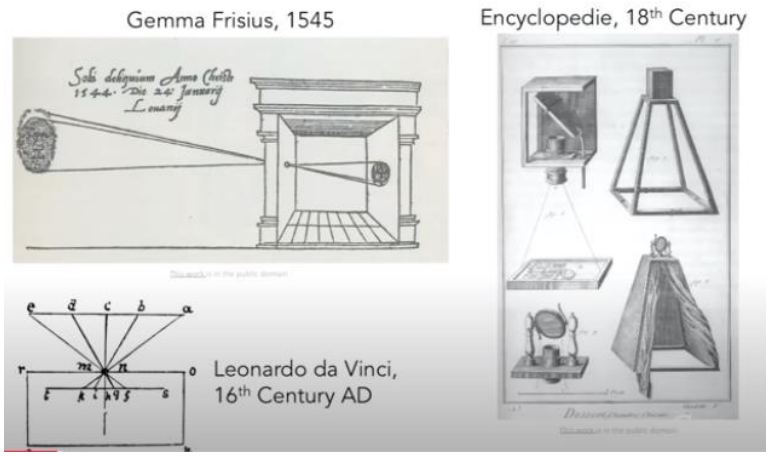
01 Brief History of Computer Vision

History

1. Eyes – Beginning of Vision

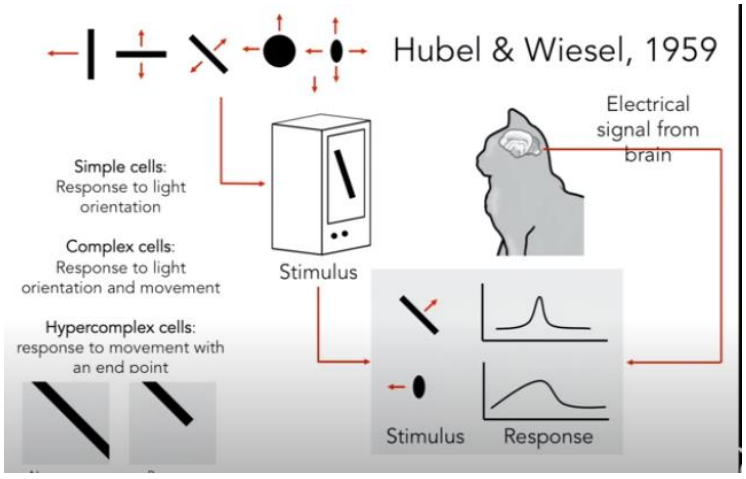
Human's 50% neuron -> Vision Processing

2. 초기 카메라의 등장

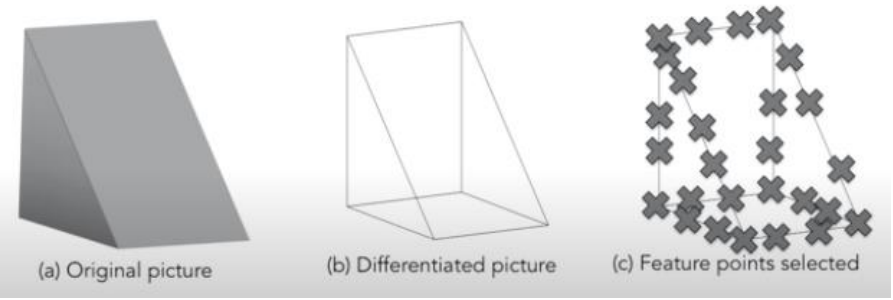


3. Hubel & Wiesel – 1959

What is the visual process mechanism?

