

Deep Learning이란?

수업 목표

이번 수업의 핵심:

- Deep learning (심층 학습)과 인공 신경망의 개념
- 인공지능 / 기계학습 / 심층학습의 차이
- Deep learning의 성공 원인 및 현황
- Deep learning의 적용 분야

핵심 개념

- Deep learning
- 인공 신경망
- 인공지능, 기계학습

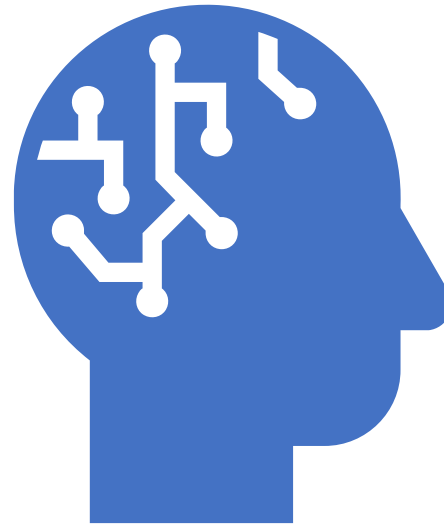
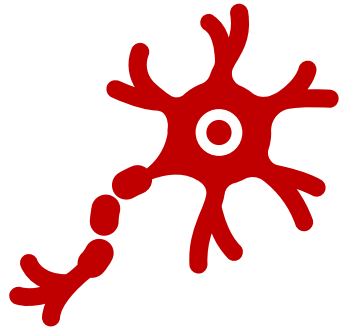
Deep Learning

Deep Learning (심층학습)

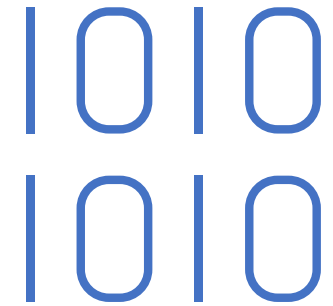
- Artificial neural network (인공신경망)을 여러 층 쌓아 학습하는 기술



