1- Introduction to Neural Networks

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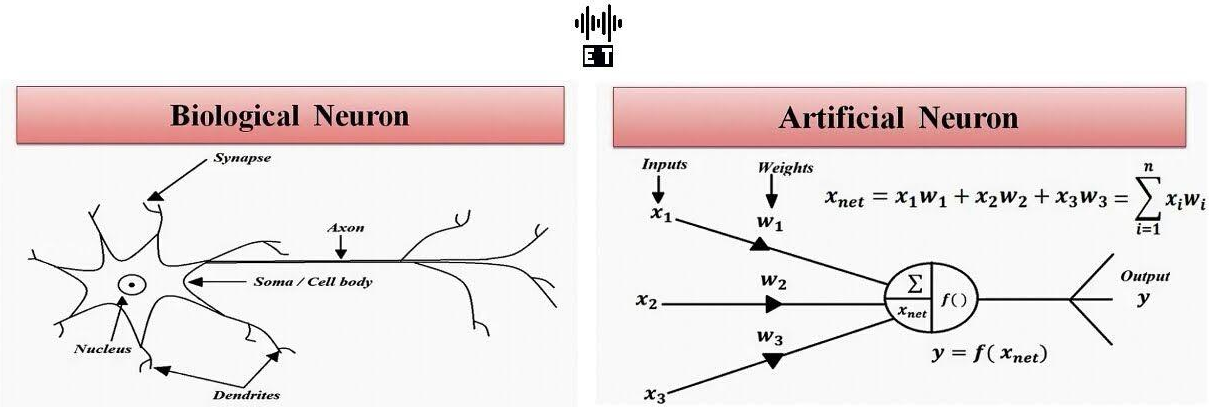
From Human Brain to Neural Networks:

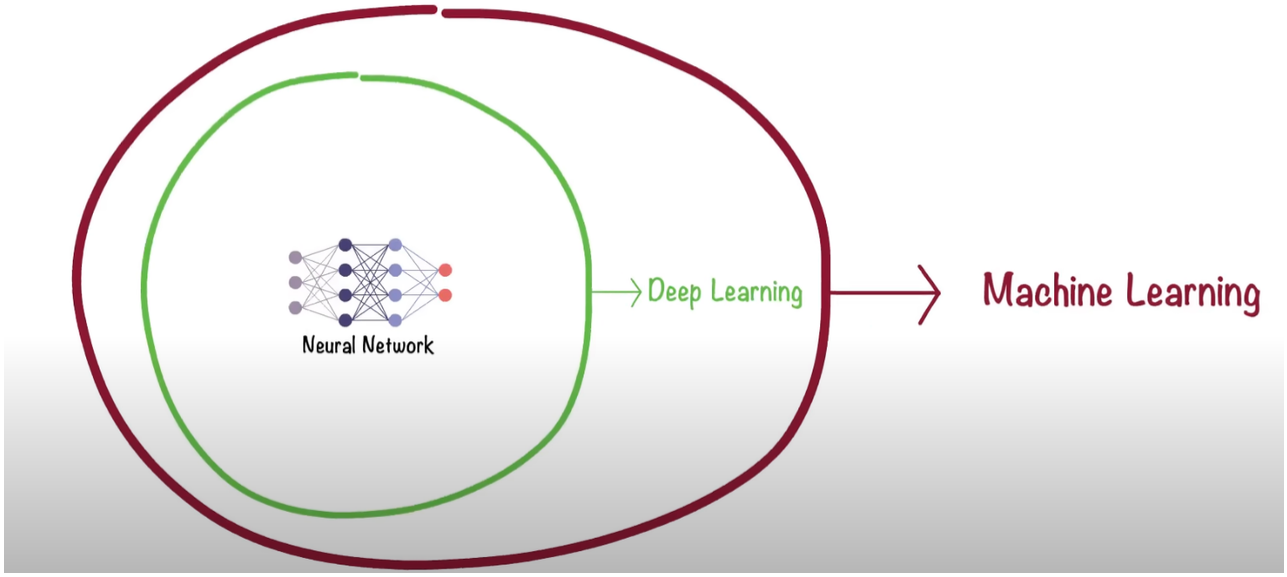
https://youtu.be/UuCTfDvdeoU

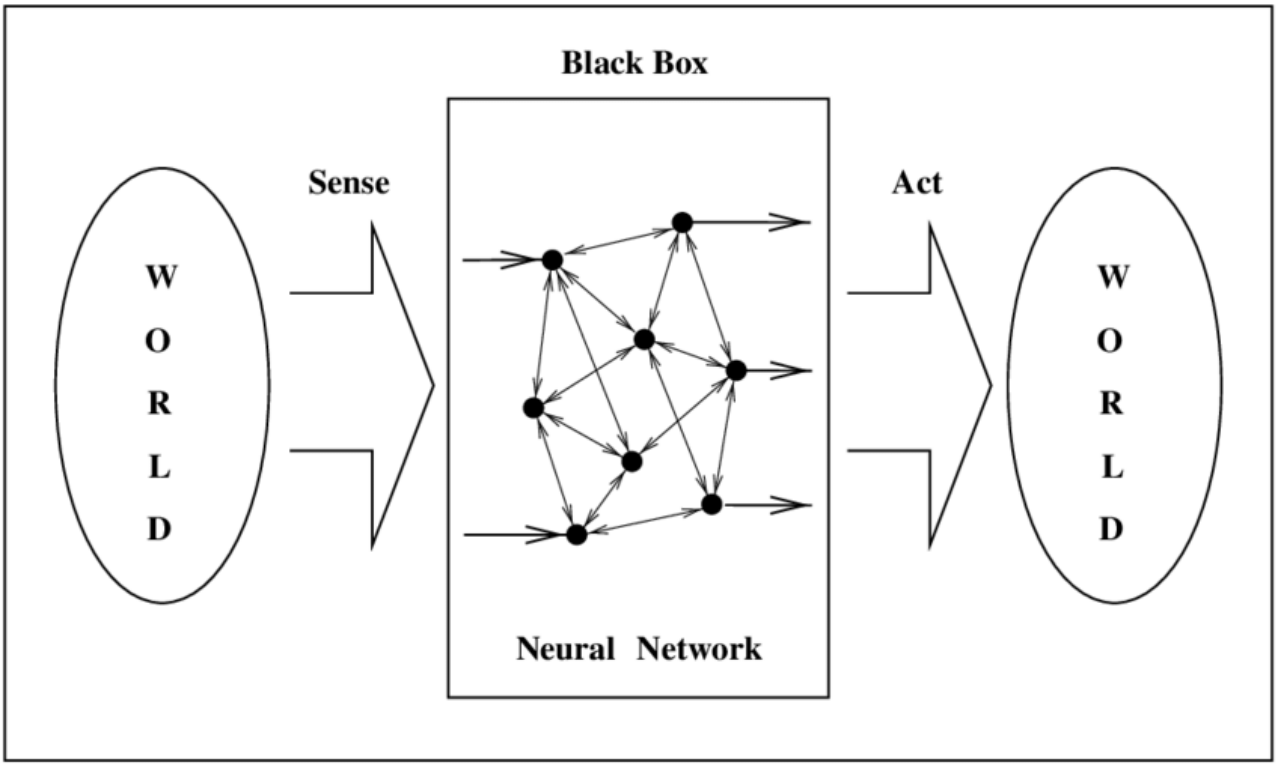


