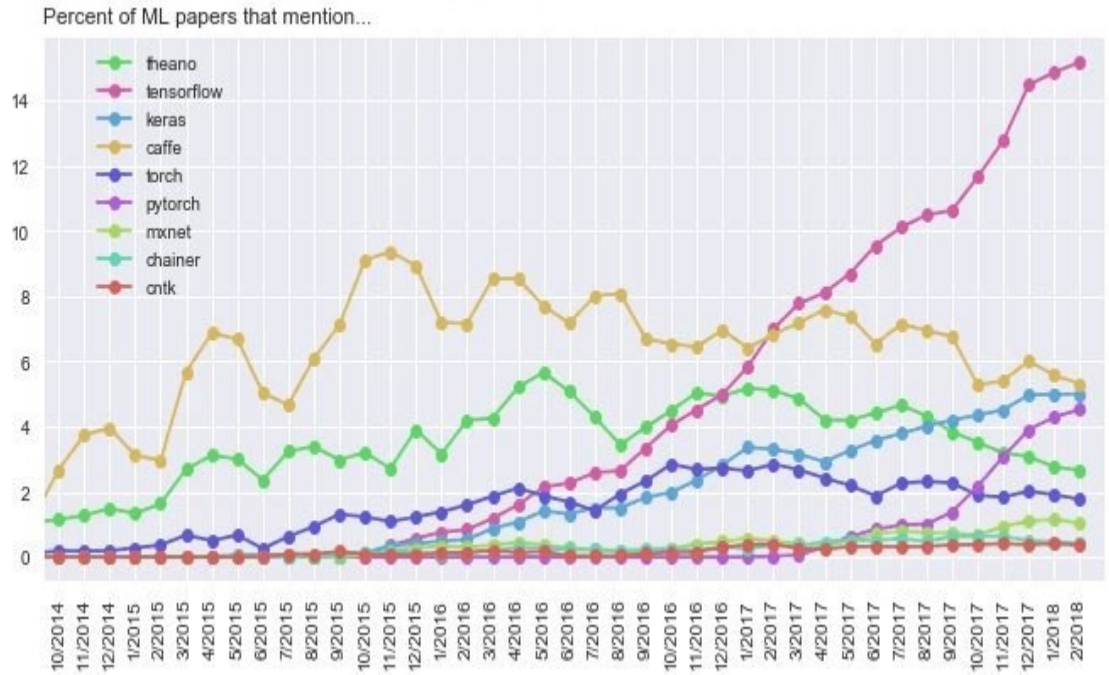
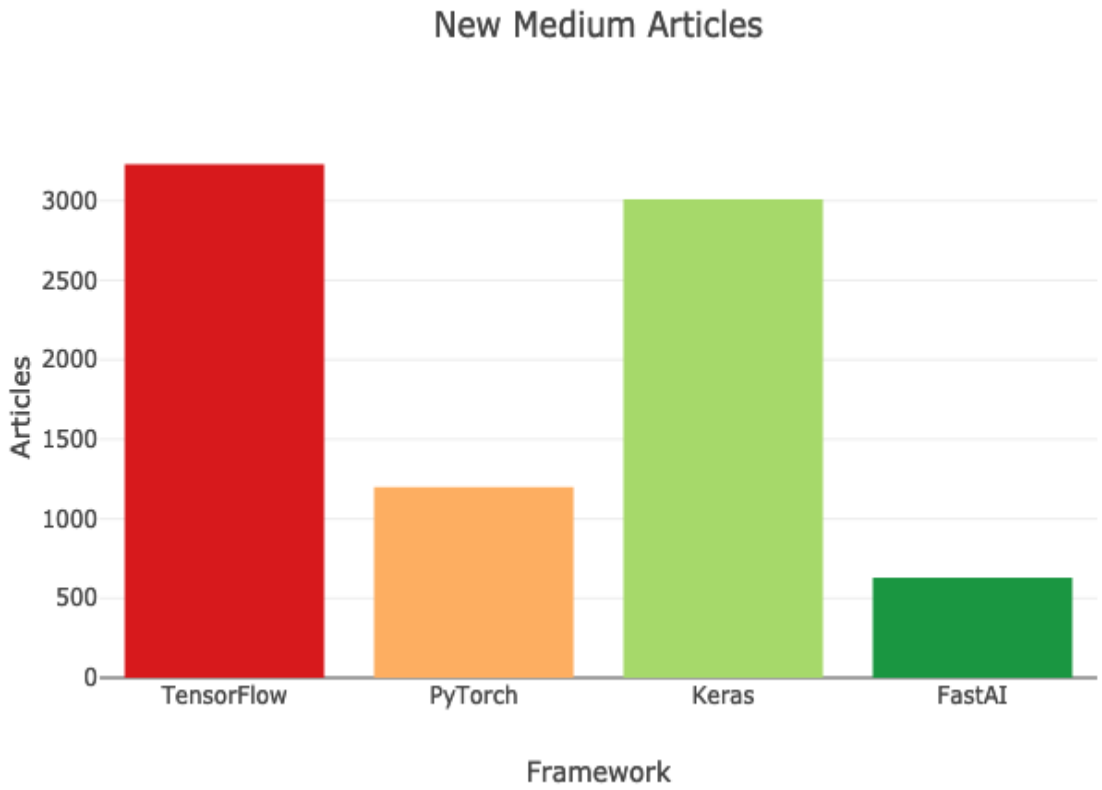
In The Name Of God