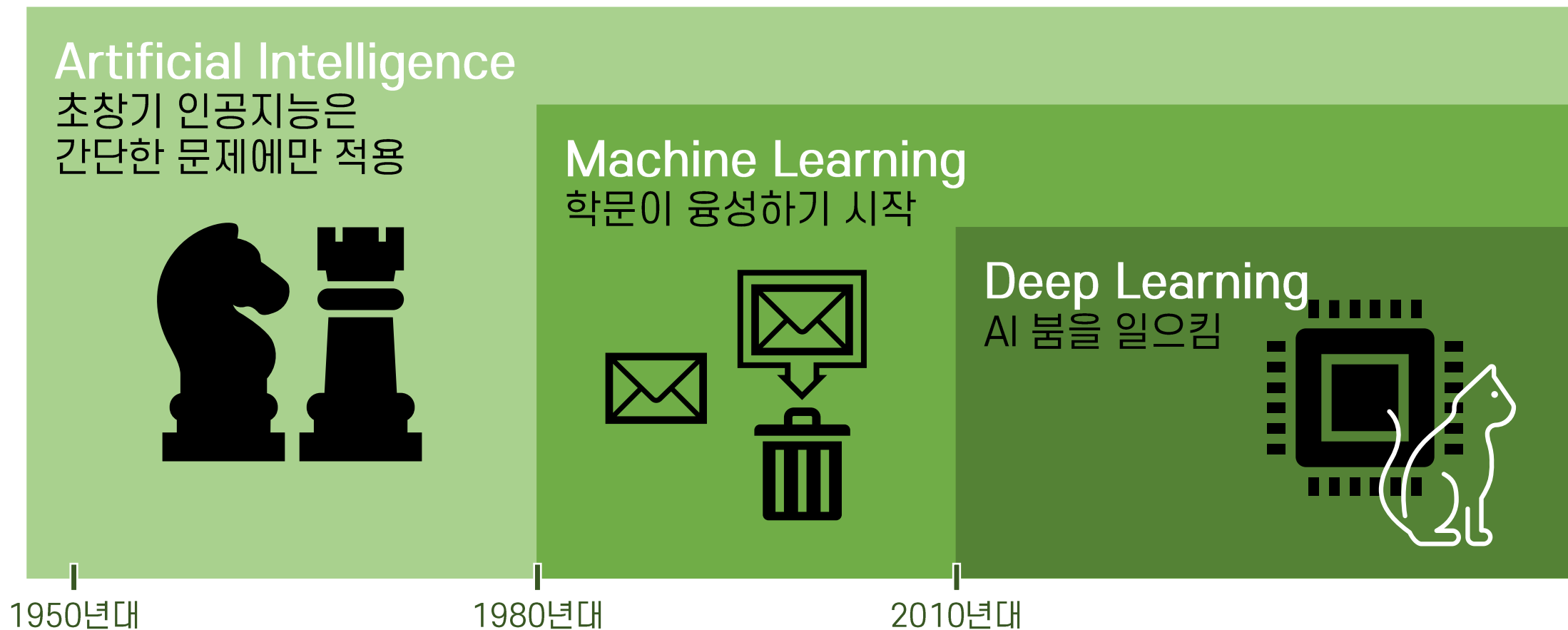
사람의 신경망



인공 신경망



인공지능 vs. 기계학습 vs. 심층학습

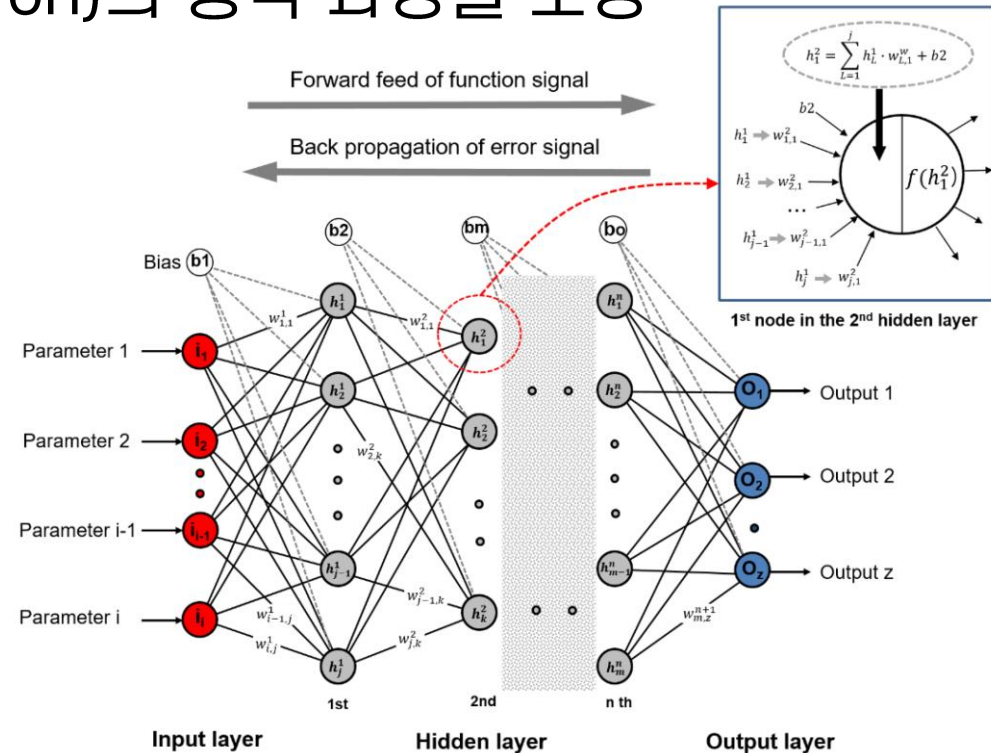
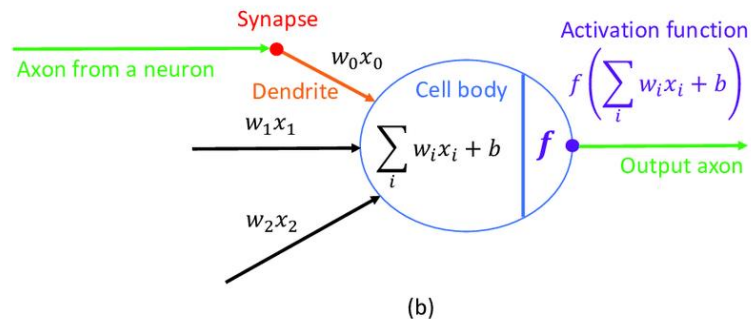
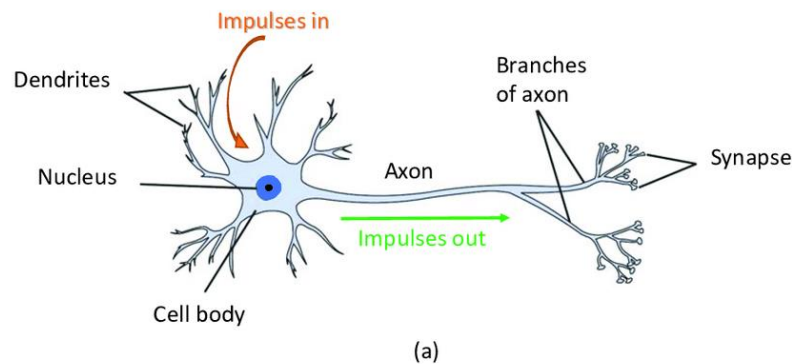


