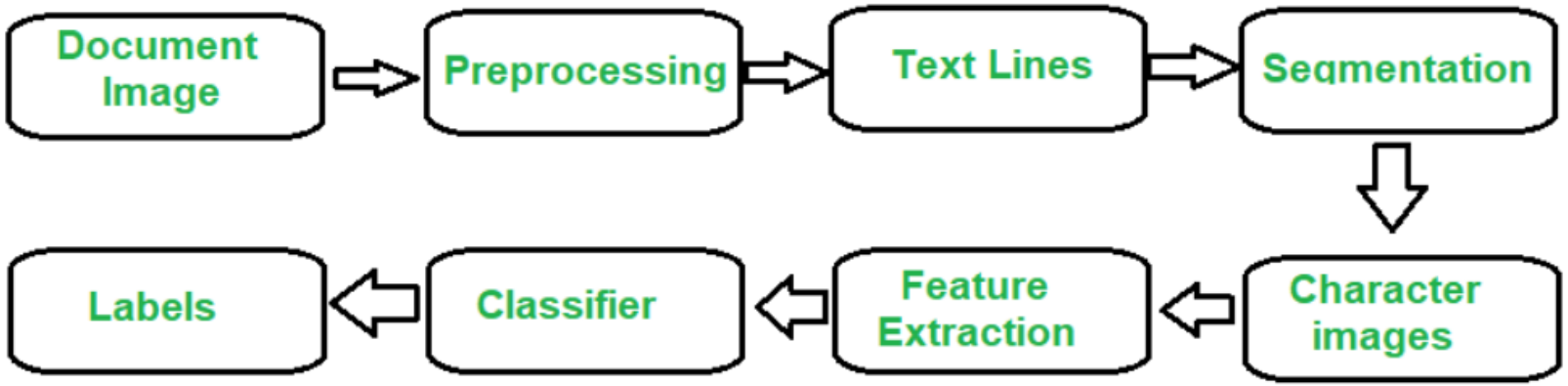
HOG features



SVM Classifier

Fig. 1: Images from INRIA person database [1] with different pedestrian sizes based on their distance from the camera.