Subject: MLP-CNN

Presenter: Reza Karimzadeh

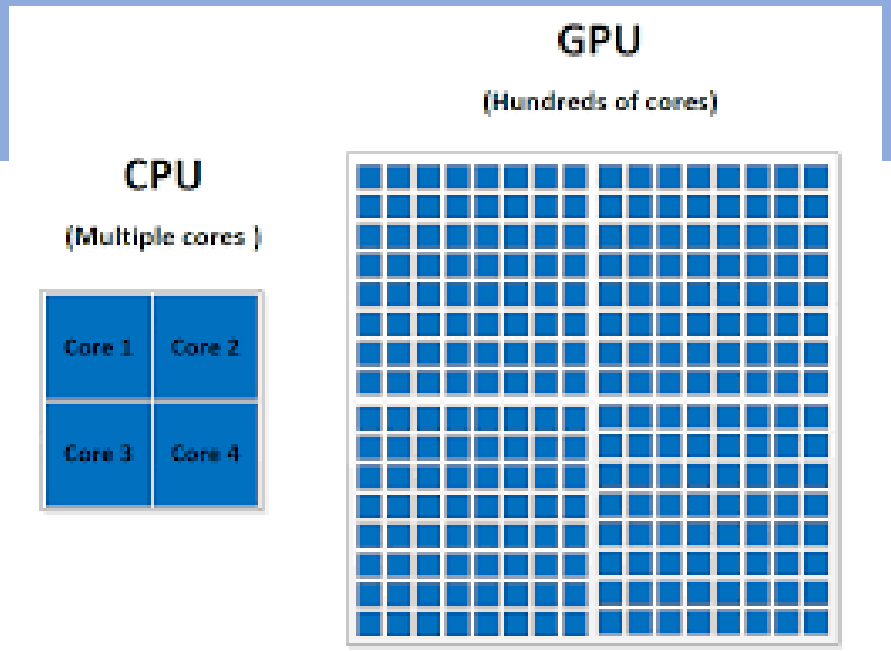
Frameworks popularity!