인공지능 \subset 기계학습 \subset 심층학습

Artificial Neural Network

Artificial Neural Network (인공신경망, 신경망)

- 인간 두뇌에 존재하는 신경 세포 (Neuron)의 동작 과정을 모방



Roffo, Giorgio. "Ranking to Learn and Learning to Rank: On the Role of Ranking in Pattern Recognition Applications." . 2017. <https://arxiv.org/abs/1706.05933>

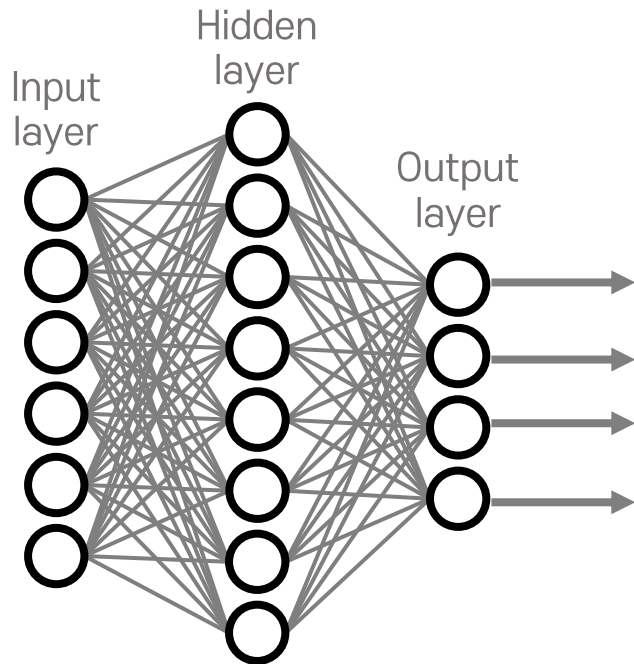
Kim, Yangkyun, and Sean S. Lee. "Application of Artificial Neural Networks in Assessing Mining Subsidence Risk". Applied Sciences 10, no. 4: 1302. 2022. <https://doi.org/10.3390/app10041302>