Classic Classifier Systems

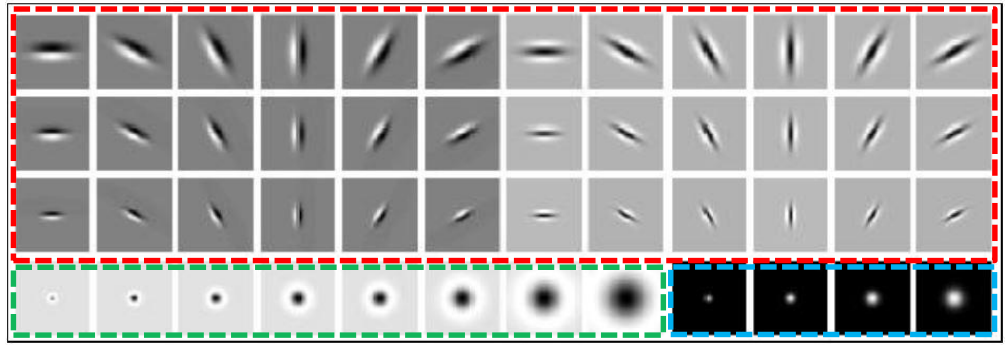


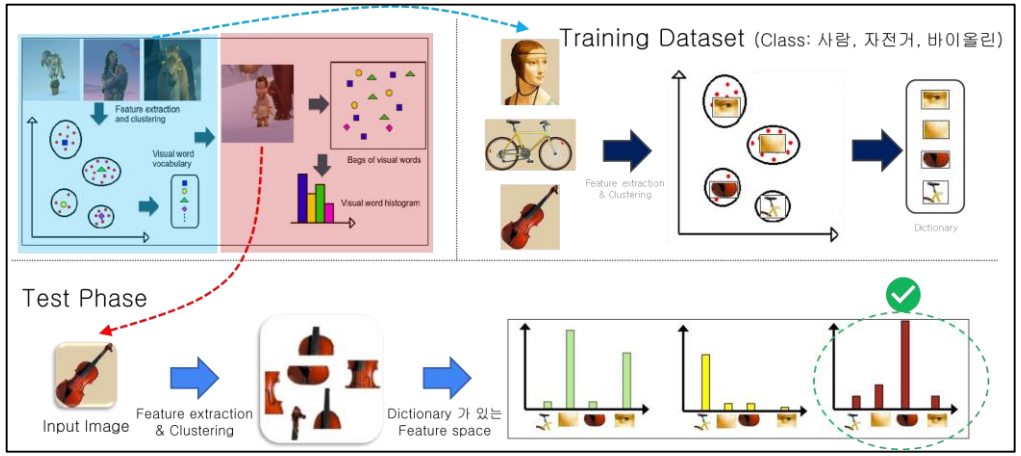
Flow Diagram of OCR

alternative interpretation of the input string. Typically, each module is manually optimized, or sometimes trained, outside of its context. For example, the character recognizer would be trained on labeled images of pre-segmented characters. Then the complete system is assembled, and a subset of the parameters of the modules is manually adjusted to maximize the overall performance. This last step is extremely tedious, time-consuming, and almost certainly suboptimal.

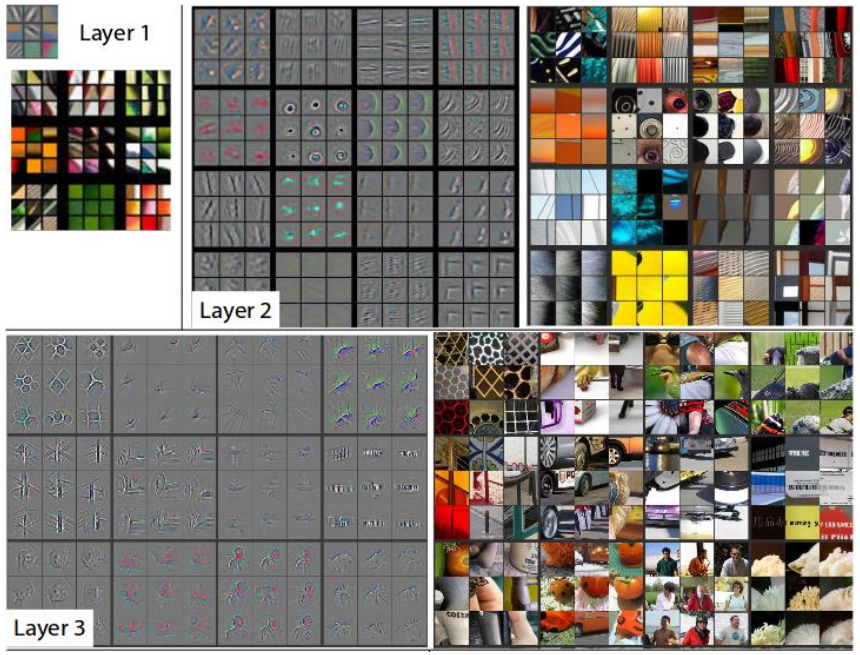
Classic Classifier Systems vs Neural Network