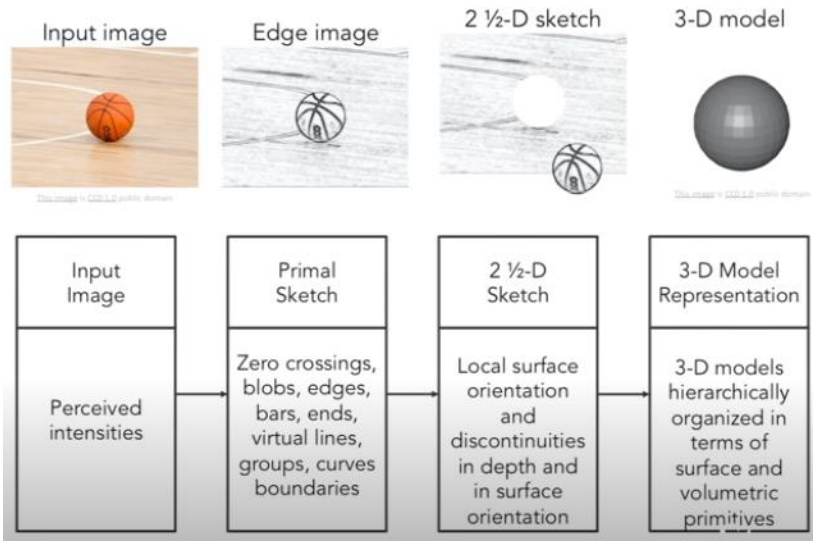


4. Block World – Larry Roberts, 1963

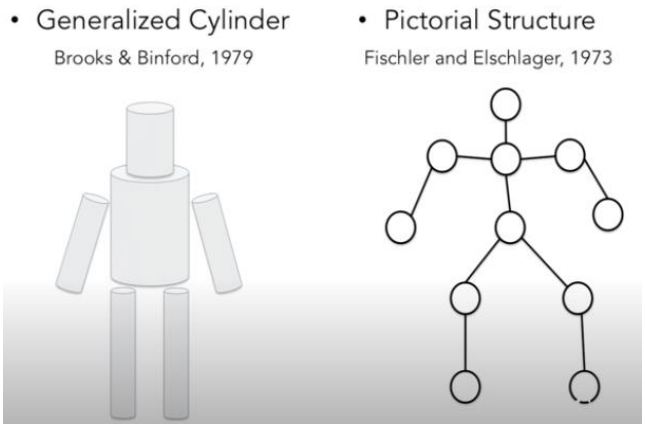


5. Summer Vision Project – 1966

6. Stage of Visual Representation(To 3D) - David Marr, 1970s

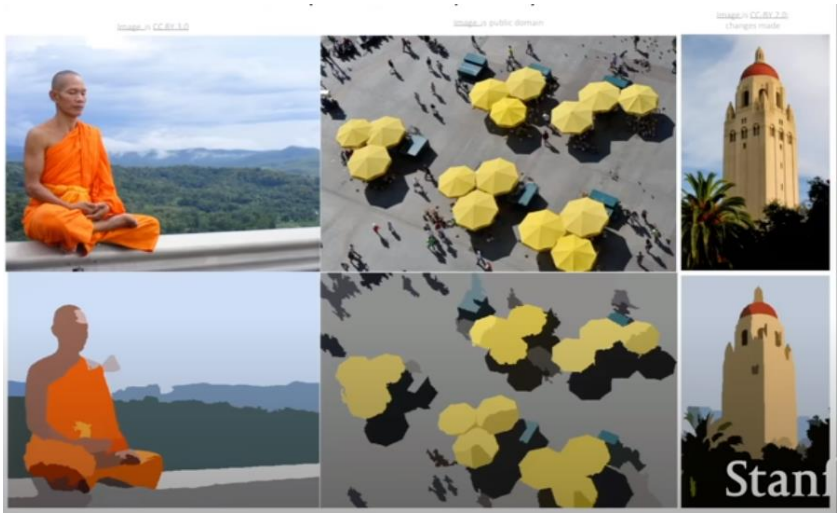


7. 이미지의 Block화 – 1973, 1979



8. Edge – David Lowe, 1987

9. Normalized Cut – Shi & Malik, 1997

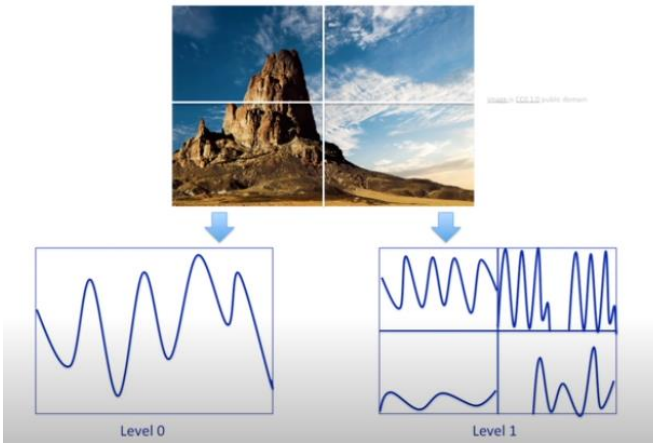


10. Face Detection – Viola & Jones, 2001

11. SIFT & Object Recognition – David Lowe, 1999

12. Spatial Pyramid Matching, Lazebnik, Schmid & Ponce, 2006