Deep Neural Network

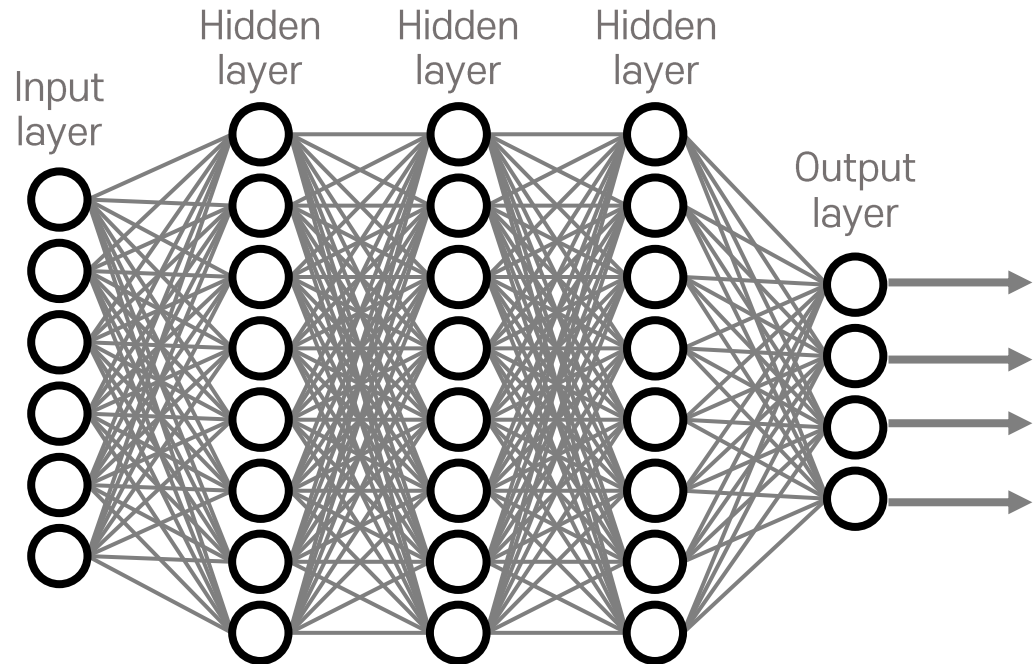
Deep Neural Network (심층신경망)