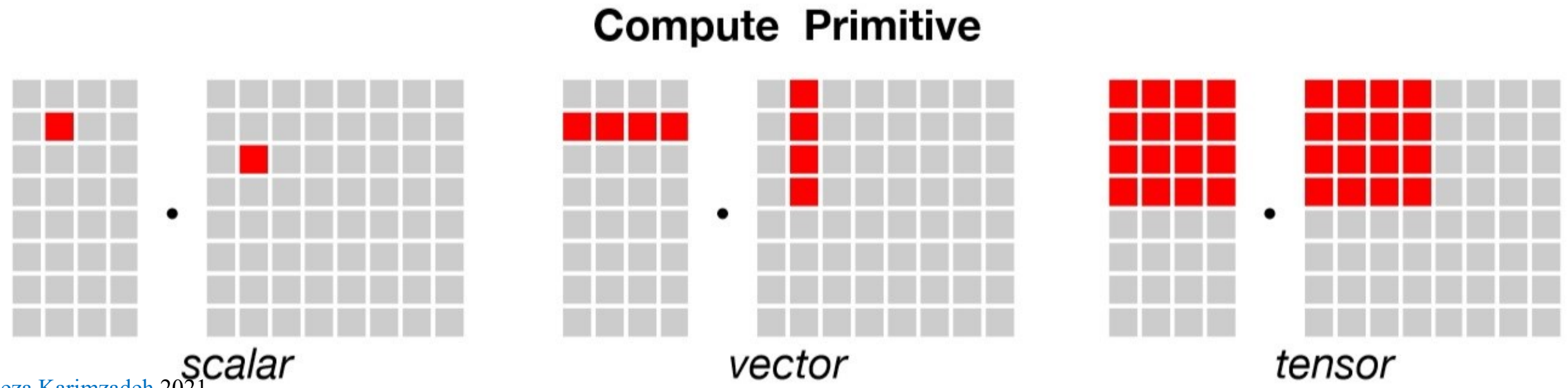




CPU v.s. GPU v.s. TPU

Type	Instructions per cycle
CPU	~ 10^0
CPU (with vector extensions)	~ 10^1
GPU	~ 10^4
TPU	~ 10^5