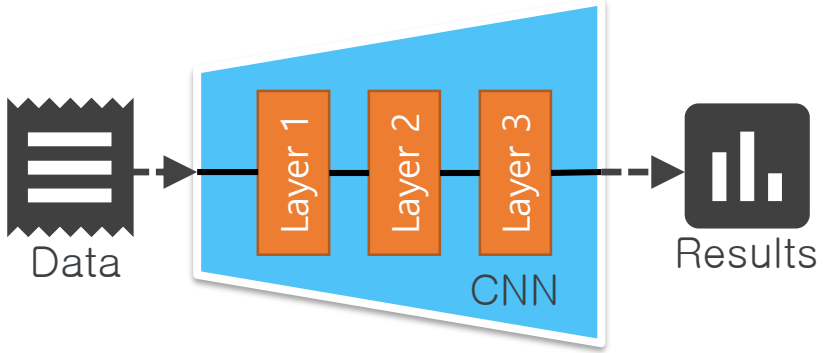
Traditional feature extraction approach



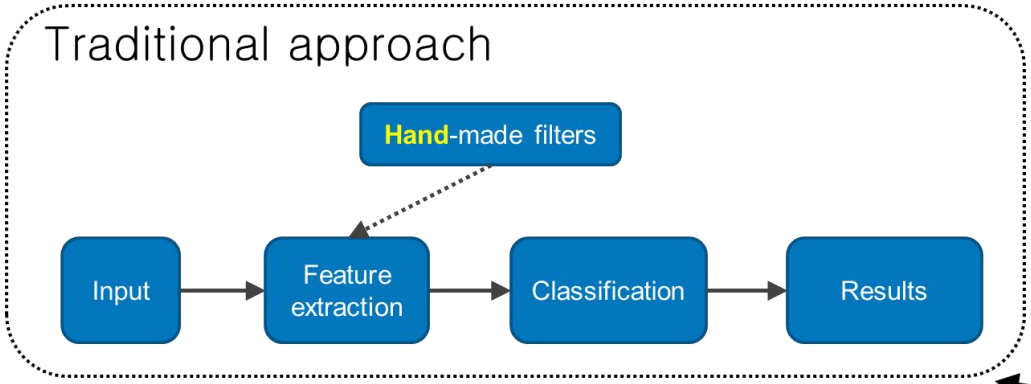


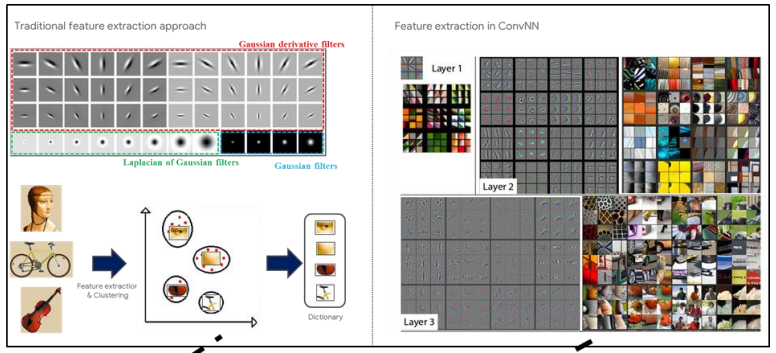
Feature extraction in CNN

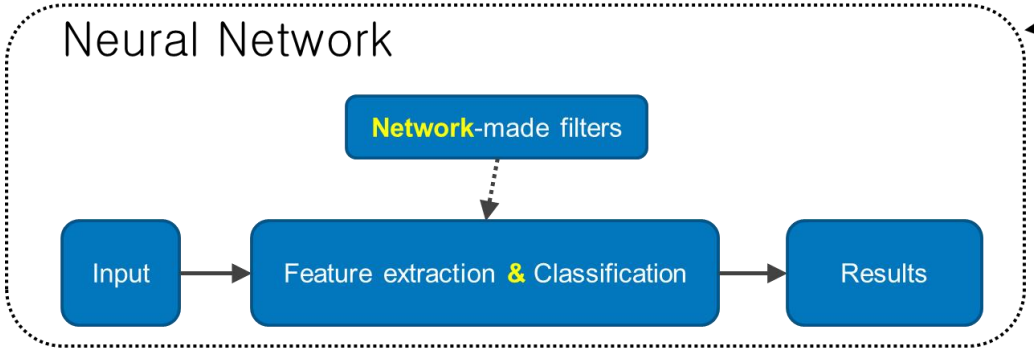




Classic Classifier Systems vs Neural Network