- Neural network의 층을 많이 쌓아, 인공지능 기술의 정확도를 향상

“Non-deep” Neural Network



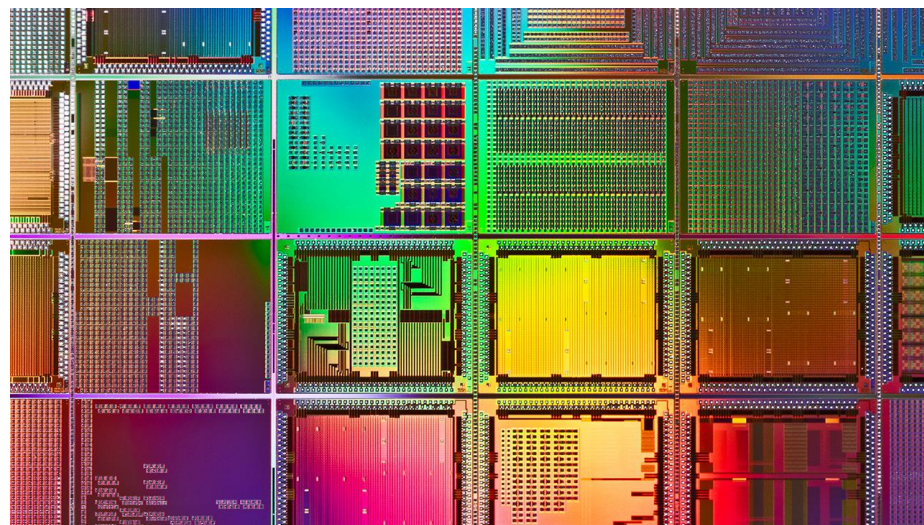
Deep Neural Network



Deep Learning의 성공 요인



빅데이터



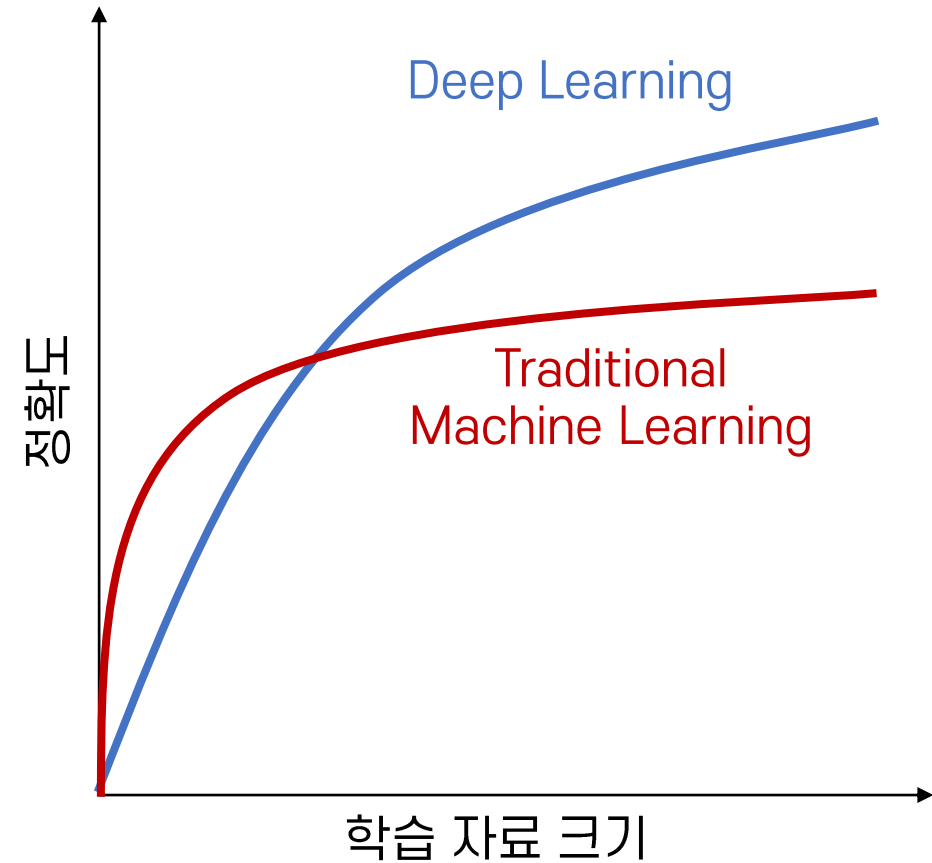
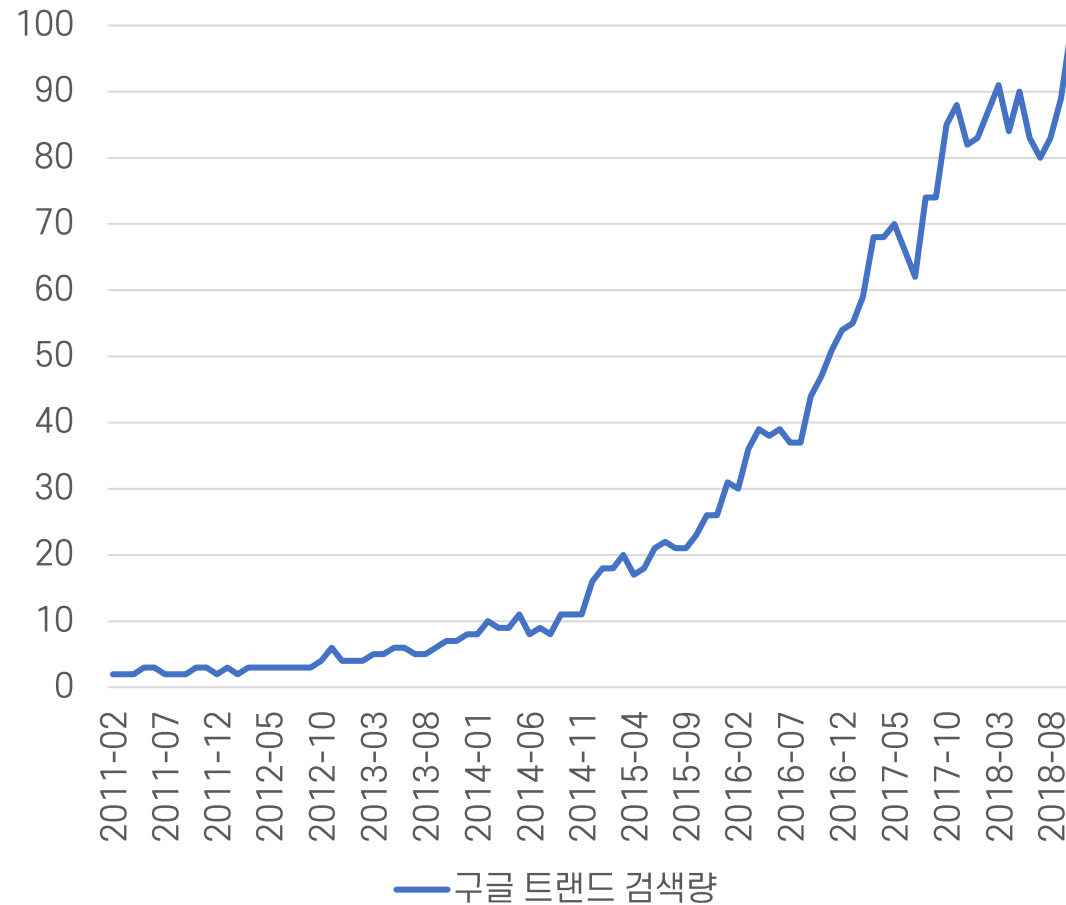
GPU 가속