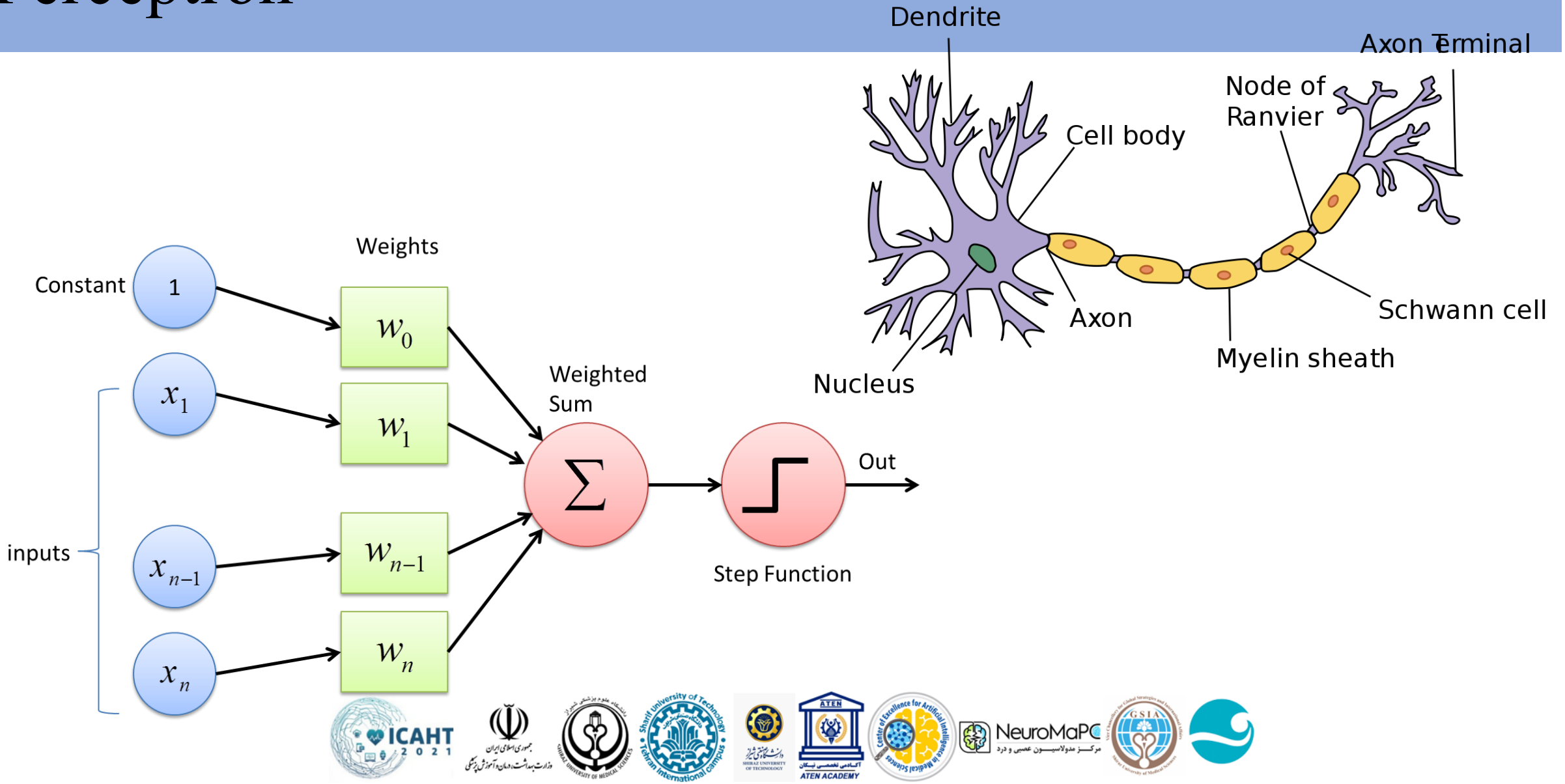




Google Colaboratory

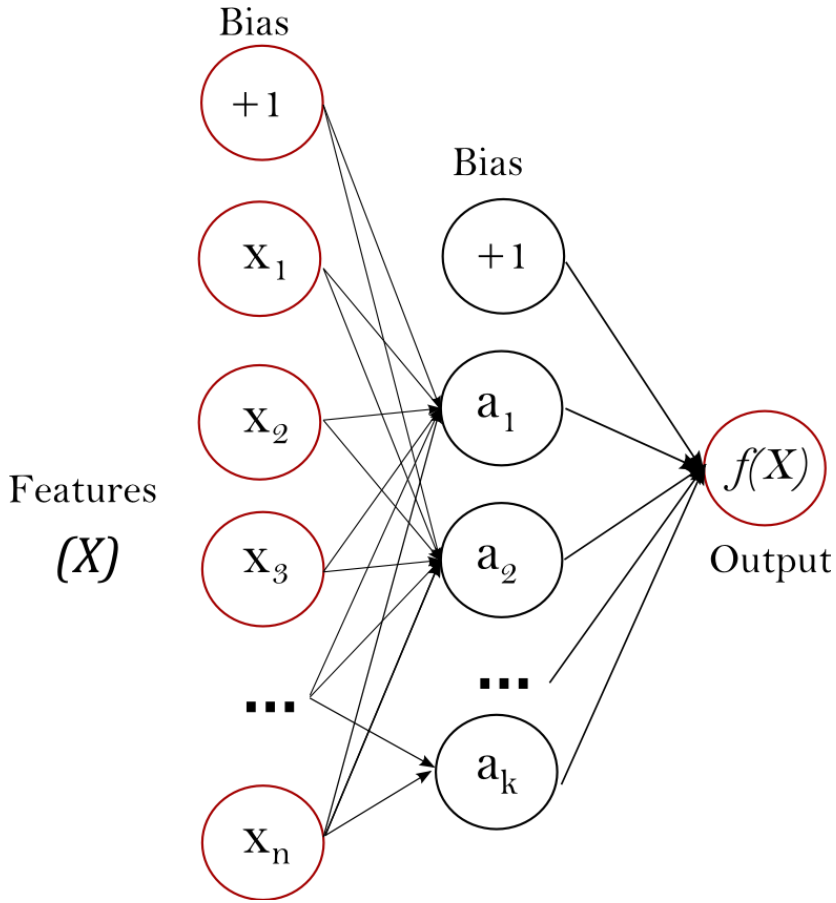
- https://colab.research.google.com/

Perceptron

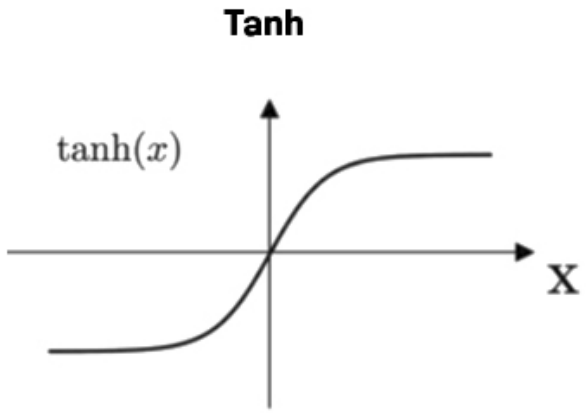

Dendrite
Axon Terminal
Node of Ranvier
Cell body
Axon
Schwann cell
Myelin sheath
Nucleus