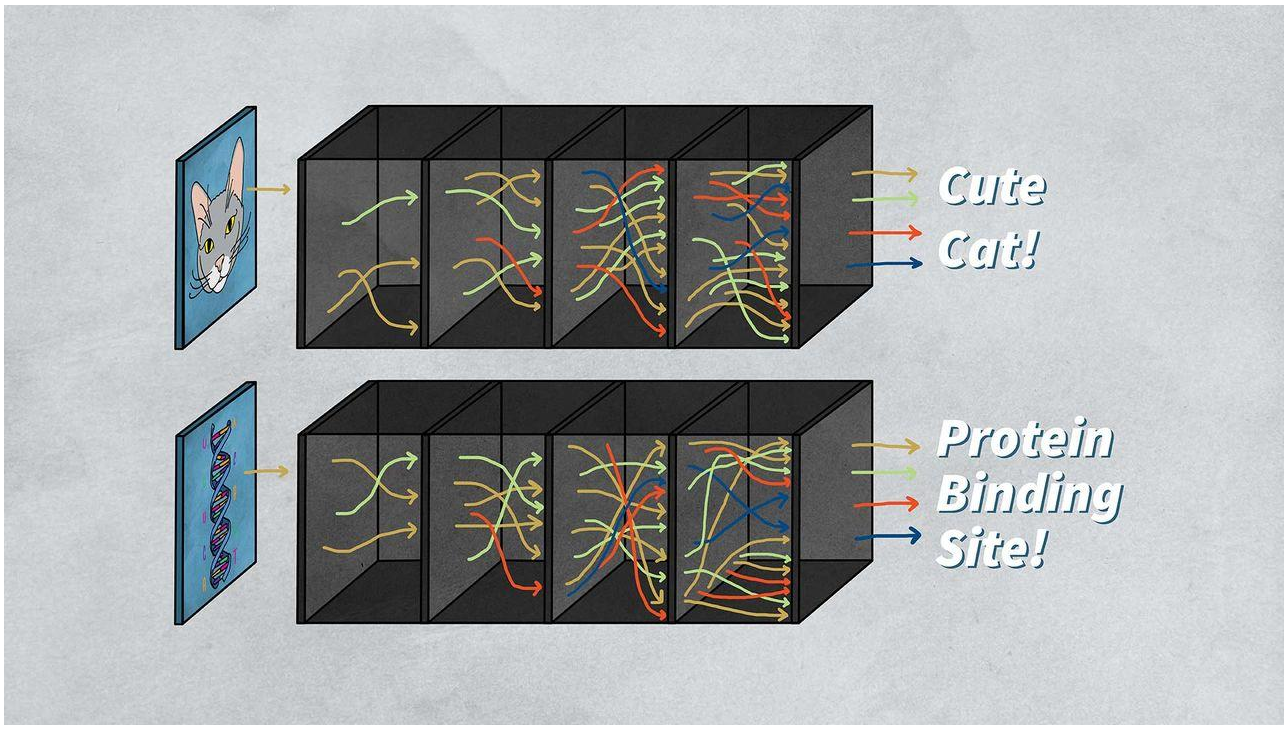
Biological vs Artificial Neural Networks : A Comparison