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onreadystatechange",  
    "learn Number String Function Array Date RegL  
    _={};function F(e){var t=_[e]={};return b.ea  
    t[1])===!1&&e.stopOnFalse){r=!1;break}n=!1,u&  
    ?o=u.length:r&&(s=t,c(r))}return this},remove  
    nction(){return u=[],this},disable:function()  
    re:function(){return p.fireWith(this,argument  
    ending",r={state:function(){return n},always:  
    romise)?e.promise().done(n.resolve).fail(n.re  
    dd(function(){n=s},t[1^e][2].disable,t[2][2].  
    =0,n=h.call(arguments),r=n.length,i=1!==r|e&  
    (r),l=Array(r);r>t;t++)n[t]&&b.isFunction(n[t]  
    />table>/table>a_href=/false/</input type  
    />table>/table>a_href=/false/</input type  
    />table>/table>a_href=/false/</input type
```

알고리즘 고도화

Deep Learning의 현황

2011-2018 Deep Learning 검색량



Deep Learning의 영웅들

Geoffrey Hinton



Andrew Ng



Yann LeCun



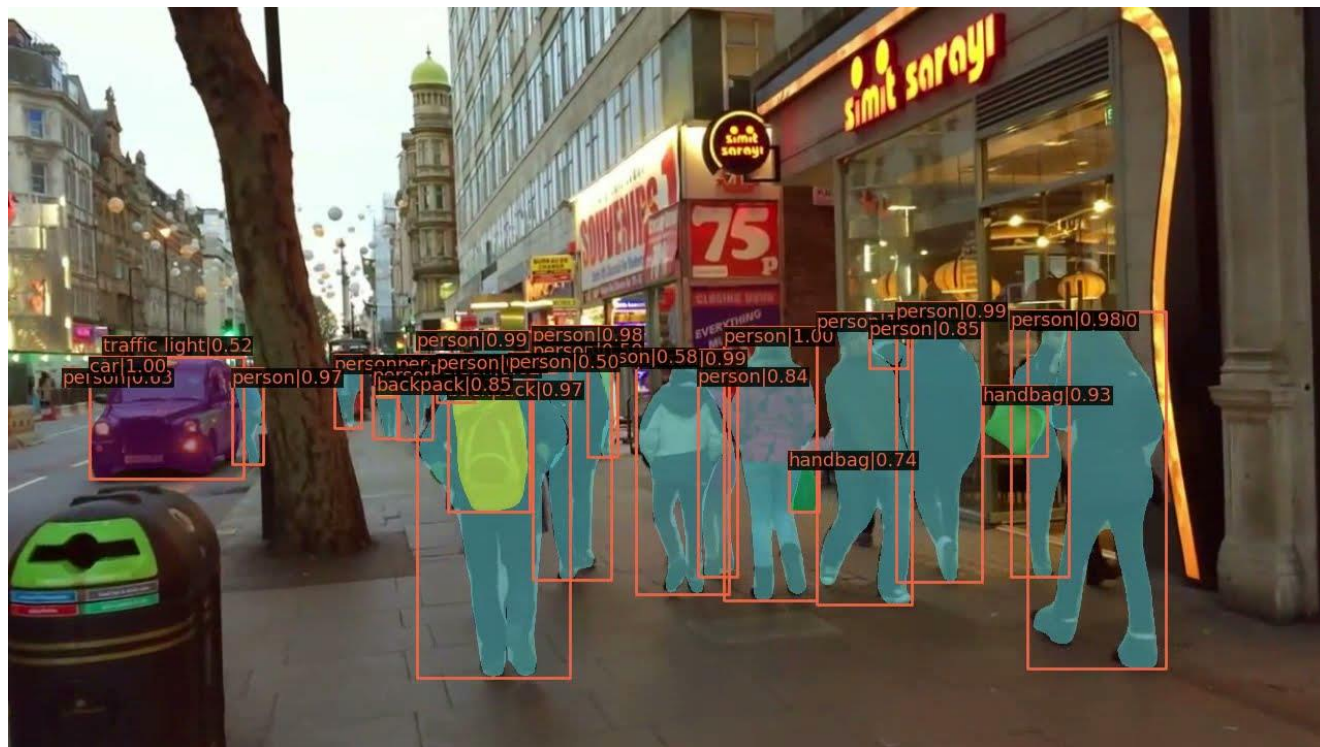
Yoshua Bengio



<https://www.cs.toronto.edu/~hinton/>
<https://www.andrewng.org/>
<http://yann.lecun.com/>
<https://yoshuabengio.org/>

Deep Learning의 적용 분야

Computer Vision



물체 검출



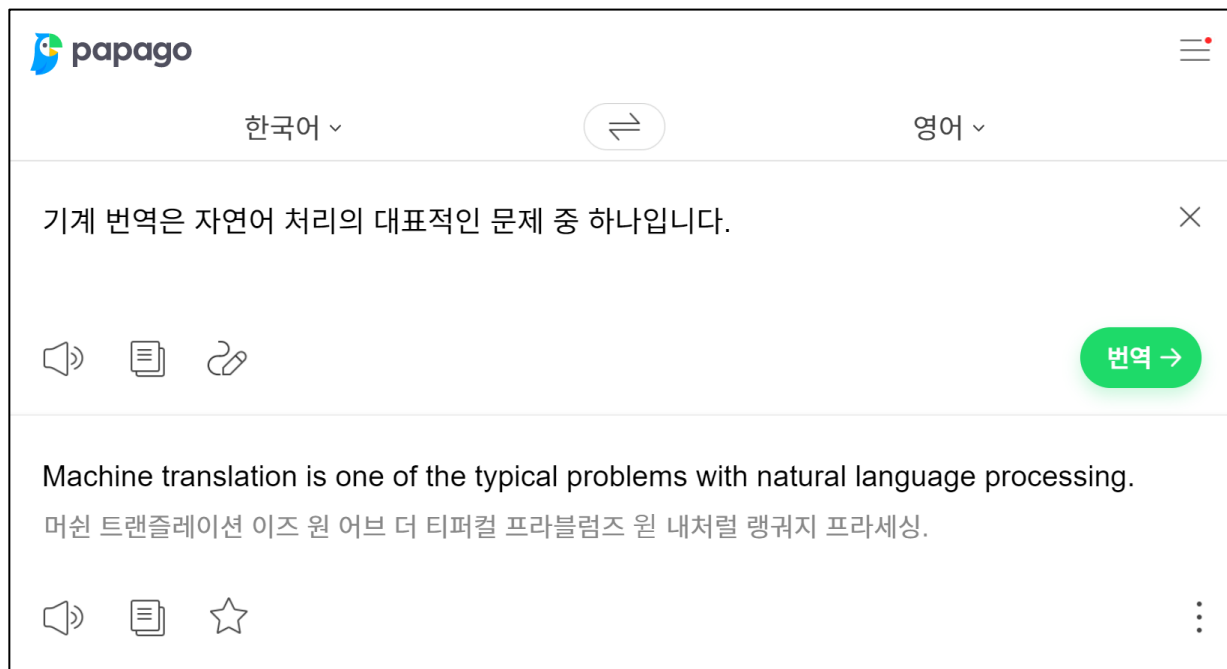
영상 합성

Liu, Ze et al. "Swin Transformer: Hierarchical Vision Transformer Using Shifted Windows." Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV). 2021.

Karras, Tero et al. "Analyzing and Improving the Image Quality of StyleGAN." Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR). 2020.

Deep Learning의 적용 분야

Natural Language Processing



기계 번역



스팸 메일 분류

Deep Learning의 적용 분야

Time-Series Analysis



주가 예측



음성 인식 및 합성

Deep Learning의 적용 분야

Reinforcement Learning



바둑



아타리 게임

요약

- Deep learning의 개념과 Artificial neural network의 이해
- 인공지능, 기계학습, 그리고 심층학습의 발전과정
- Deep learning의 발전 요인과 그 현황
- Computer vision, Natural language processing 등 Deep learning의 응용

