Unione europea
Fondo sociale europeo

Regione Emilia-Romagna

ER Educazione Ricerca Emilia-Romagna

DATA LAB

GUARDA AVANTI

Big Data, nuove competenze
per nuove professioni.

FORM INDUSTRIA EMILIA ROMAGNA

ifoa Sapere utile

CEFORM

REISS ROMOLI la passione della conoscenza

UNIMORE Università degli Studi di Modena e Reggio Emilia

Alma Mater Studiorum Università di Bologna

Università degli Studi di Ferrara

UNIVERSITÀ DI PARMA

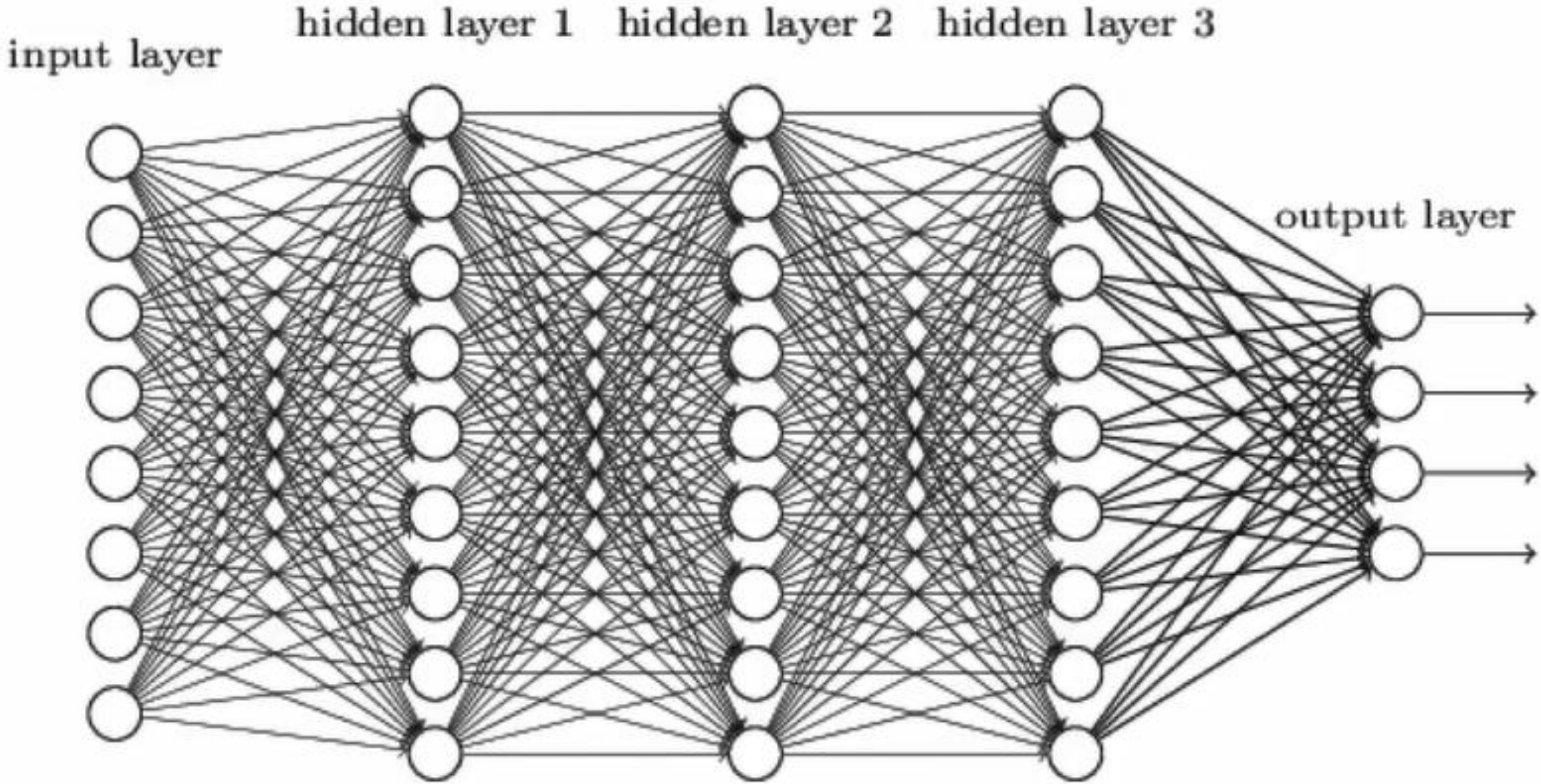
POLITECNICO MILANO 1863 Polo Territoriale di Piacenza

UNIVERSITÀ CATTOLICA del Sacro Cuore

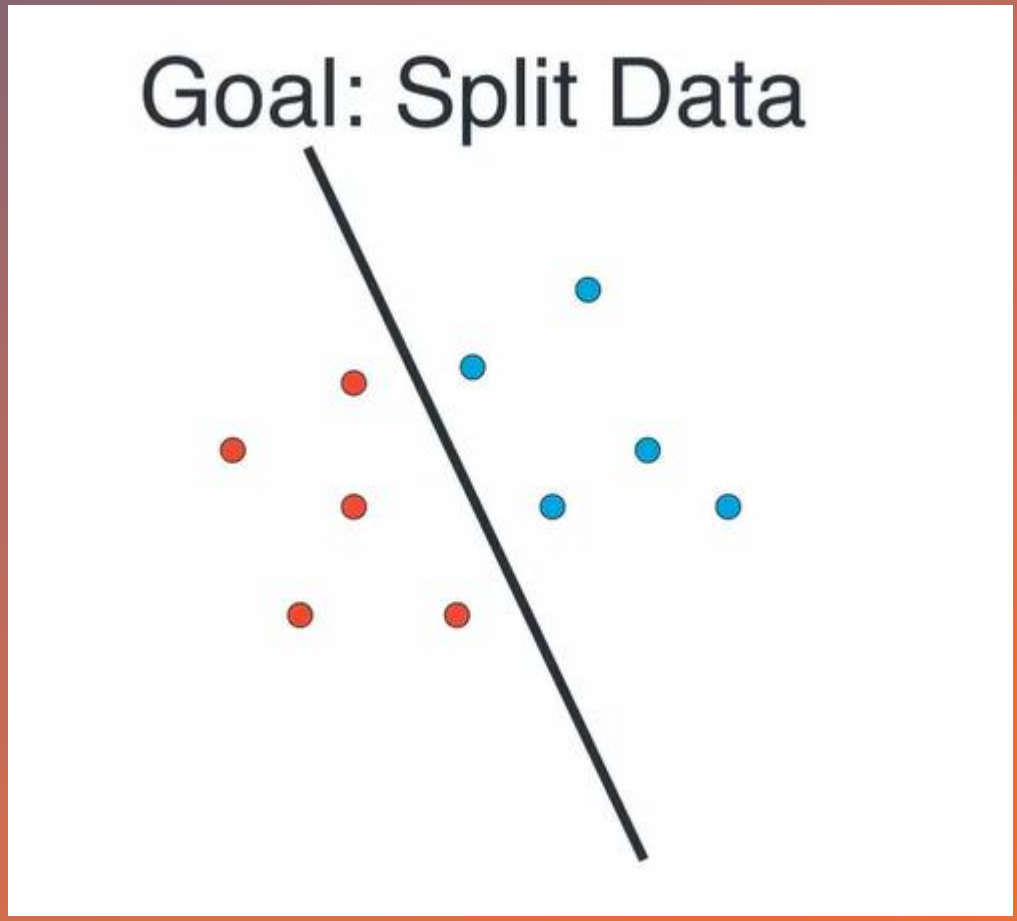
"Anticipare la crescita con le nuove competenze sui Big Data - Edizione 3" Operazione Rif. PA 2021-16029/RER approvata con DGR n° 927 del 21 giugno 2021 e co-finanziata dal Fondo Sociale Europeo PO 2014-2020 Regione Emilia-Romagna

