



Deep Neural Nets

DataBite Summer 2021

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oudatalab.com



The University of Oklahoma

DataBite Summer 2021 Schedule

Day 1

Welcome

Day 2

Introduction to
Python

Day 3

Introduction to
Probability

Day 4

Model Olympics

Day 5

Socratic Seminar

Day 6

Bias and Fairness

Day 7

Natural Language
Processing

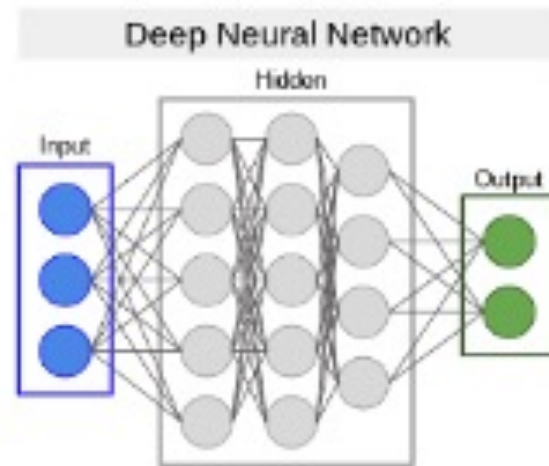
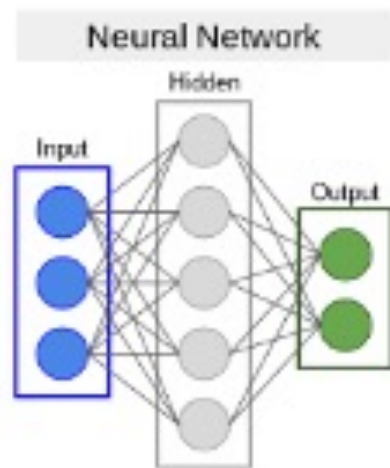
Day 8