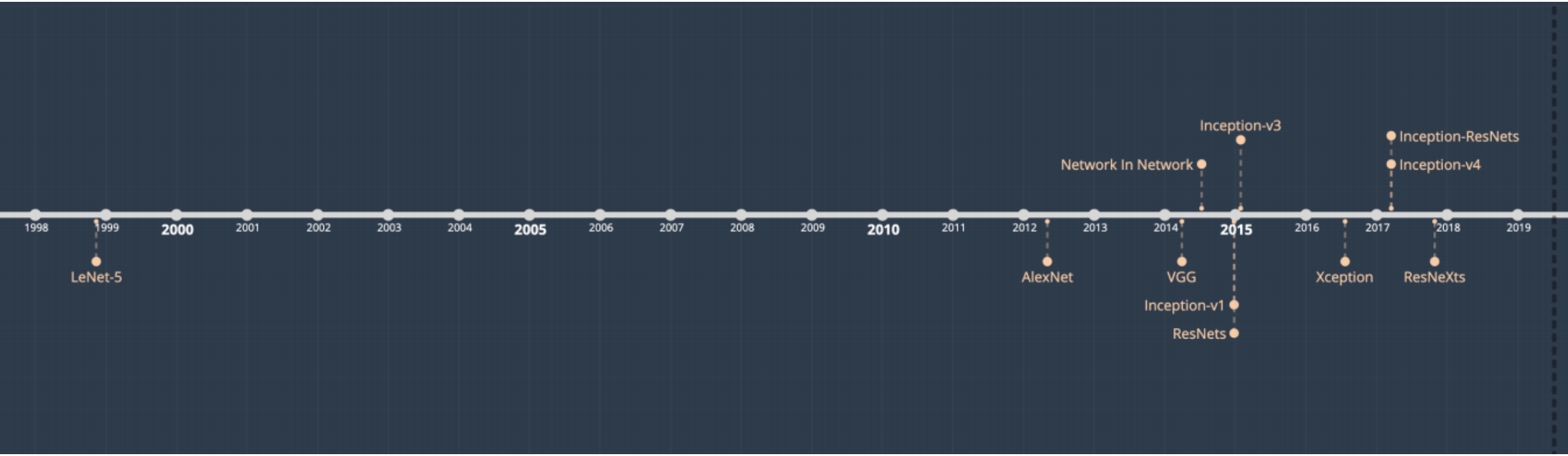




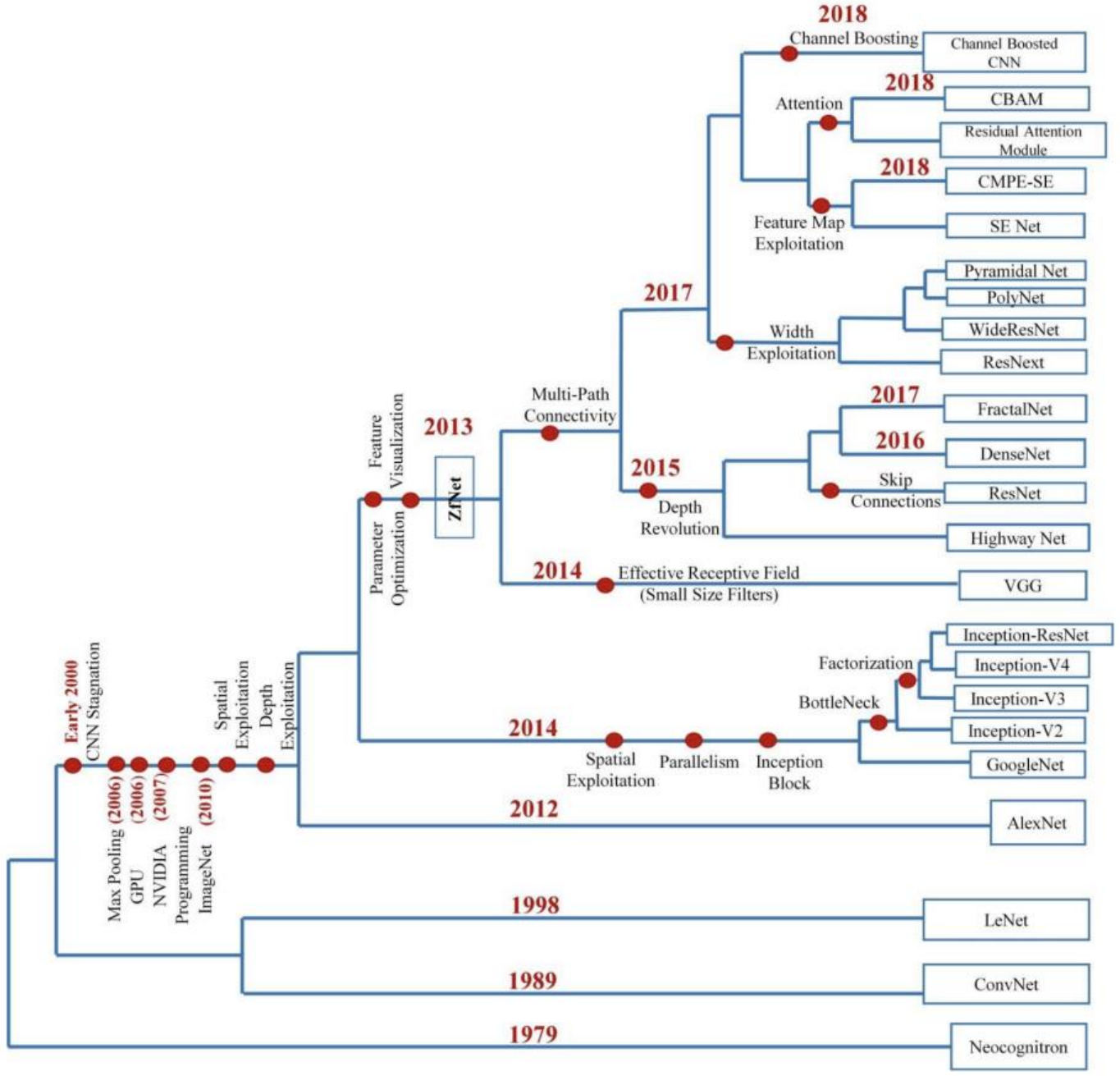
Deep Learning

- 사람이 만들 수 없는 데이터에 최적화된 수백, 수천개의 필터들
- 깊은 네트워크 일수록 추상적이며 넓은 범위를 포괄하기 때문에 더욱 강력한 features를 만들어 낸다.

Milestones of CNN



Milestones of CNN



Milestones of CNN