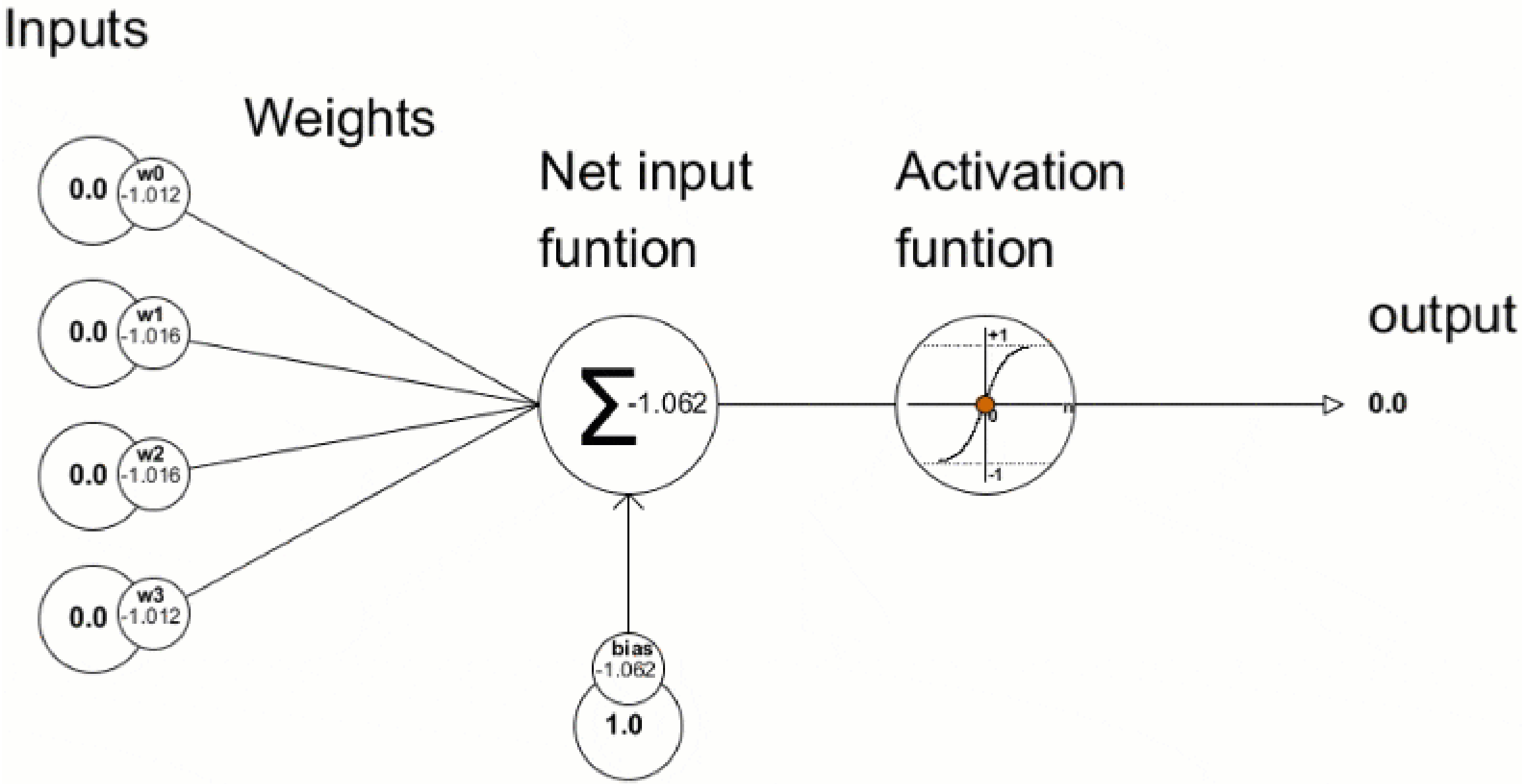
Deep Learning

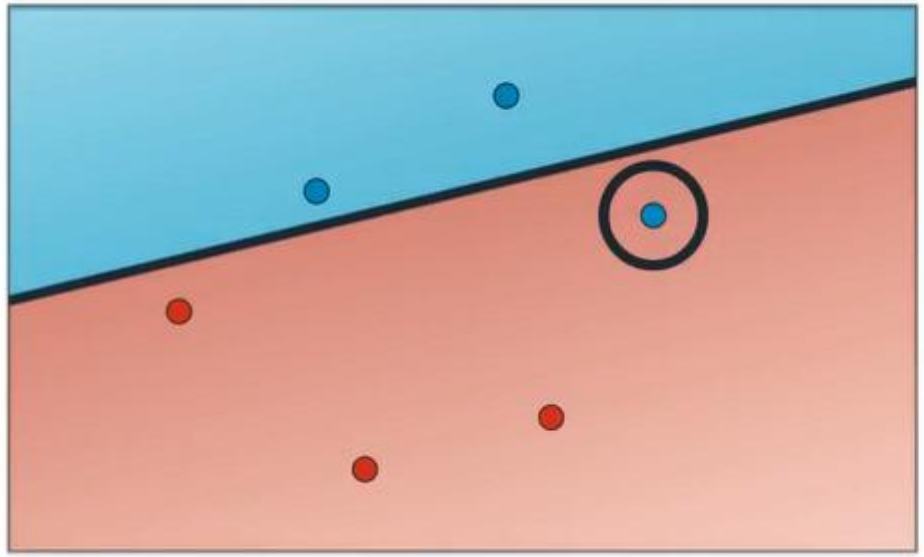
Neural Networks



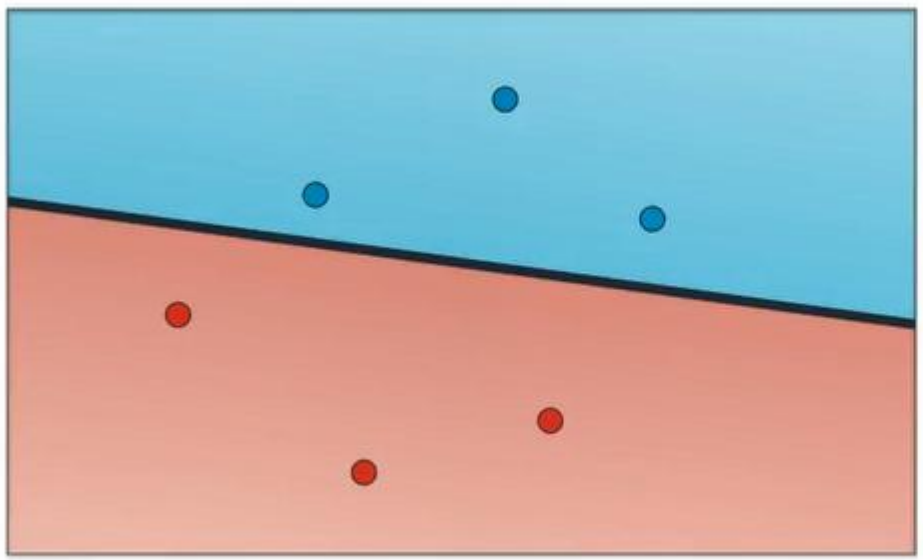
WHAT NEURAL NETWORK DO ?




Inputs
Weights
Net input
funtion
Activation
funtion
output
0.0
w0
-1.012
0.0
w1
-1.016
0.0
w2
-1.016
0.0
w3
-1.012
-1.062
bias
-1.062
1.0
+1
0
-1
0.0



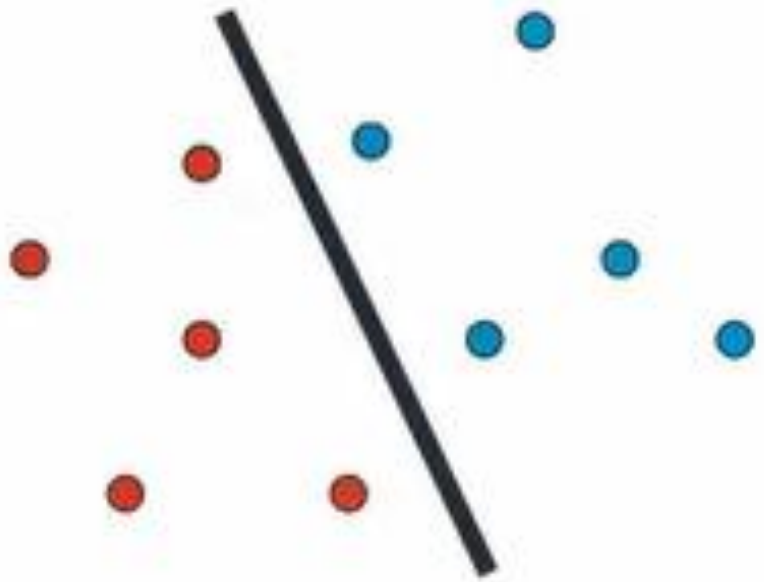
2 errors



0 errors

Hot!