Weights
Constant
1
w_0
x_1
w_1
Weighted Sum
Σ
Out
inputs
x_{n-1}
w_{n-1}
x_n
w_n
Step Function

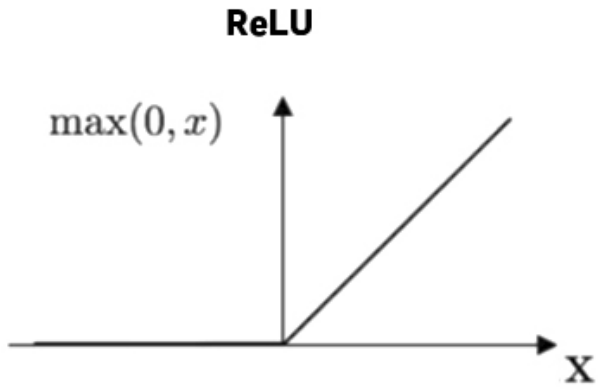
MLP (Multi Layer Perceptron)

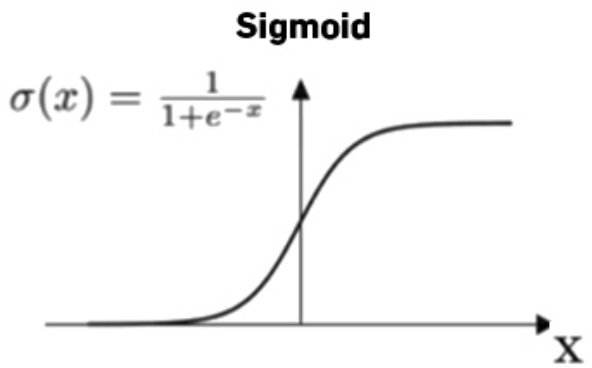
- Input and output
- Network architecture
- Cost function
- Optimization Algorithm