Deep Learning

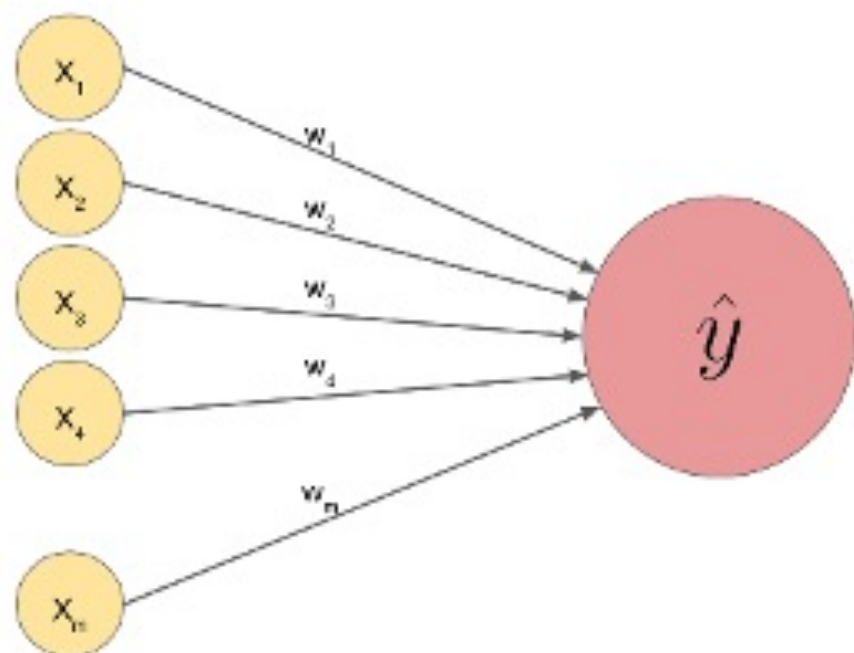




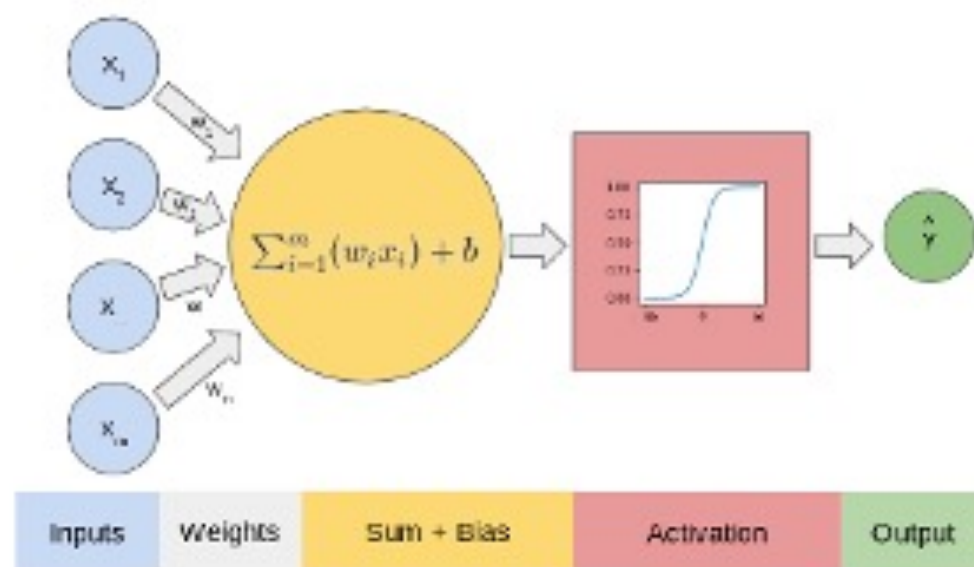
Artificial Neural Networks (ANN)



Perceptron



Perceptron



Perceptron Example

Features

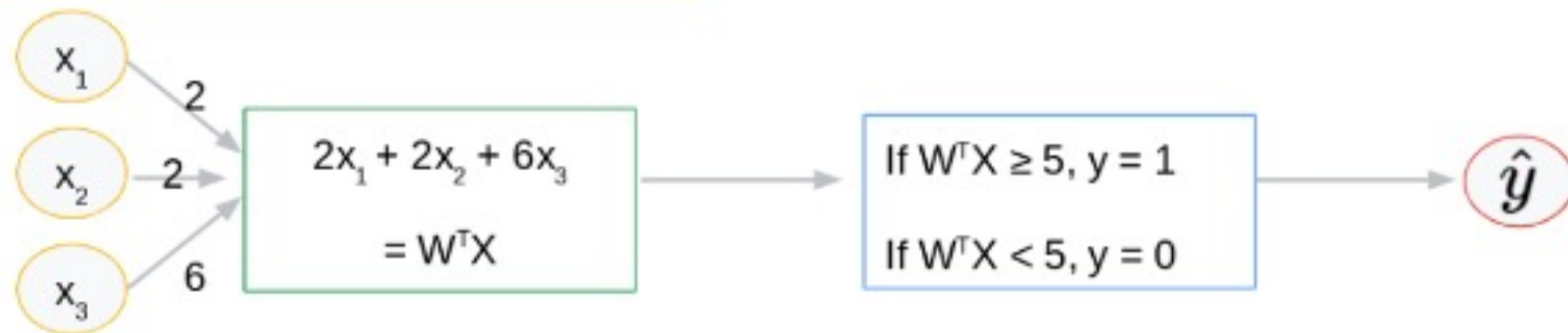
- x_1 - Will the person make more money?
- x_2 - Do they like programming and math?
- x_3 - Do they have a project that would benefit from ML?