GRADIENT DESCENT CAN BE APPLIED TO CONTINUOUS FUNCTION...

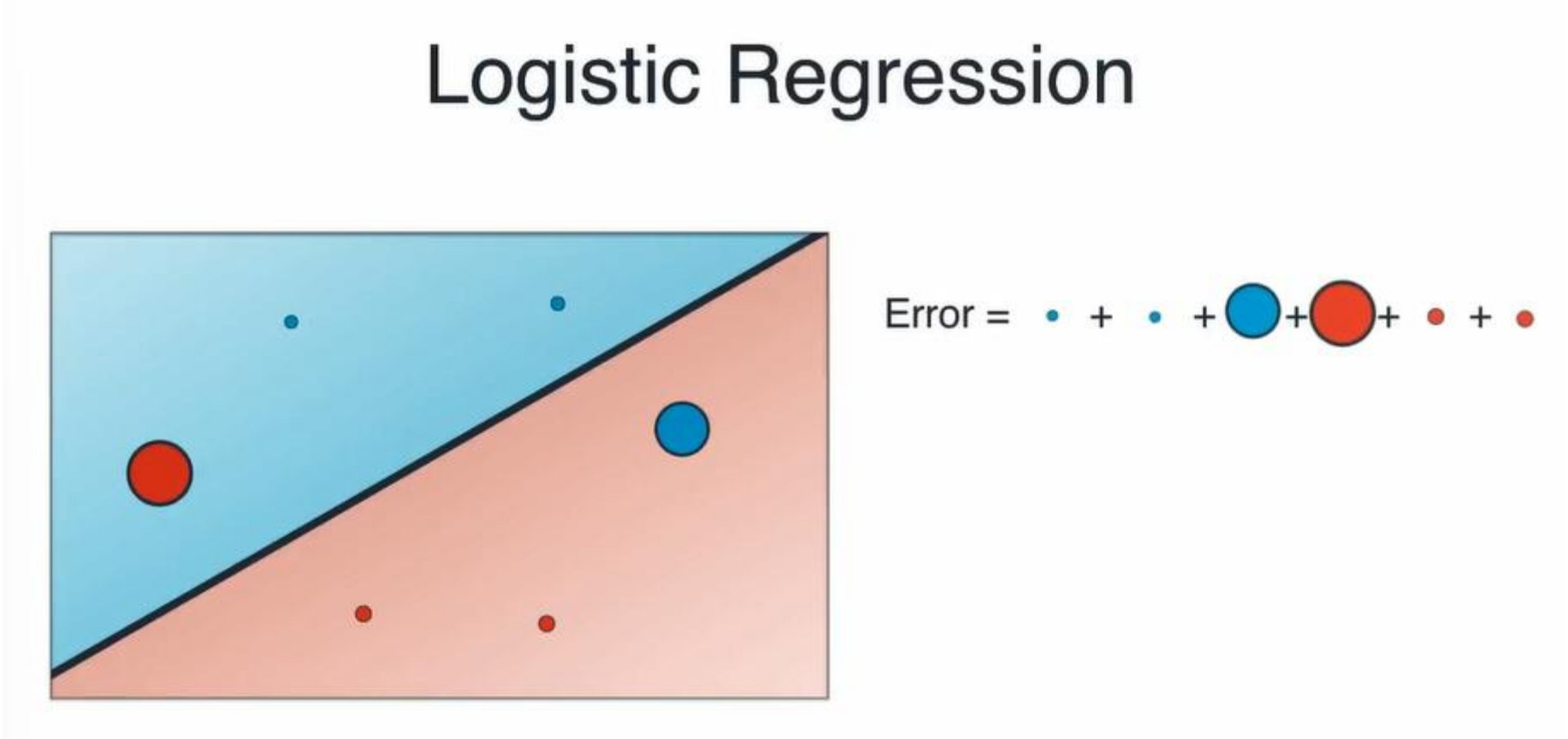


Split data

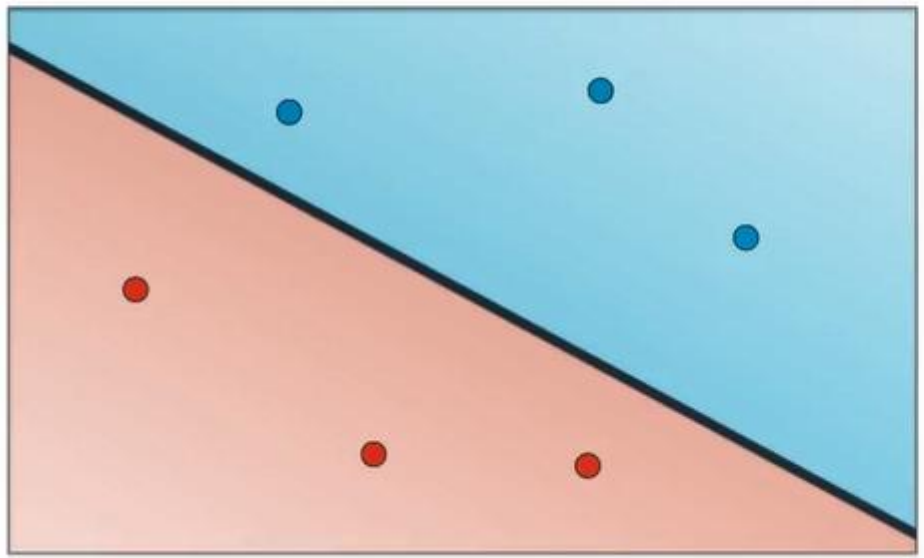
Number of errors

discrete function

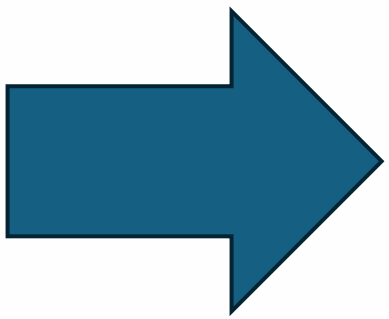