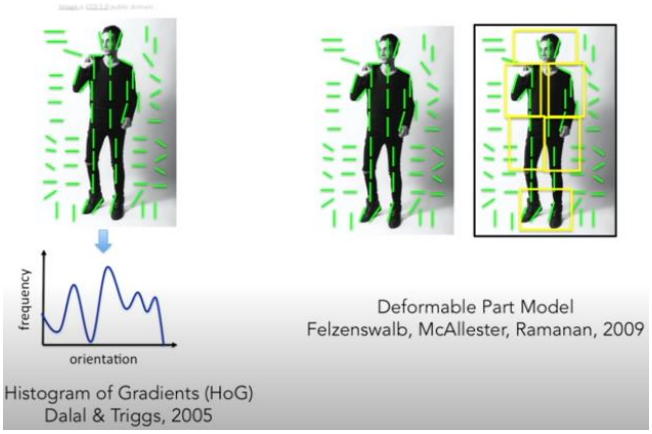
: Image' feature can give us clues of scene (ex) Using SVM)



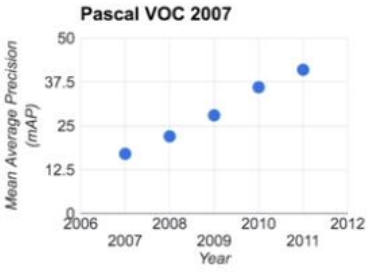
13. Human Recognition

Histogram of Gradients, Deformable Part Model.

Quality of Image가 점점 달라지기 시작한다.



14. PASCAL Visual Object Challenge (20 object categories)



15. 세상의 모든 것을 인식할 수 있는가?

AdaBoost, SVM … 당시의 것들은 Train Data에 Overfitting 되어 있기 때문에 generalization이 잘 되지 않는 문제가 있었다.

- IMAGENET Challenge

Error Rate

- 2012 Error의 급격한 감소 -> Deep Learning의 등장(Convolutional Neural Network)

Breakthrough Point!!