Target

y - Will someone study machine learning?
(yes = 1, no = 0)

Weights and Bias

$$\begin{aligned}w_1 &= 2 \\w_2 &= 2 \\w_3 &= 6 \\b &= 5\end{aligned}$$



Sample 1 ($y=1$)

$$x_1 = 0 \quad x_2 = 0 \quad x_3 = 1$$

$$W^T X = 2*0 + 2*0 + 6*1 = 6 > 5$$

$$\hat{y} = 1$$

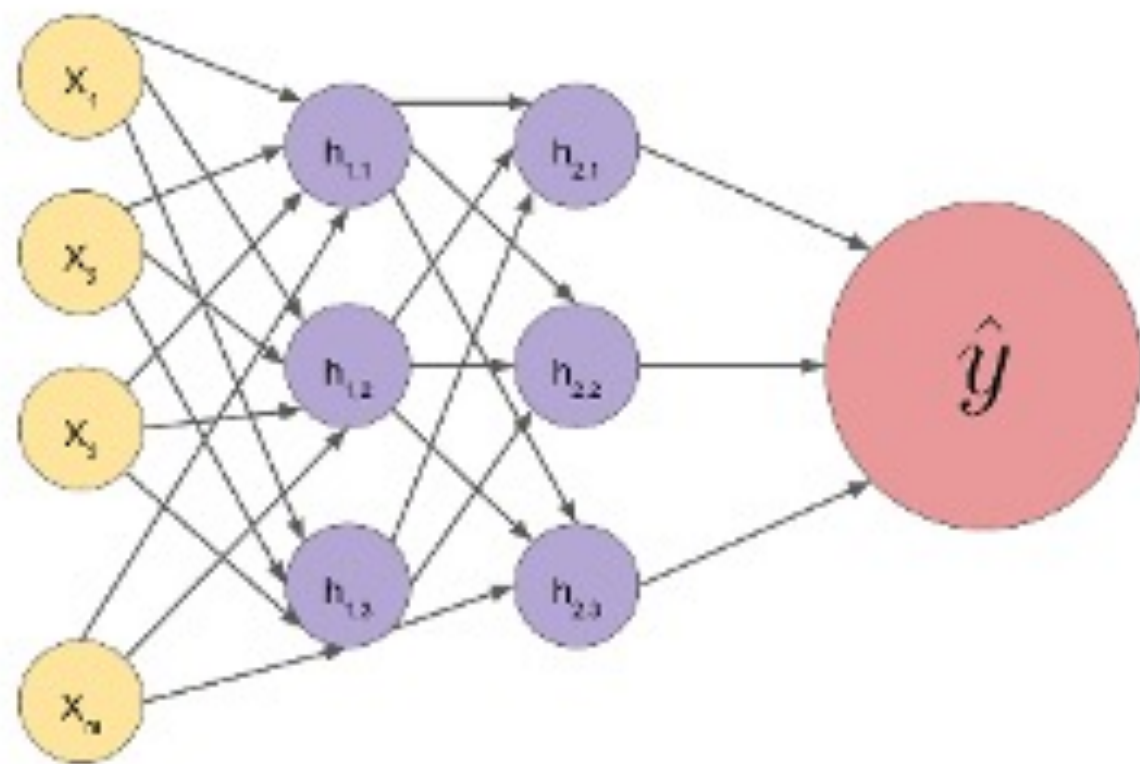
Sample 2 ($y = 1$)