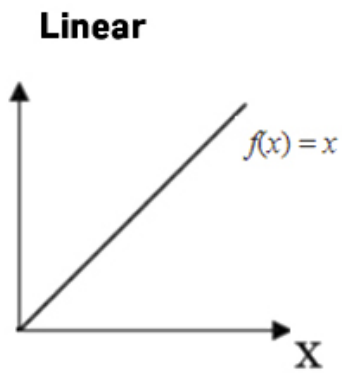


Activation Functions



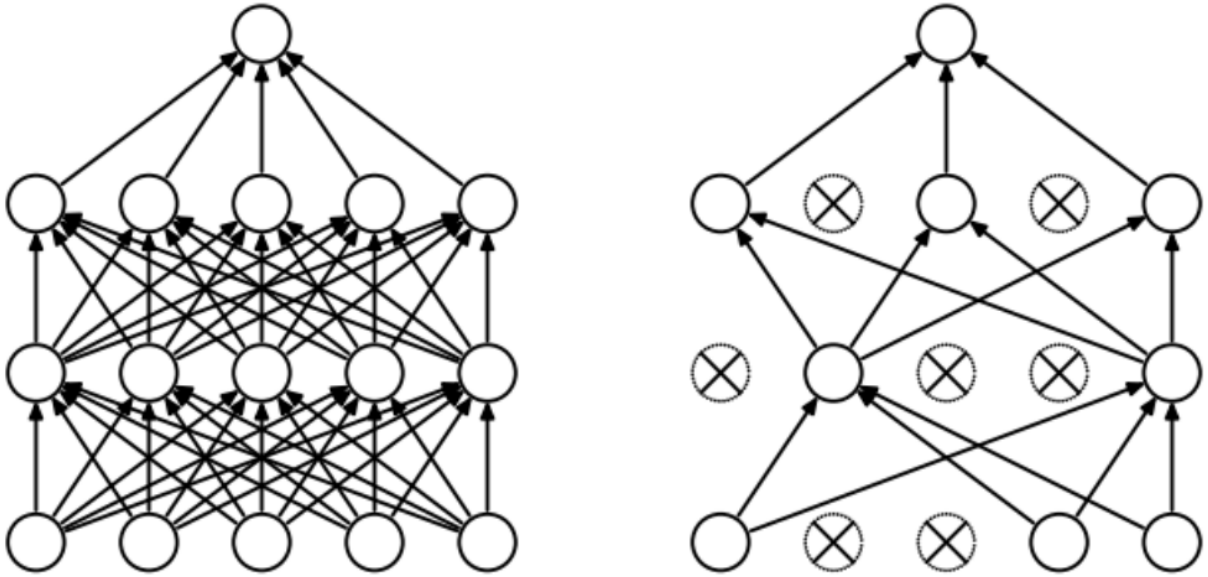






Dropout

- Learn different features
- Reduce nonlinearity



(a) Standard Neural Net

(b) After applying dropout.

Batch Normalization

Input: Values of x over a mini-batch: $\mathcal{B} = \{x_{1...m}\}$;
Parameters to be learned: γ, β

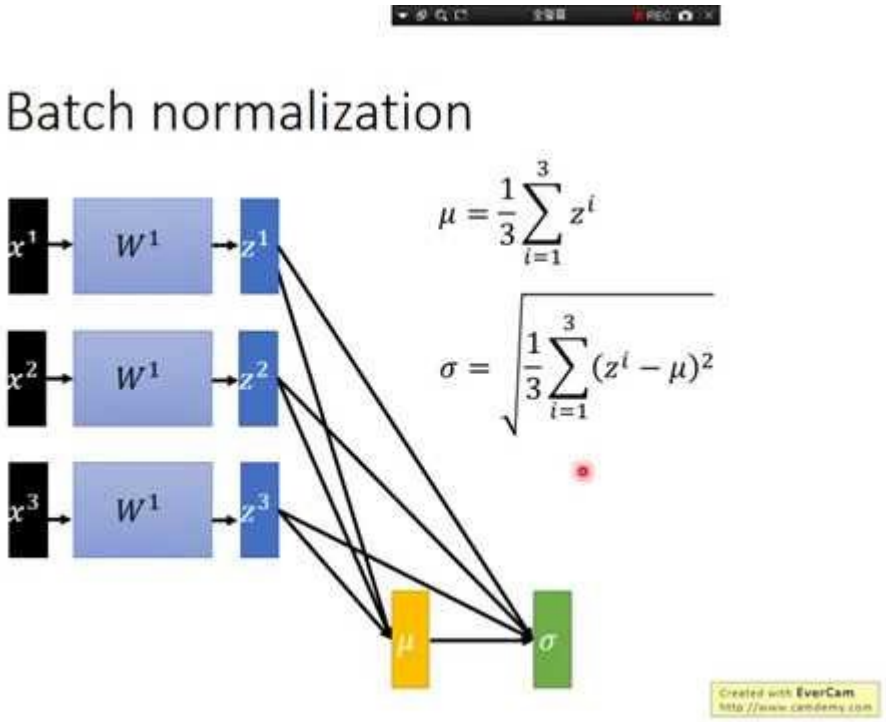
Output: $\{y_i = \mathrm{BN}_{\gamma,\beta}(x_i)\}$