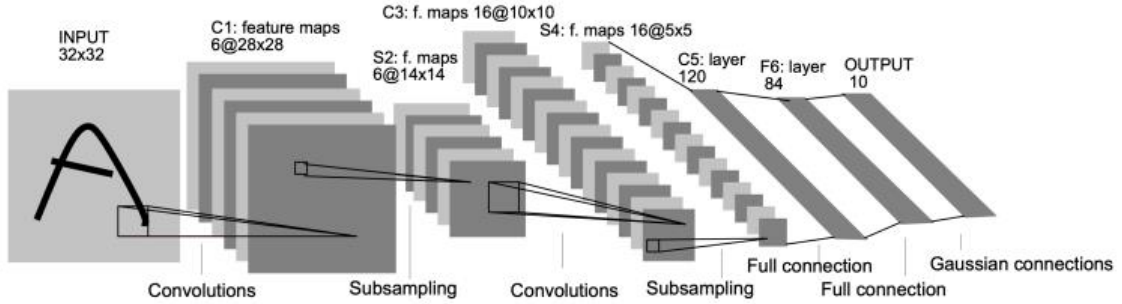
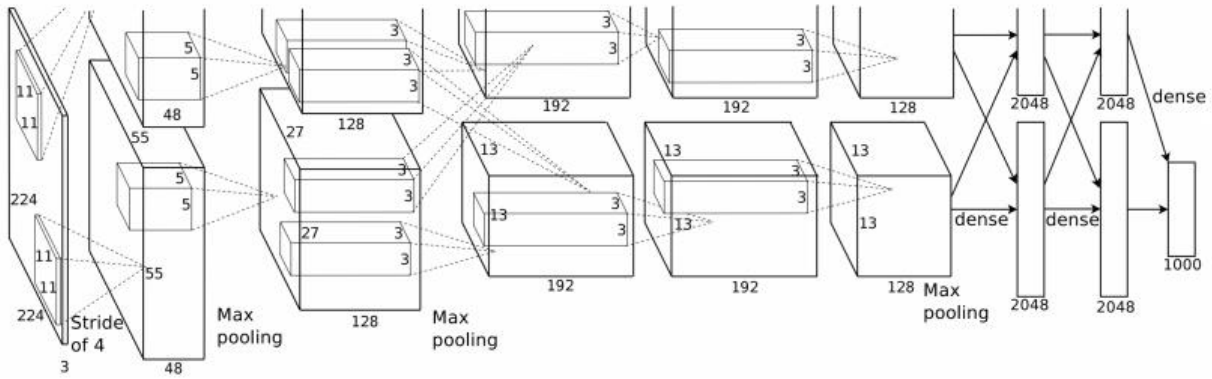


Fig. 2. Architecture of LeNet-5, a Convolutional Neural Network, here for digits recognition. Each plane is a feature map, i.e. a set of units whose weights are constrained to be identical.