$$x_1 = 1 \quad x_2 = 1 \quad x_3 = 0$$

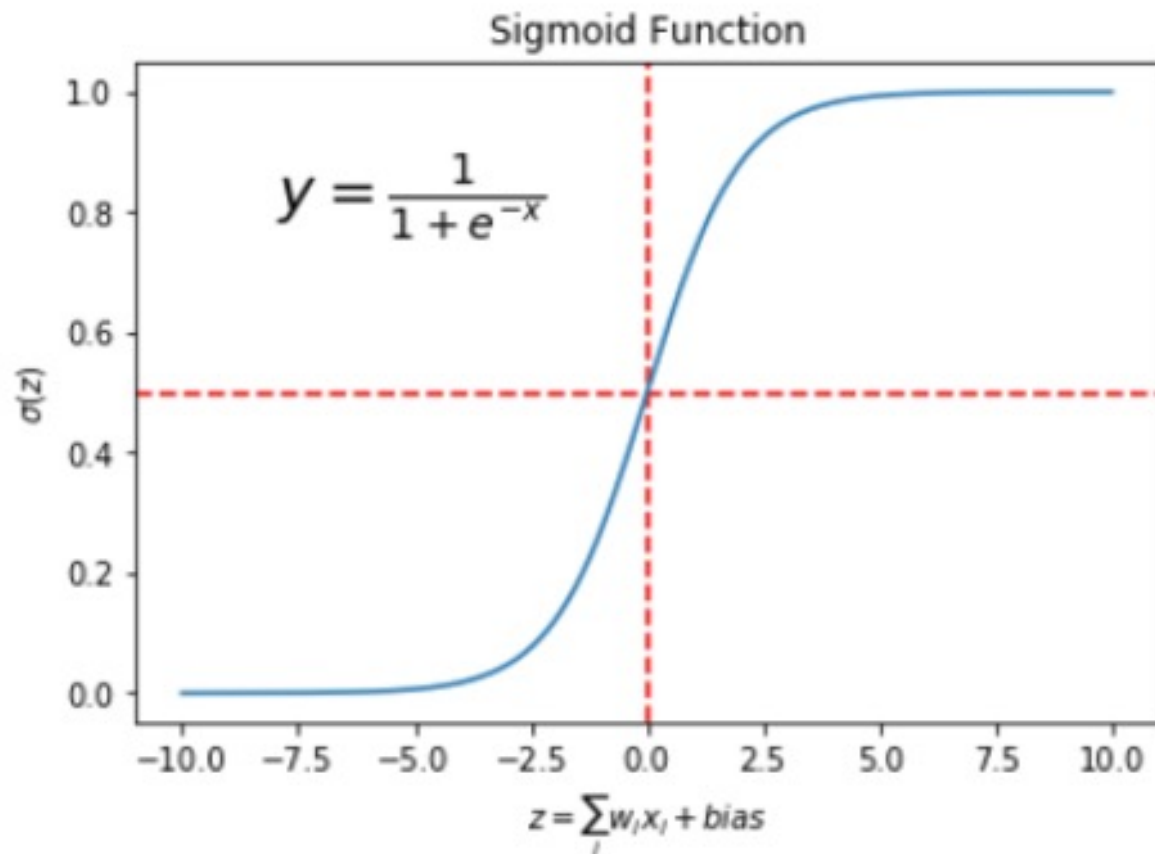
$$W^T X = 2*1 + 2*1 + 6*0 = 4 < 5$$

$$\hat{y} = 0$$

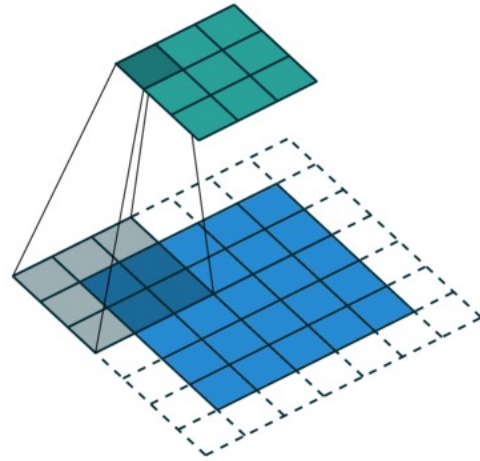
Networks With Hidden Layers

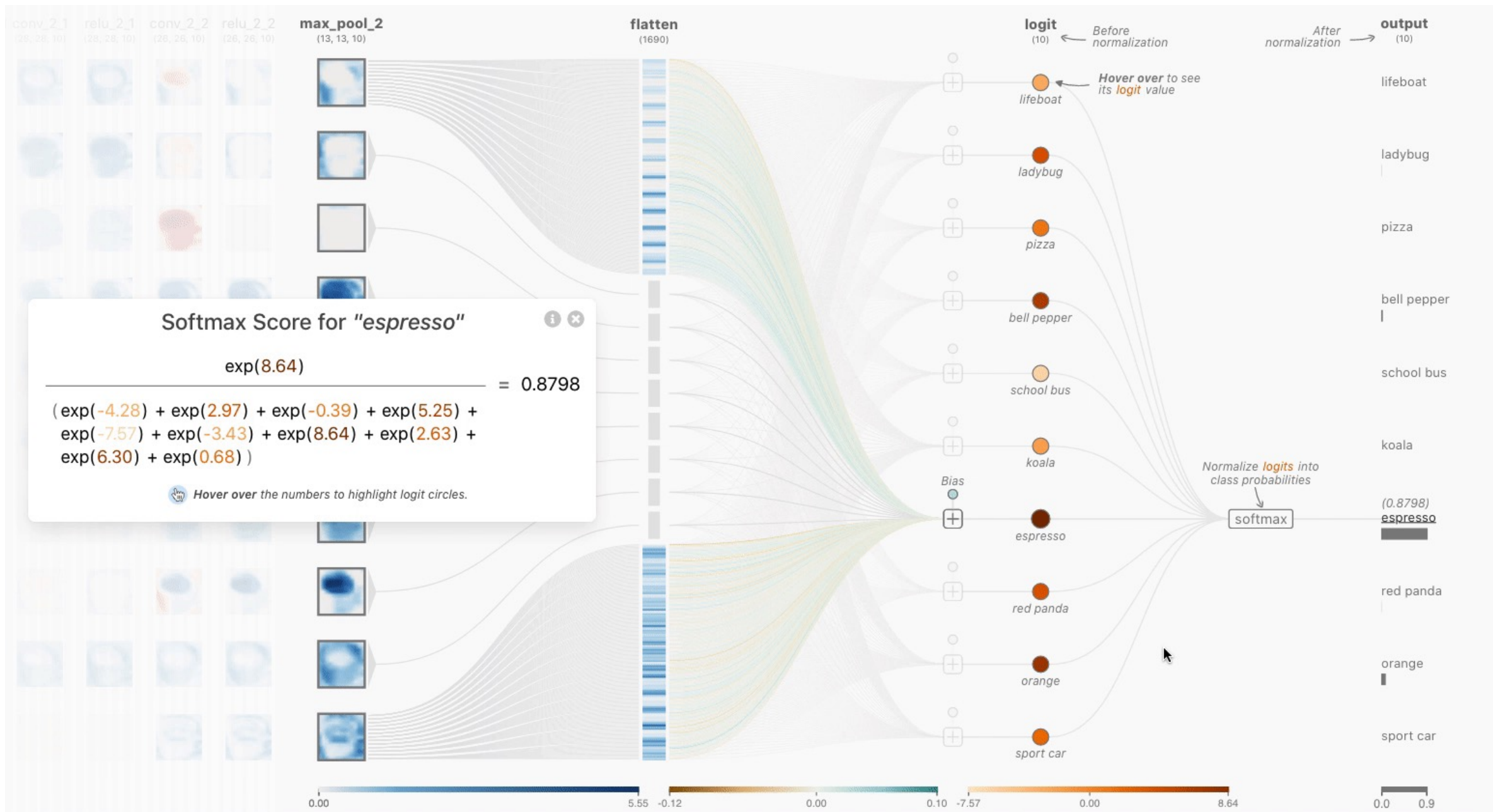


Sigmoid



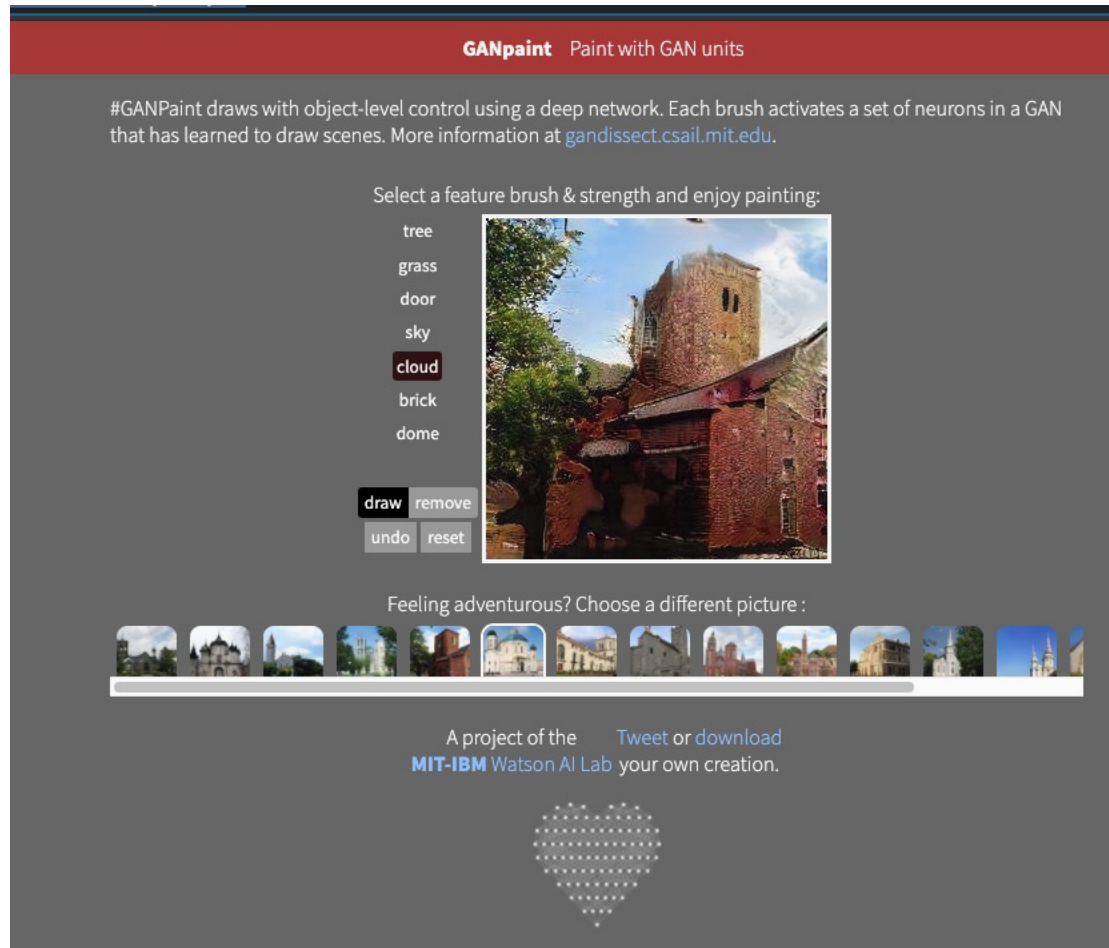
Convolutional Neural Network (CNN)





GAN Demo

- <http://gandissect.res.ibm.com/ganpaint.html>



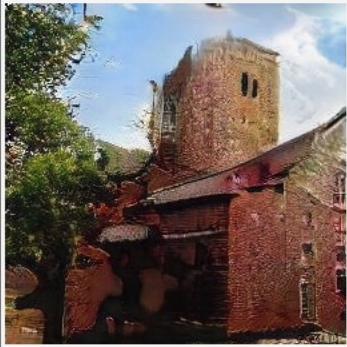
GANpaint Paint with GAN units

#GANPaint draws with object-level control using a deep network. Each brush activates a set of neurons in a GAN that has learned to draw scenes. More information at gandissect.csail.mit.edu.


Select a feature brush & strength and enjoy painting:

- tree
- grass
- door
- sky
- cloud
- brick
- dome

draw remove
undo reset



Feeling adventurous? Choose a different picture :



A project of the [MIT-IBM Watson AI Lab](#) [Tweet or download](#) your own creation.