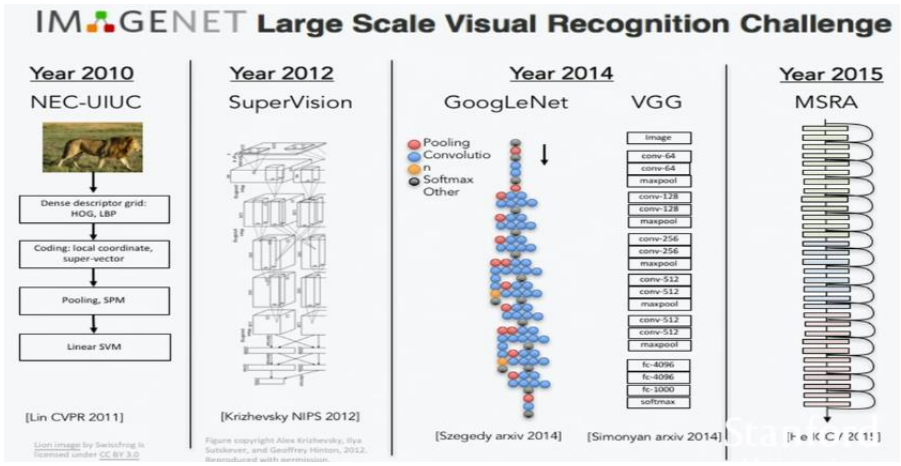
Computer Vision Issue

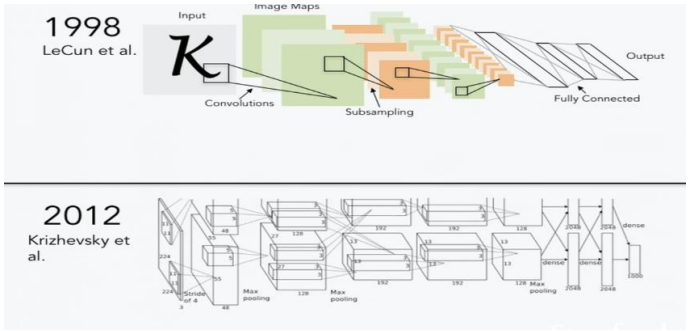
- Object detection

- Action classification

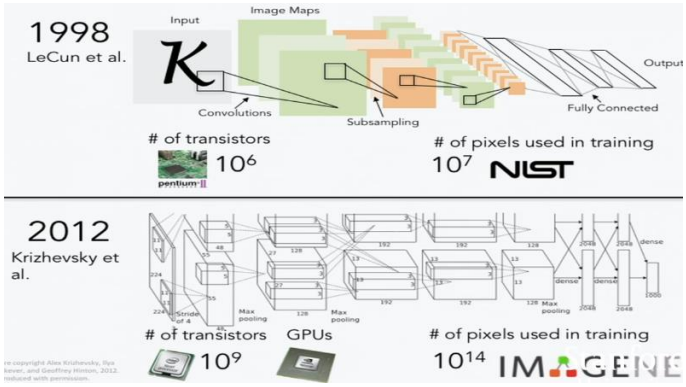
- Image captioning

- …



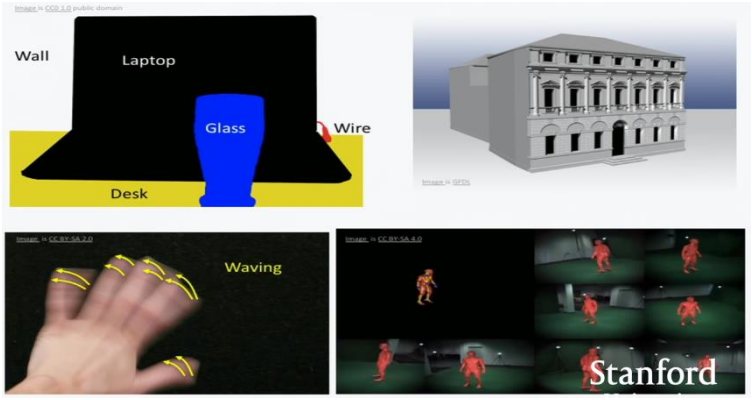


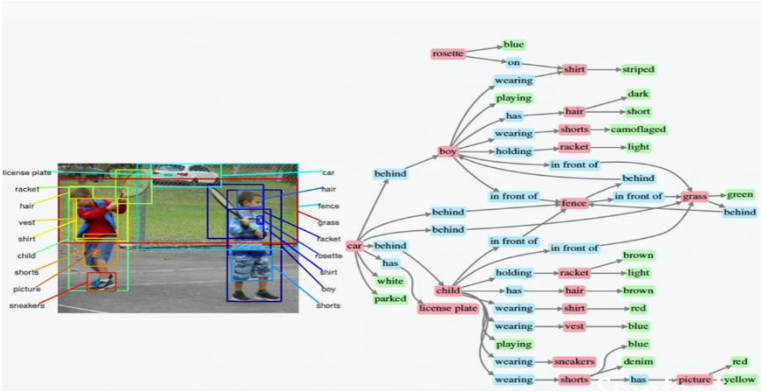
1998년(LeCun)에도 존재하였는데 왜 2012년부터 주목을 받기 시작했는가?



GPU, Memory 용량 증가로 계산 성능 증가!

Quest





Understanding of Image

[출처] [Convolutional Neural Networks for Visual Recognition (Spring 2017)]