[5]



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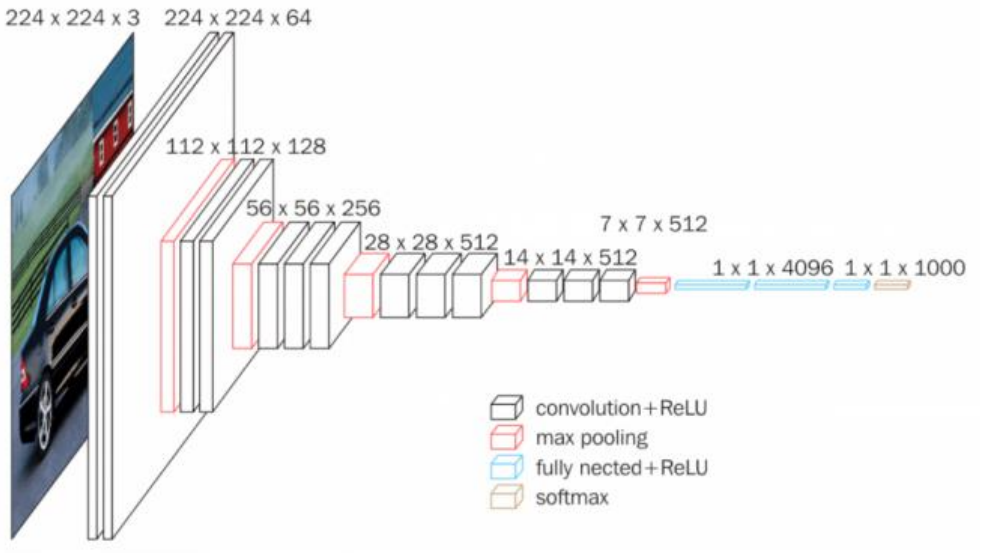

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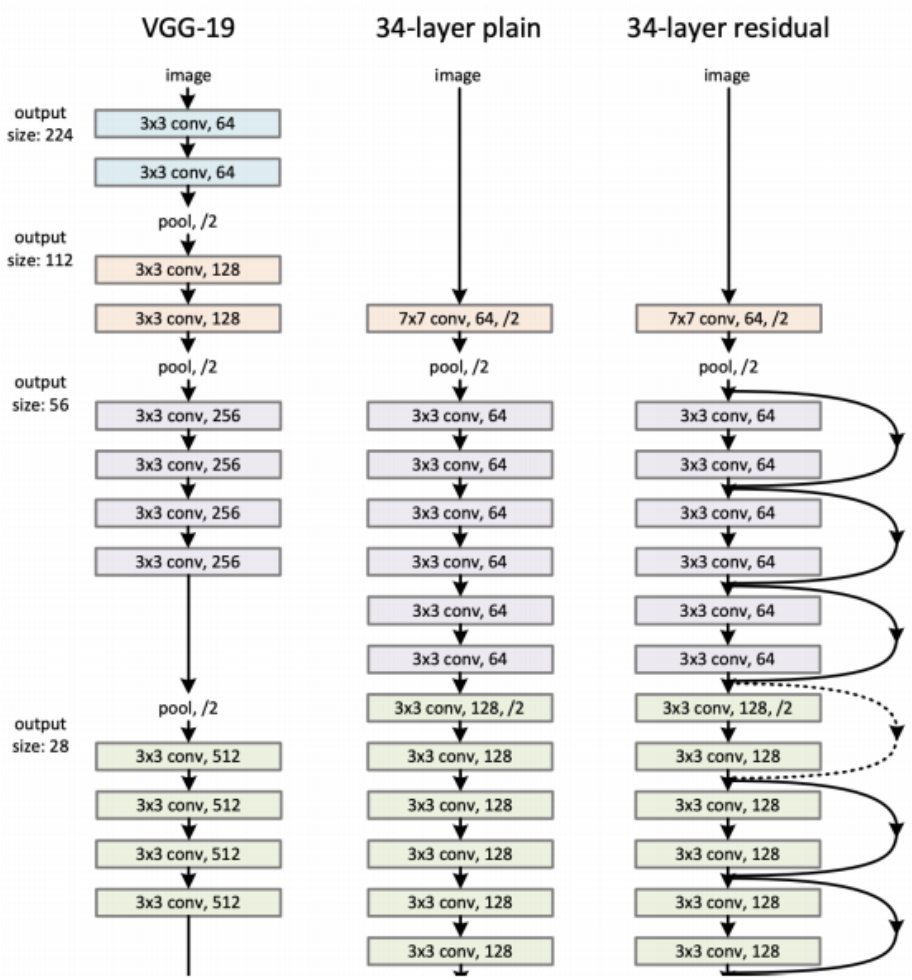
Milestones of CNN