$$\mu_{\mathcal{B}} \leftarrow \frac{1}{m}\sum_{i=1}^{m} x_i \qquad \text{// mini-batch mean}$$

$$\sigma^2_{\mathcal{B}} \leftarrow \frac{1}{m}\sum_{i=1}^{m}(x_i - \mu_{\mathcal{B}})^2 \qquad \text{// mini-batch variance}$$

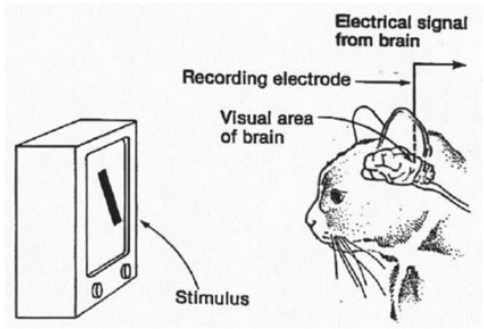
$$\widehat{x}_i \leftarrow \frac{x_i - \mu_{\mathcal{B}}}{\sqrt{\sigma^2_{\mathcal{B}} + \epsilon}} \qquad \text{// normalize}$$

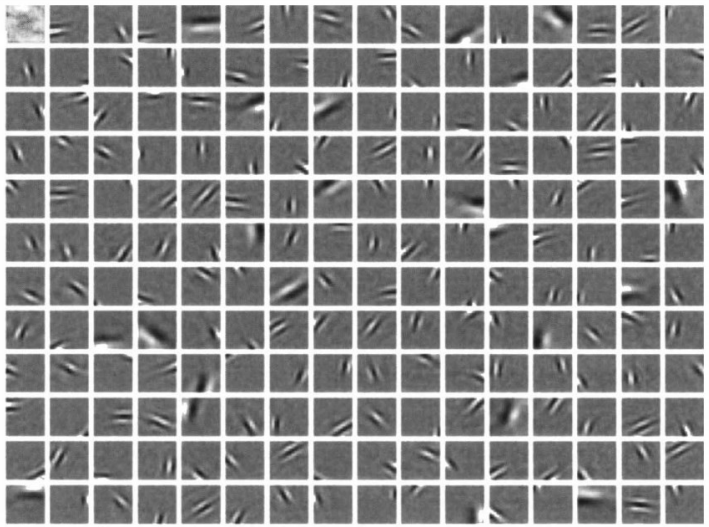
$$y_i \leftarrow \gamma\widehat{x}_i + \beta \equiv \mathrm{BN}_{\gamma,\beta}(x_i) \qquad \text{// scale and shift}$$