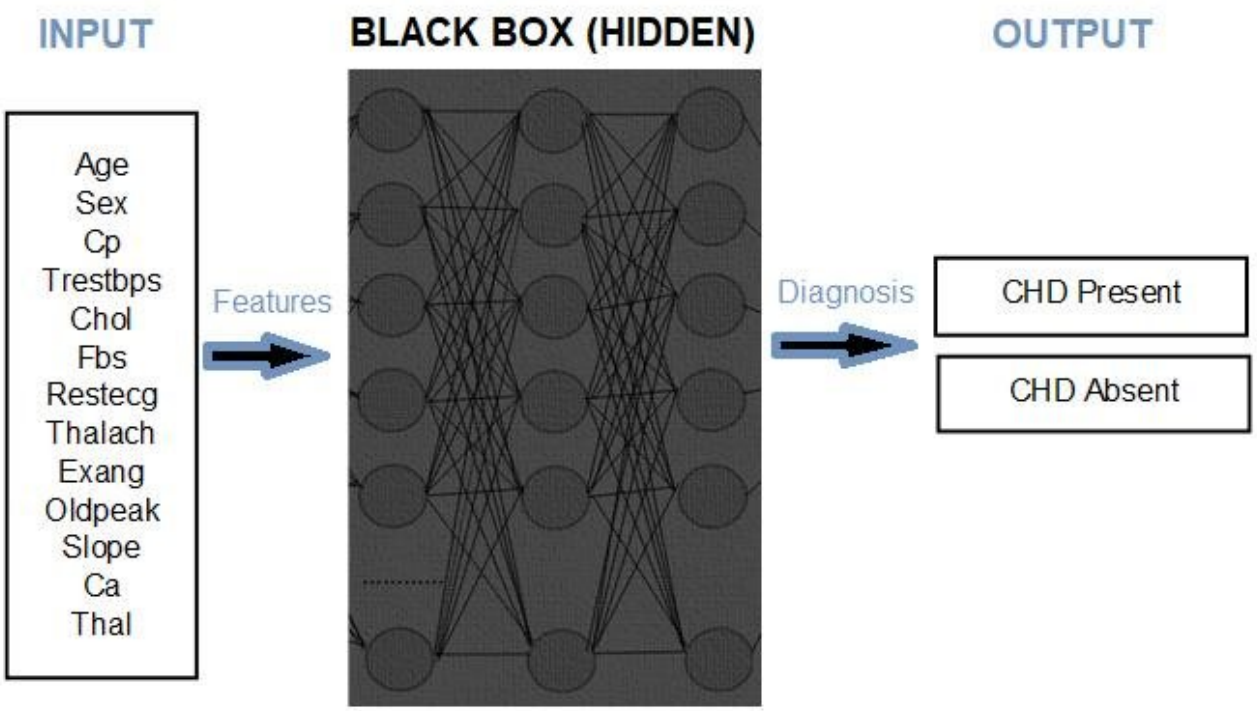
Neural Networks

What is Neural Networks:



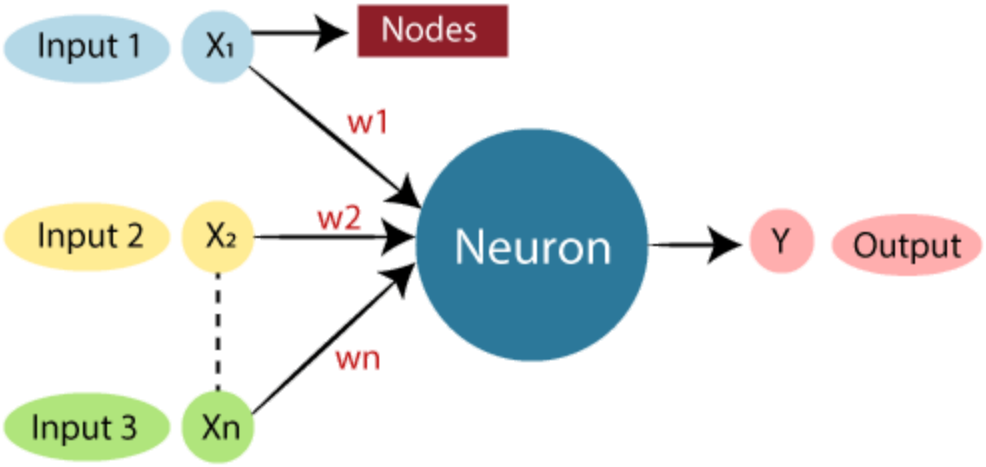



Cute
Cat!
Protein
Binding
Site!


INPUT
BLACK BOX (HIDDEN)
OUTPUT
Age
Sex
Cp
Trestbps
Chol
Fbs
Restecg
Thalach
Exang
Oldpeak
Slope
Ca
Thal
Features
Diagnosis
CHD Present
CHD Absent

Basic Component of Neural Network:

- **What exist in the black box?**



Is it that Simple?

https://youtu.be/Yyx2k4od3qk

https://youtu.be/UiQyMSKez7k

How Neural Networks work?