SO WE CREATE AN ERROR FUNCTION, TO PUT ALL ERRORS TOGETHER



Logistic Regression

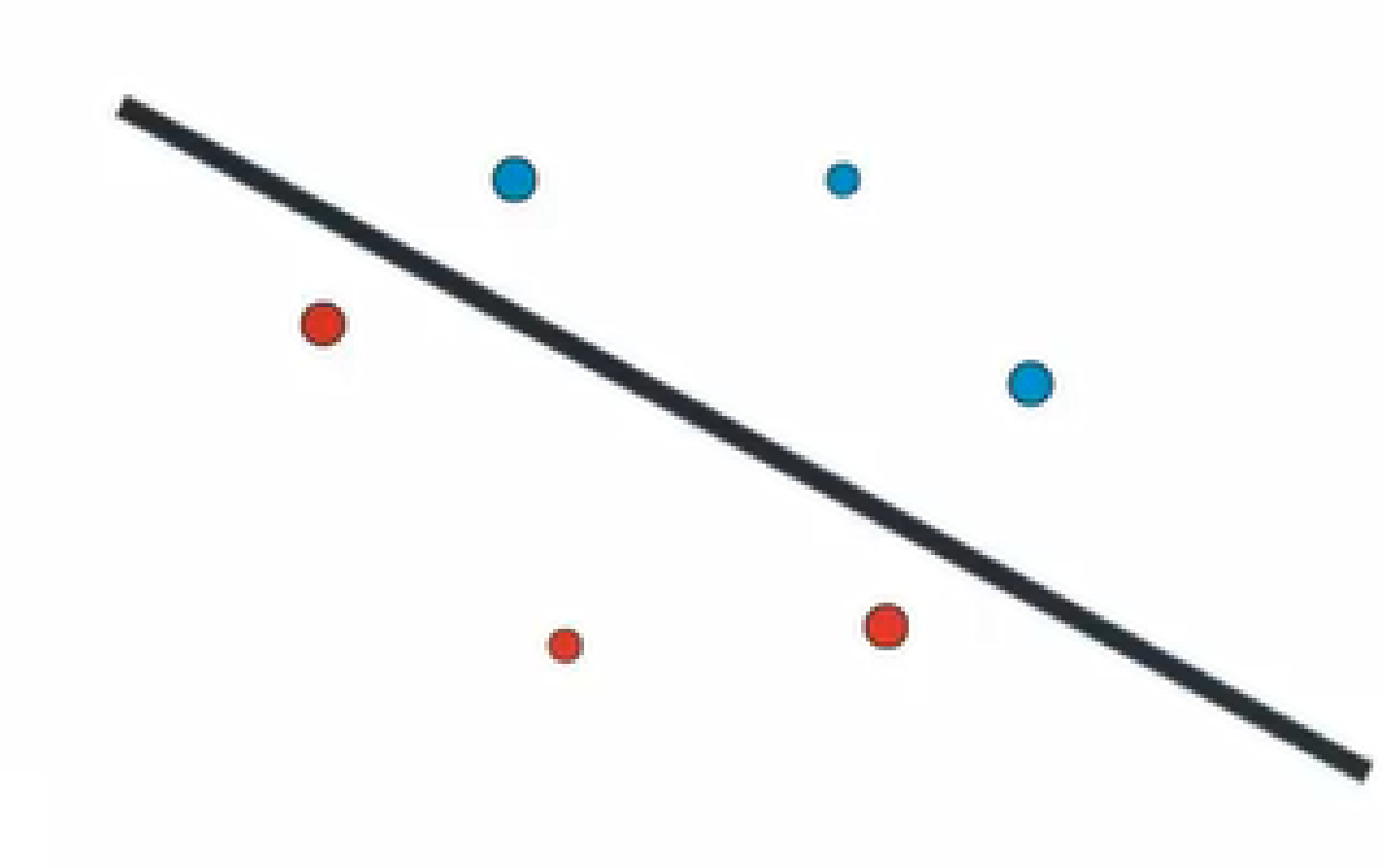


Minimize error

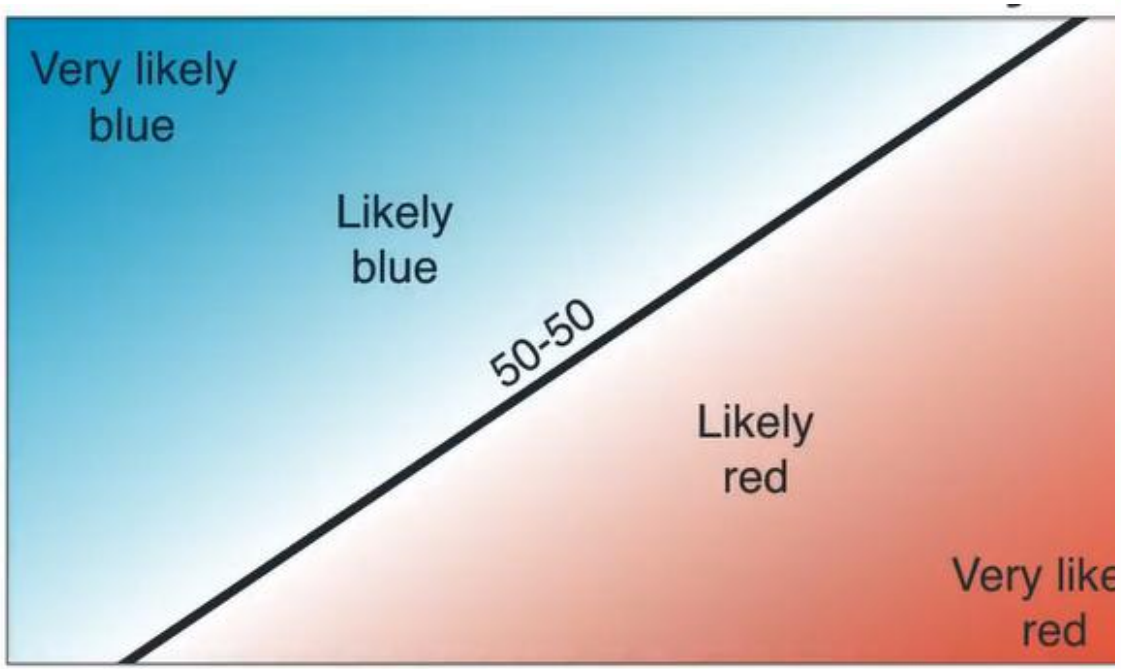


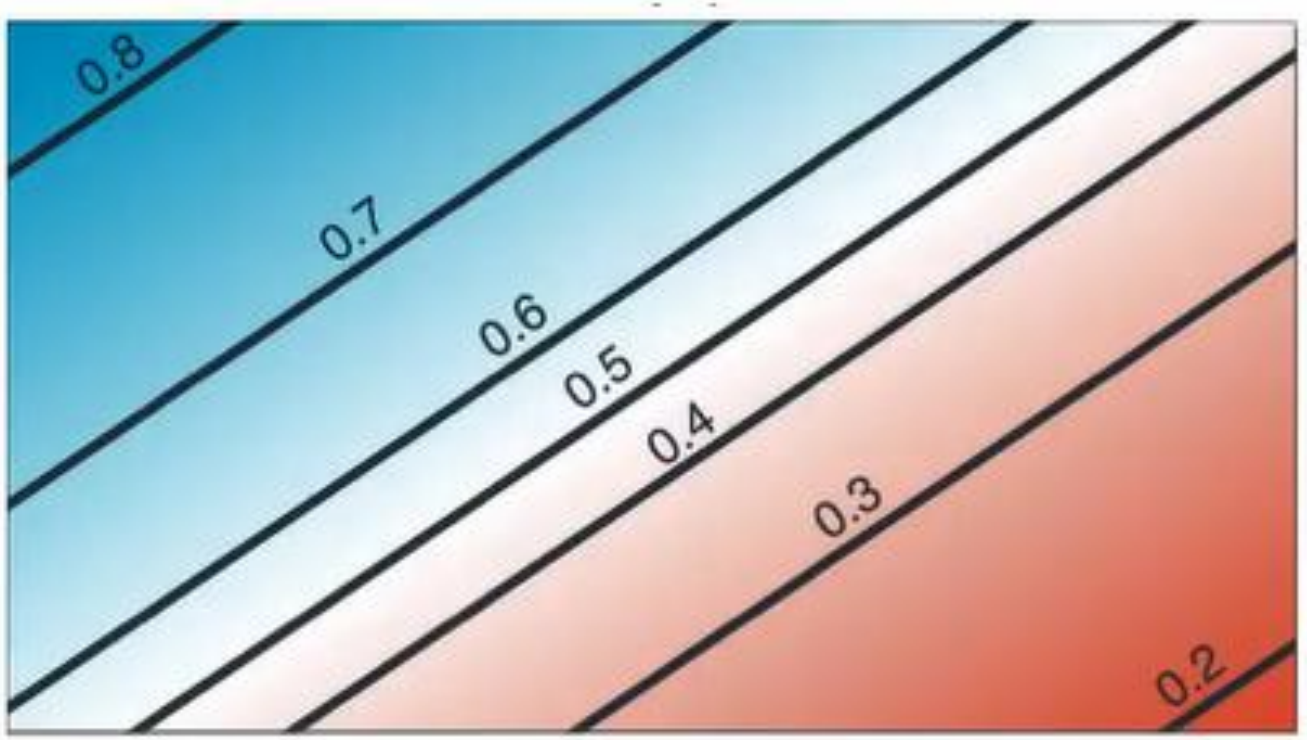