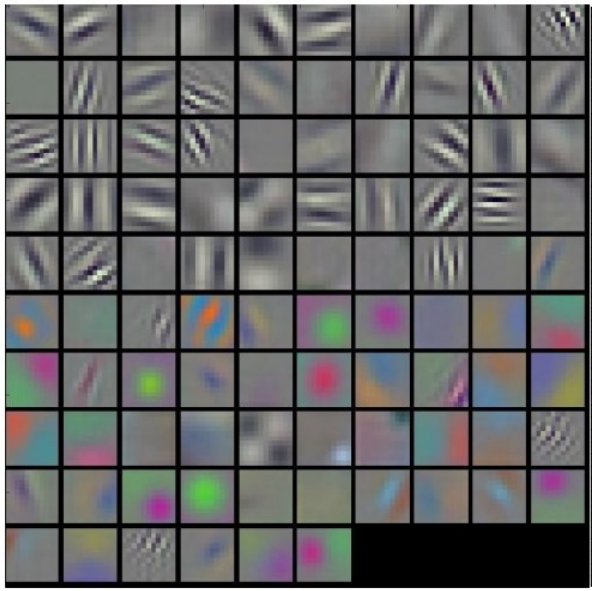


Convolutional Neural Networks

❖ What is the CNNs origin?



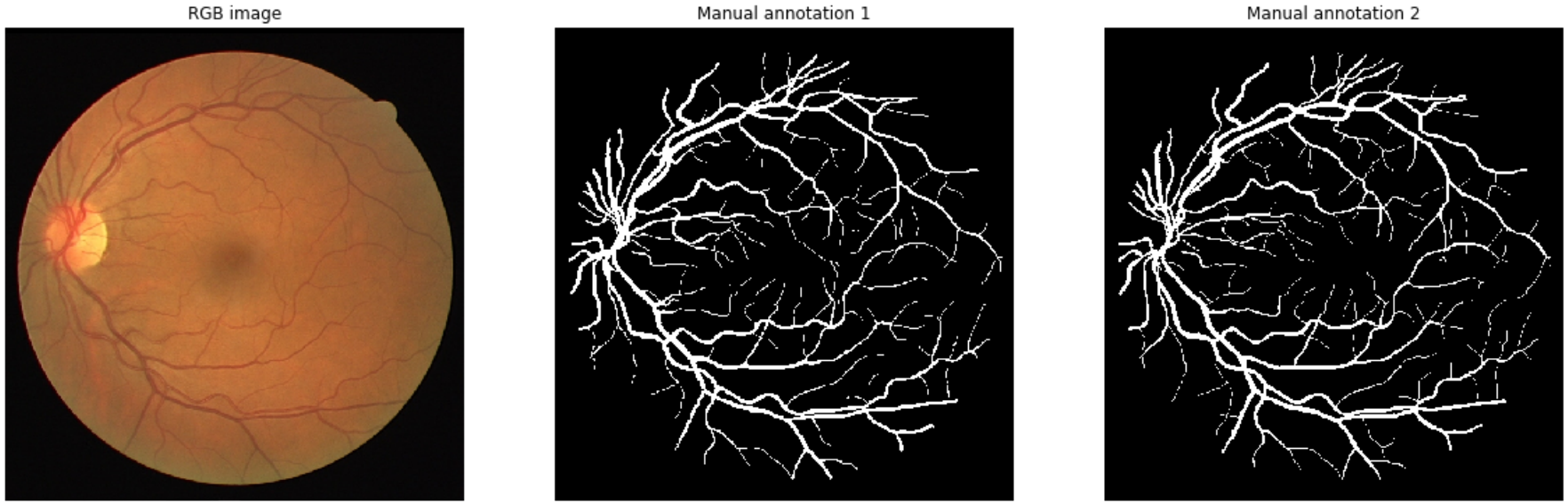




❖ https://towardsdatascience.com/a-comprehensive-guide-to-convolutional-neural-networks-the-eli5-way-3bd2b1164a53

Segmentation (DRIVE Dataset)

❖ https://drive.grand-challenge.org/



Any Question?

- Contact me!!

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اولین کنگره بین المللی

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