https://youtu.be/vbeanwfm0Q4

https://youtu.be/rEDzUT3ymw4

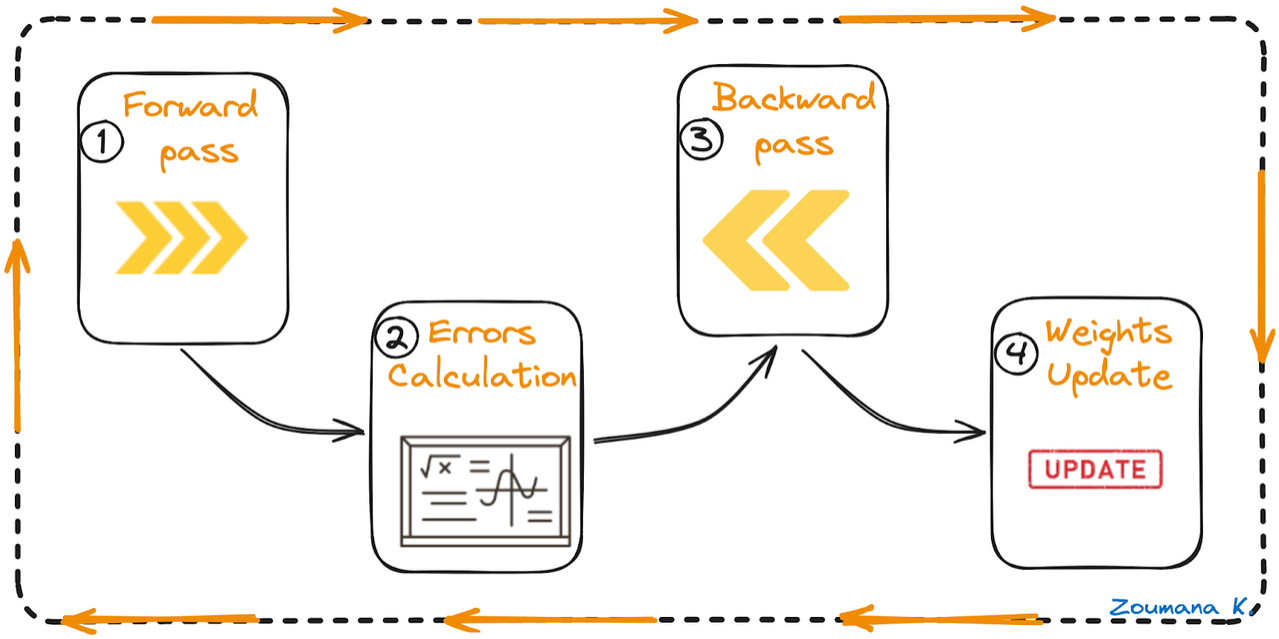
https://youtu.be/SRAFVJ5UbB0

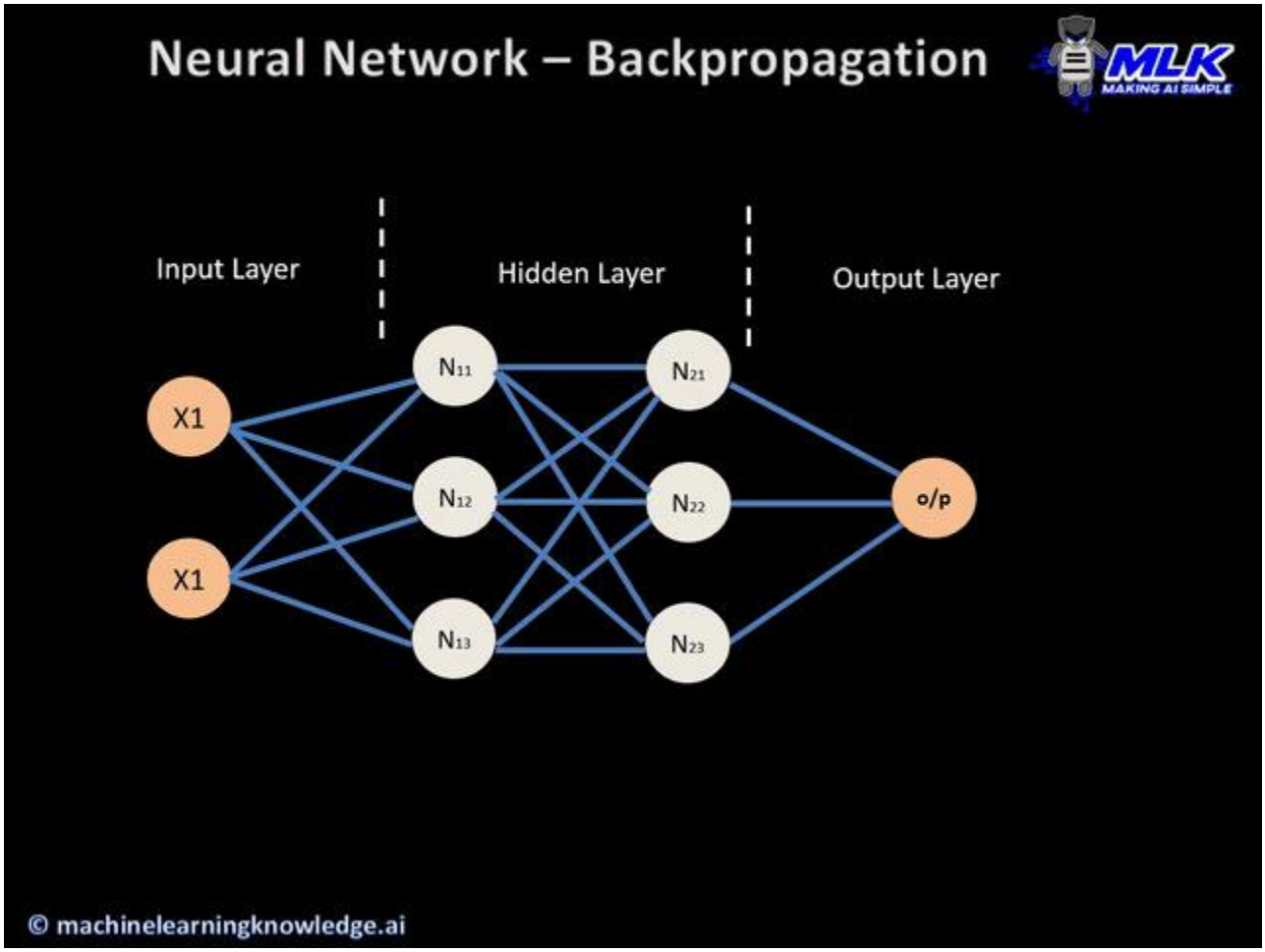
Math behind Basic Neural Network:

- https://jalammar.github.io/visual-interactive-guide-basics-neural-networks/
- https://jalammar.github.io/feedforward-neural-networks-visual-interactive/
- https://mlu-explain.github.io/neural-networks/

More in Feed-Forward propagate & Backpropagation:

https://youtu.be/sLsCN9ZL9RI


1 Forward pass
2 Errors Calculation
3 Backward pass
4 Weights Update
UPDATE
Zoumana K.


Neural Network – Backpropagation
MLK
MAKING AI SIMPLE
Input Layer
Hidden Layer