GRADIENT DESCENT

GRADIENT DESCENT

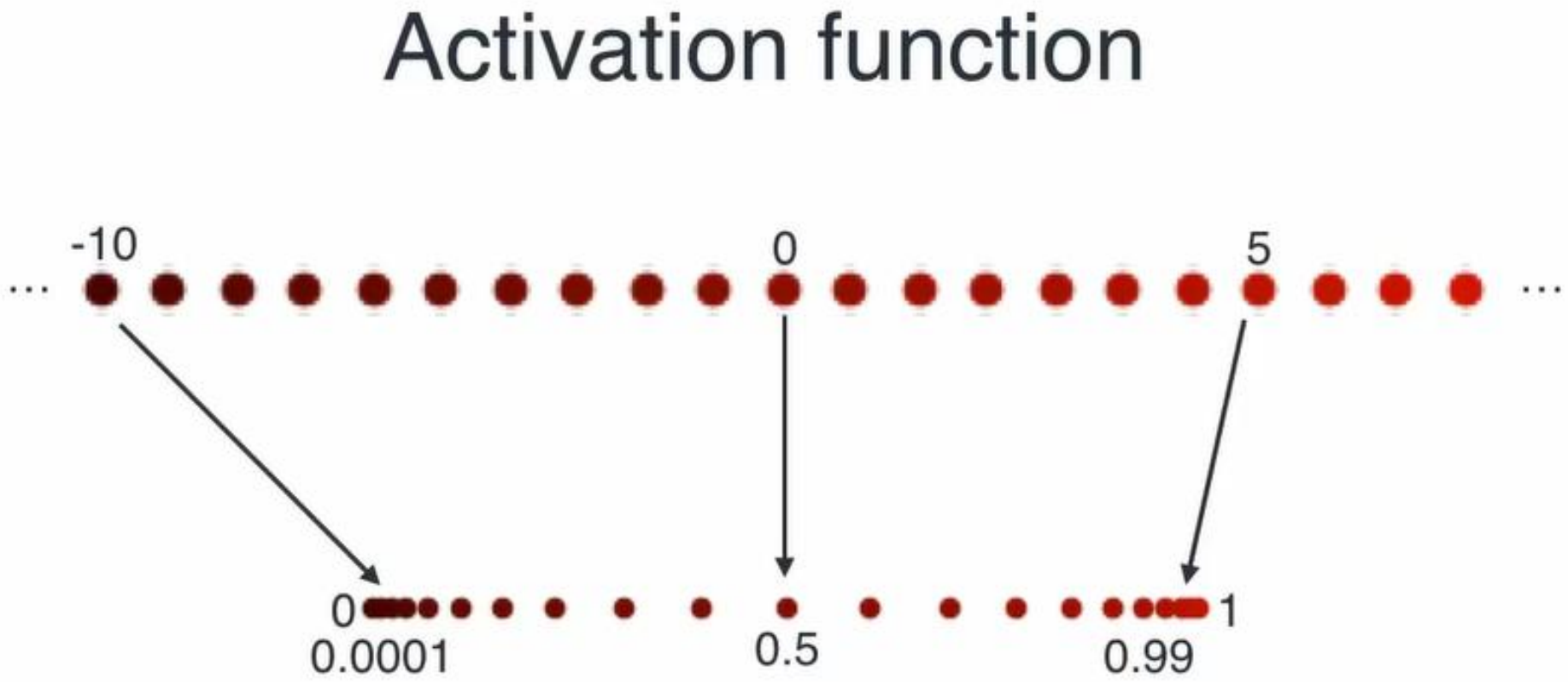


BUT WE WANT A PROBAILITY FUNCTION

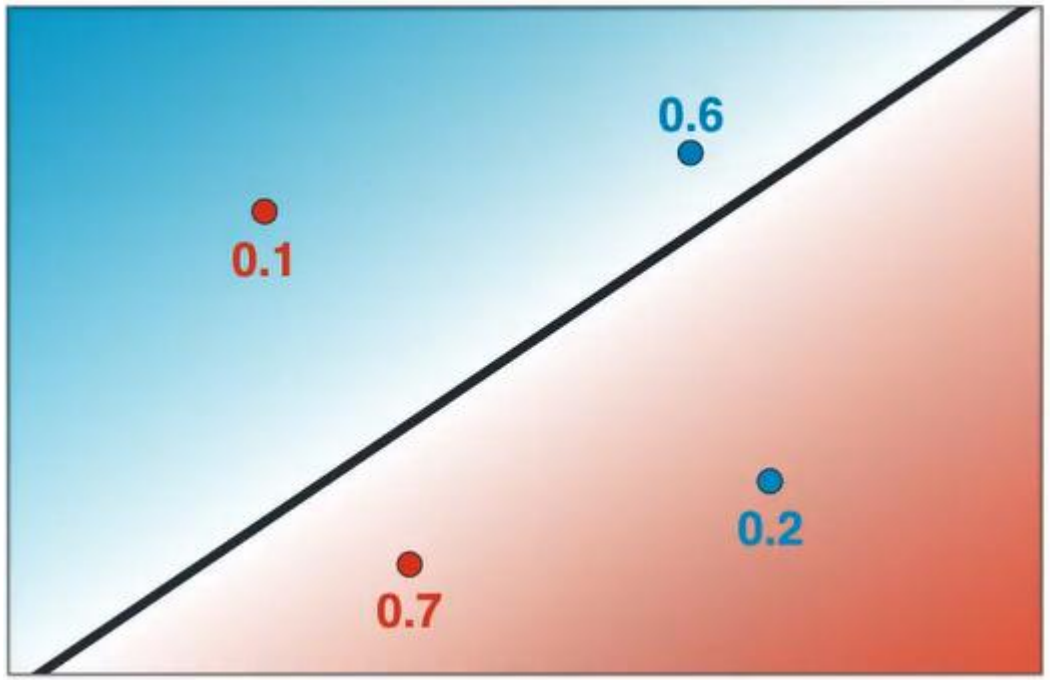


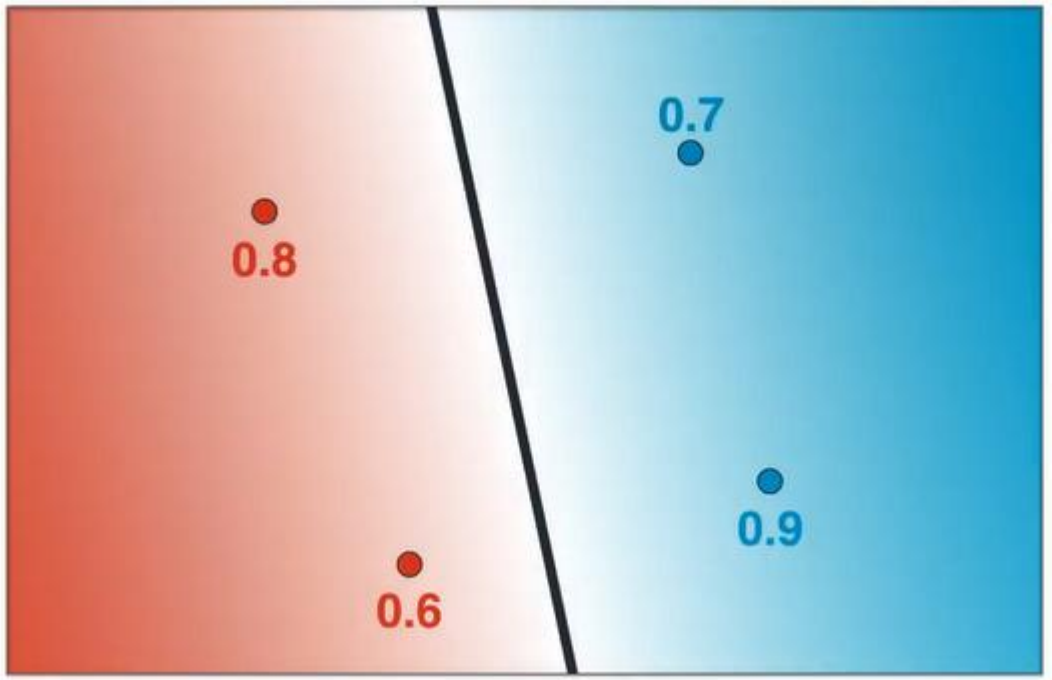


HOW?