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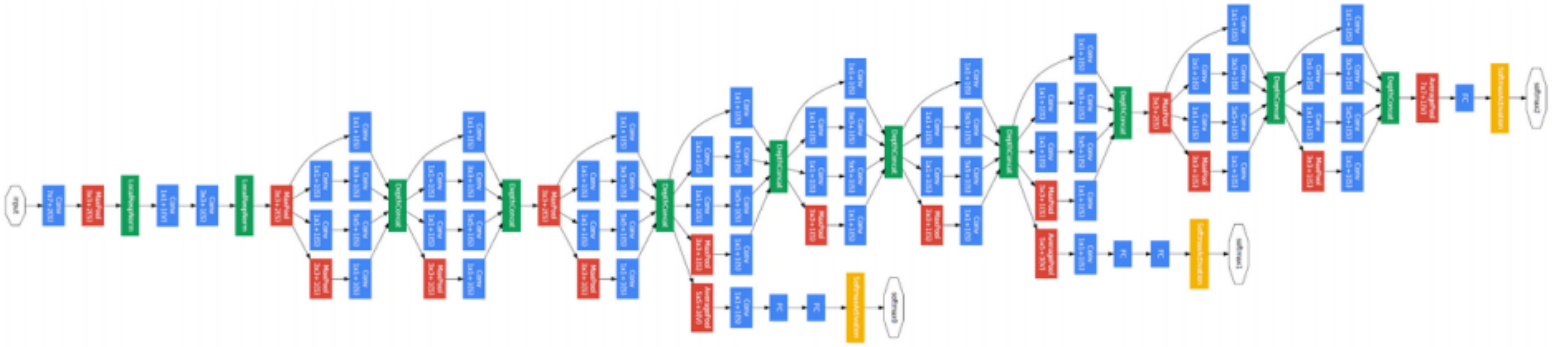

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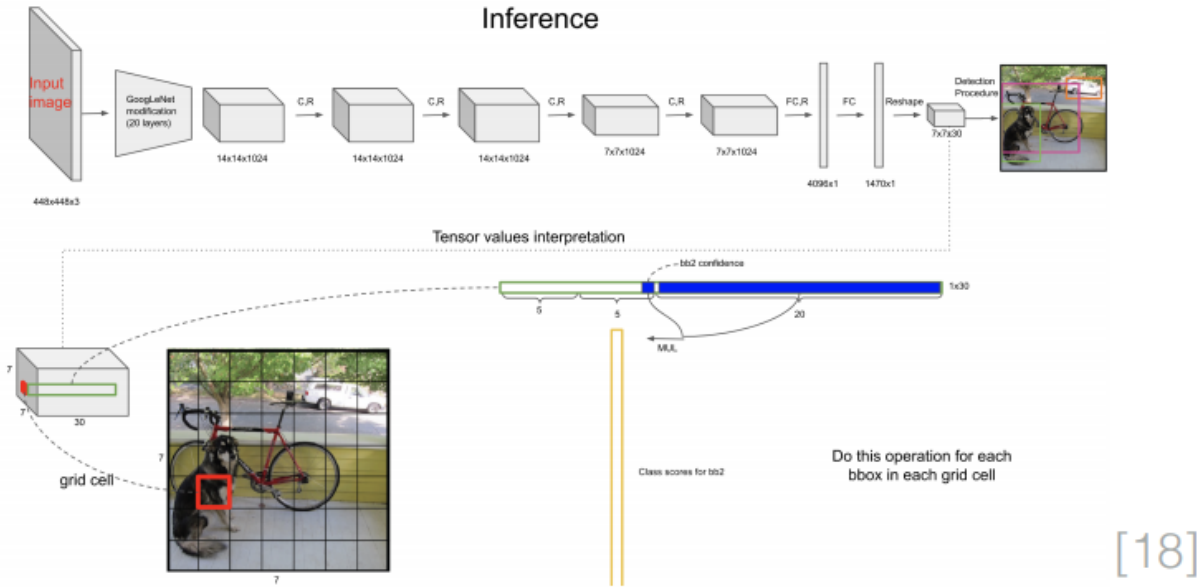

[18]