Output Layer
X1
X1
N11
N12
N13
N21
N22
N23
o/p
© machinelearningknowledge.ai

- https://hmkcode.com/ai/backpropagation-step-by-step/
- https://mattmazur.com/2015/03/17/a-step-by-step-backpropagation-example/
- https://medium.com/datathings/neural-networks-and-backpropagation-explained-in-a-simple-way-f540a3611f5e
- https://youtu.be/_9qHQA30hys
- https://xnought.github.io/backprop-explainer/
- https://medium.datadriveninvestor.com/artificial-neural-network-nn-explained-in-5-minutes-with-animations-9a80f49ab190

Demo:

- Tensorflow demo

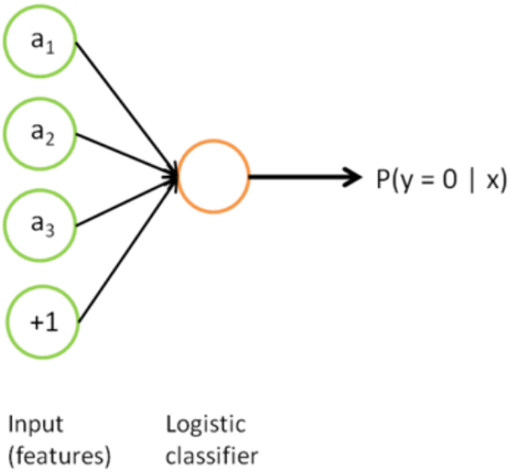
https://youtu.be/Tsvxx-GGITg

How it differs from logistic regression?