Probability



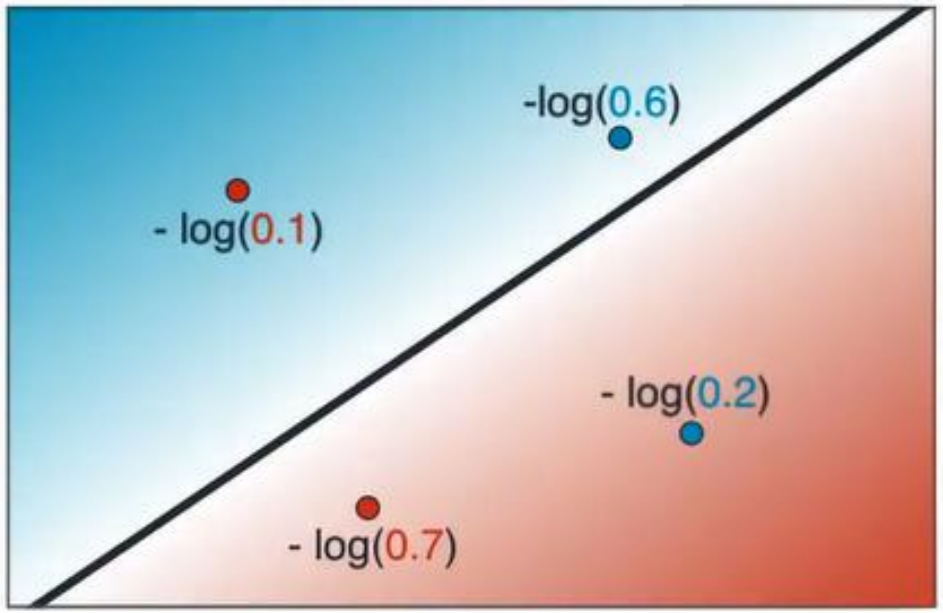


0.6*0.2*0.1*0.7 = 0.0084

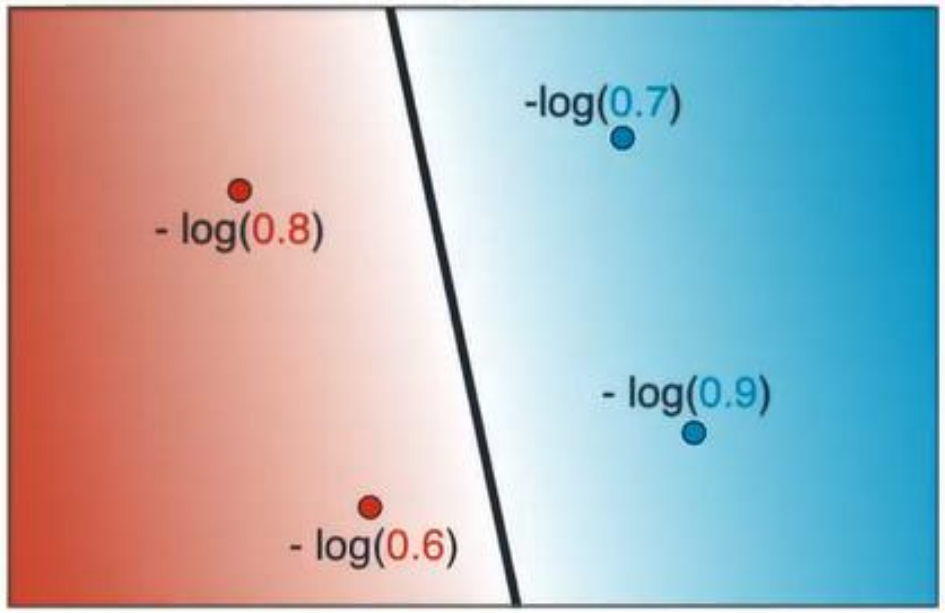
0.7*0.9*0.8*0.6 = 0.3024

Maximum Likelihood

Error function



0.6*0.2*0.1*0.7 = 0.0084



0.7*0.9*0.8*0.6 = 0.3024

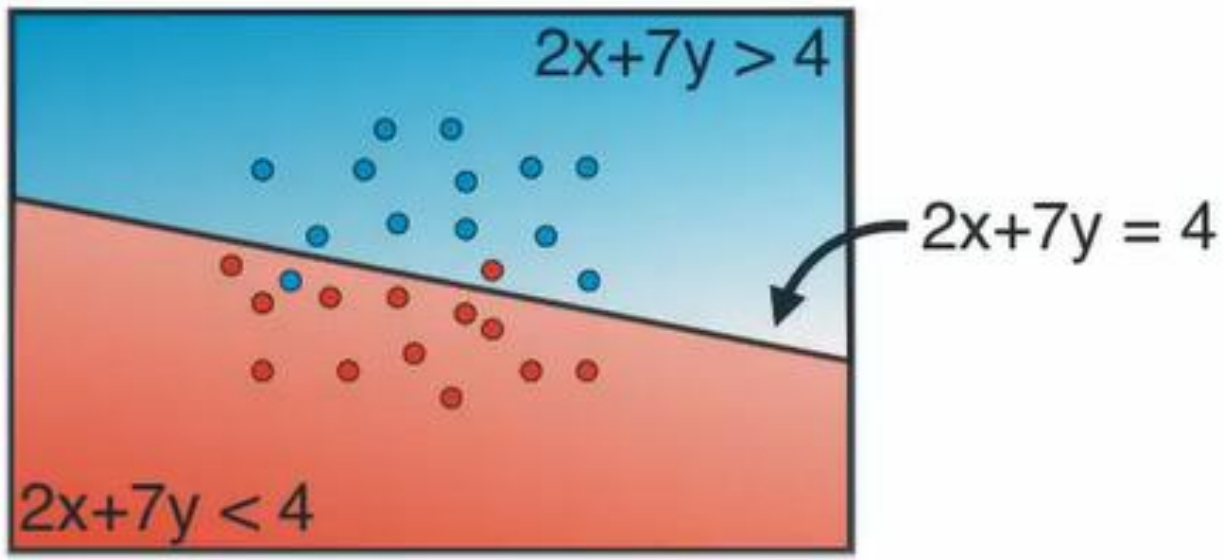
-log(0.6) - log(0.2) - log(0.1) - log(0.7) = 4.8

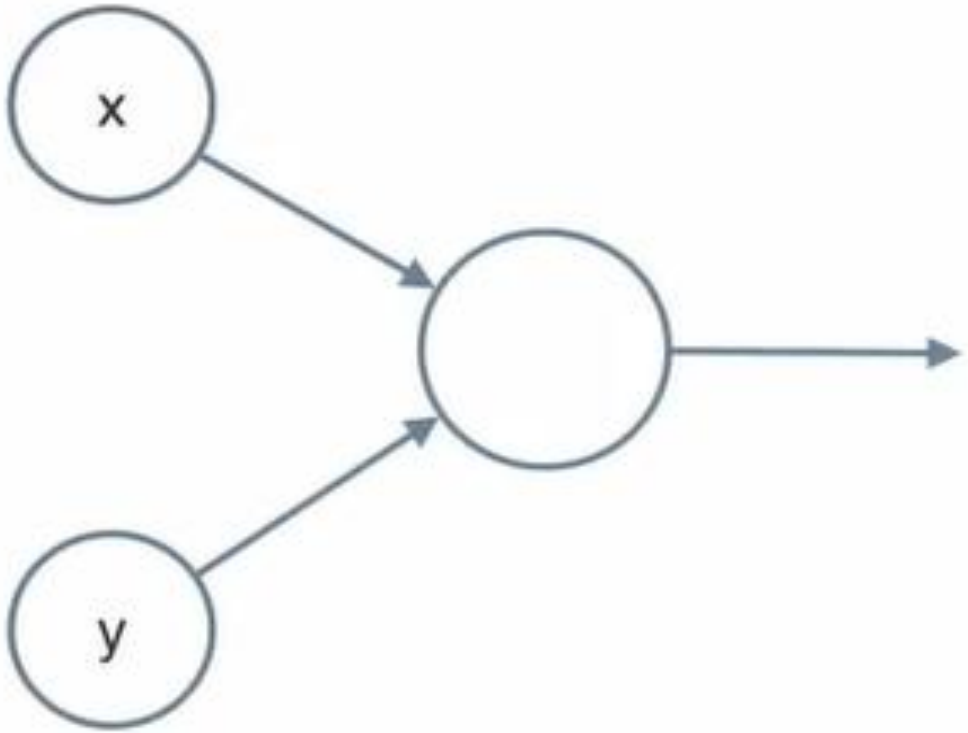
2.3

-log(0.7) - log(0.9) - log(0.8) - log(0.6) = 1.2

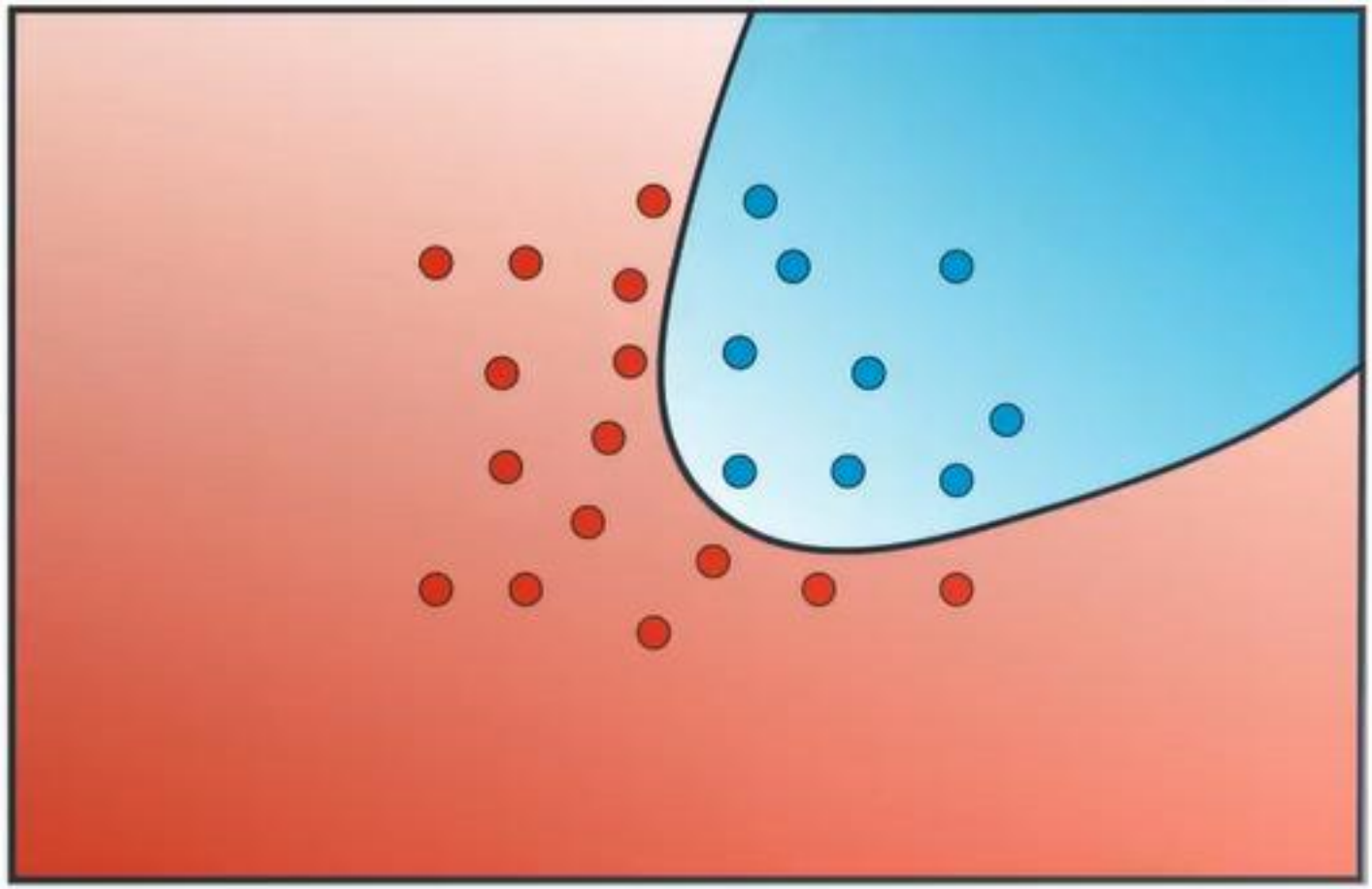
0.2

PERCEPTRON

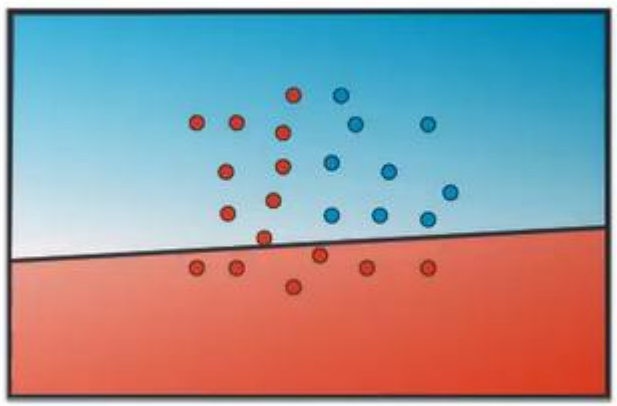


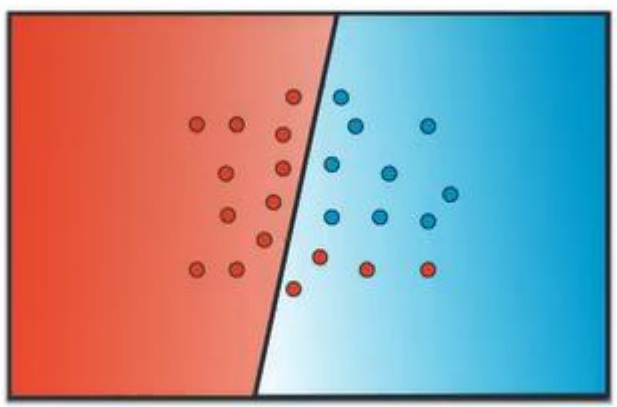


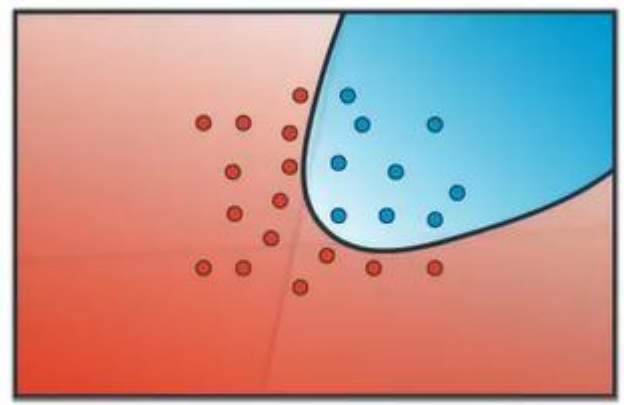
Non-linear regions



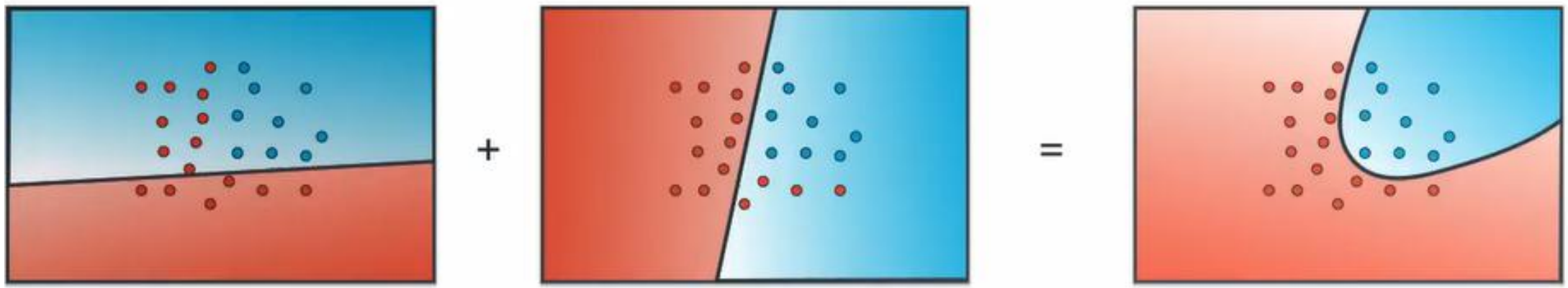
Combining Regions



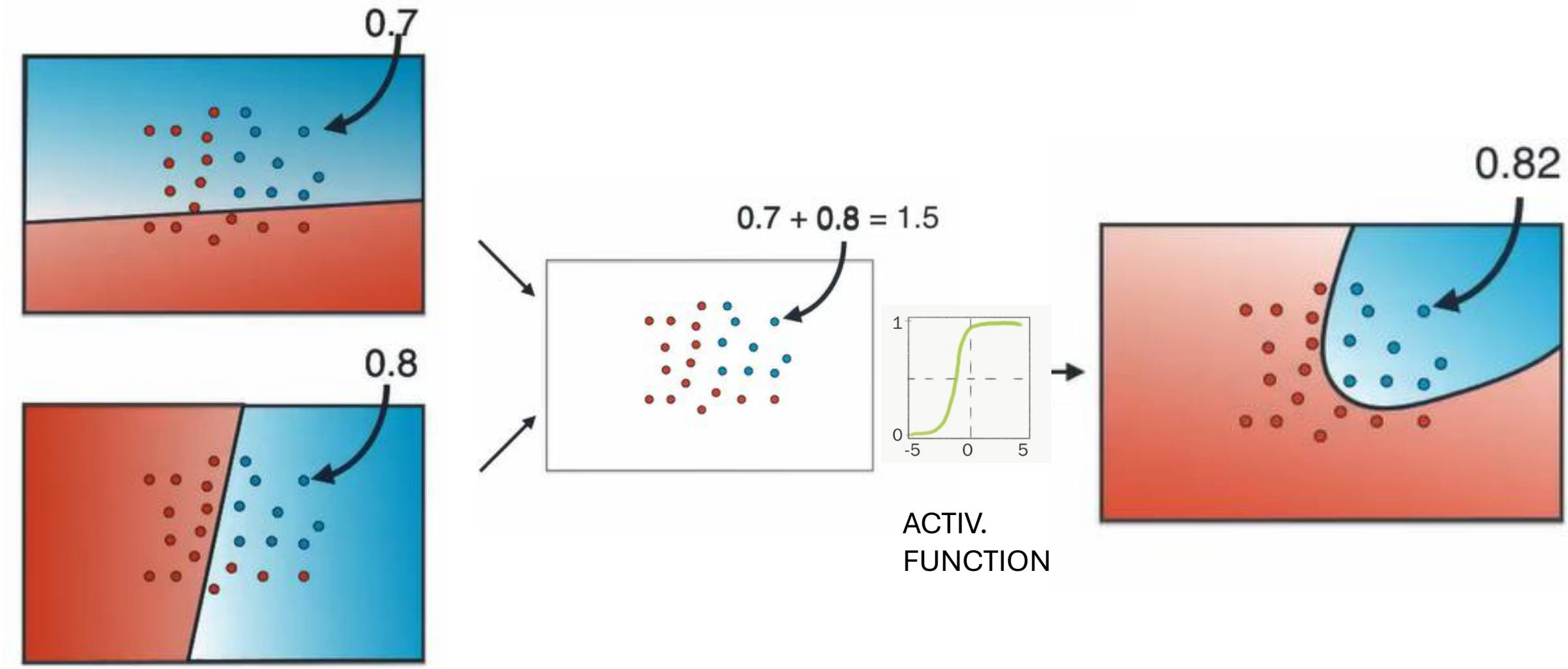




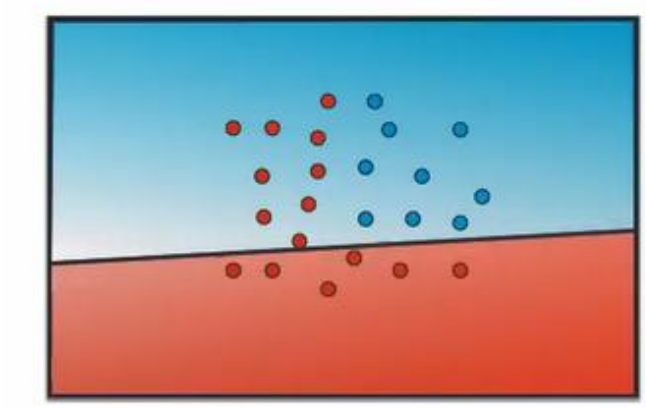