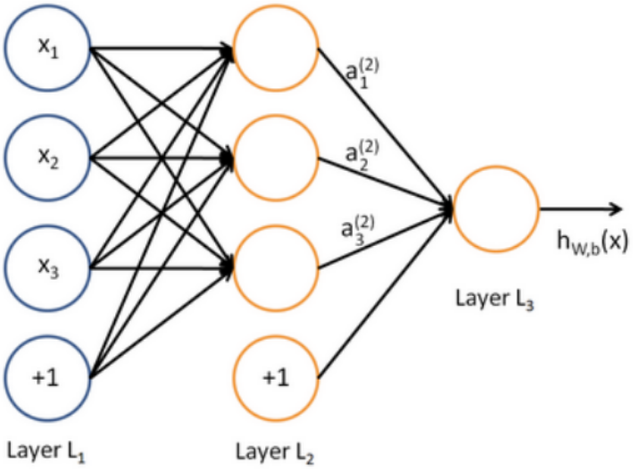
https://youtu.be/RkxThL4V2d4

Neural Network	Logistic Regression
It can be applied to both classification and regression problems.	It is appropriate for issues involving binary categorization.
Designed after the anatomy of the human brain	The results of linear regression are transformed using a logistic function.
It can recognize patterns in data and	It can only simulate linear decision

capture non-linear relationships.	boundaries.
It takes substantially more memory and processing power.	It uses less processing power and memory.
Implementation and training might be difficult.	Simple to use and train
It can need regularization and be prone to overfitting.	It may not need regularization and is less prone to overfitting.



Logistic Regression



Neural Network

4. Feed-Forward propagate & Backpropagation

a. https://medium.com/datathings/neural-networks-and-backpropagation-explained-in-a-simple-way-f540a3611f5e
b. https://mattmazur.com/2015/03/17/a-step-by-step-backpropagation-example/
c. https://medium.datadriveninvestor.com/artificial-neural-network-nn-explained-in-5-minutes-with-animations-9a80f49ab190

d. https://hmkcode.com/ai/backpropagation-step-by-step/
e. https://www.youtube.com/watch?v=S5AGN9XfPK4
f. https://www.youtube.com/watch?v=gyW5gQnsm3w
g. https://www.datacamp.com/tutorial/mastering-backpropagation
h. https://xnought.github.io/backprop-explainer/

Neural Network Architectures

- It depends on input type, output type , problem type

https://www.v7labs.com/blog/neural-network-architectures-guide#:~:text=model%20was%20built.-,Standard%20Neural%20Networks,-The%20Perceptron


The Essential Guide to Neural Network Architectures • www.v7labs.com

- Most interesting one is Transformers

https://youtu.be/Ls1dJqZtl7w

Resources:

- https://medium.com/@esraa.sabry.mohamed
- https://www.bouvet.no/bouvet-deler/explaining-recurrent-neural-networks
- https://medium.com/swlh/a-gentle-introduction-to-backpropagation-and-implementing-neural-network-animation-f6b6da9d46d5
- https://www.youtube.com/watch?v=Ilg3gGewQ5U
- https://www.analyticsvidhya.com/blog/2021/05/beginners-guide-to-artificial-neural-network/
- https://youtu.be/jmmW0F0biz0?feature=shared
- https://youtu.be/bfmFfD2RIcg?feature=shared

- https://towardsdatascience.com/nothing-but-numpy-understanding-creating-binary-classification-neural-networks-with-e746423c8d5c
- https://youtu.be/CqOfi41LfDw?feature=shared
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