Combining Regions

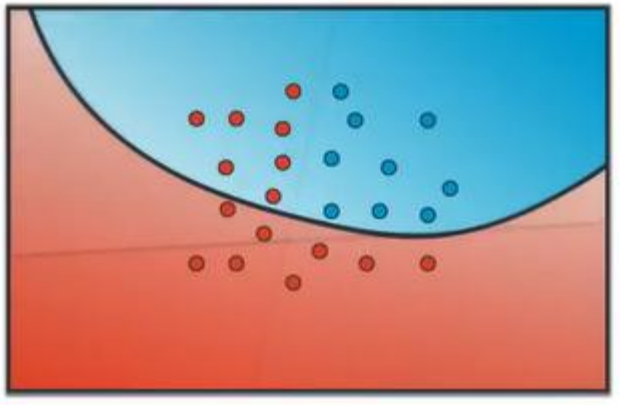


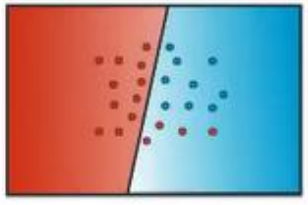
Neural Network



DIFFERENT WEIGHTS







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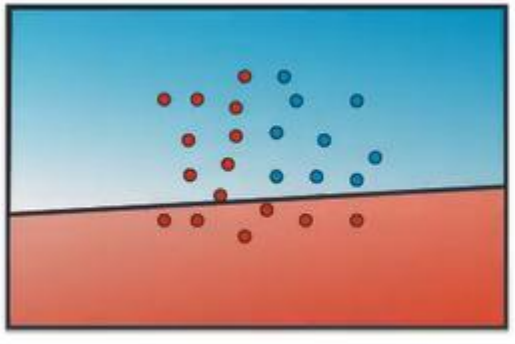

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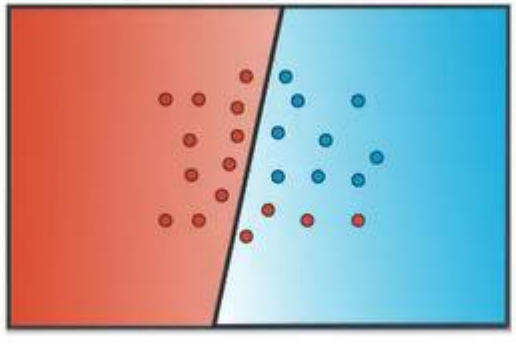

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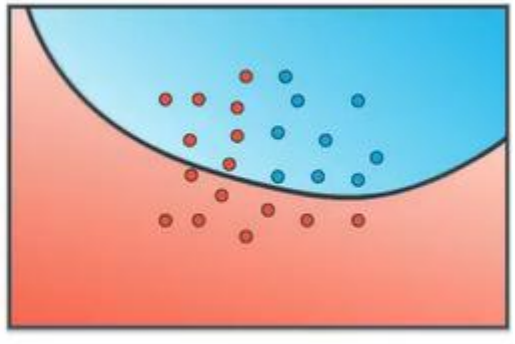
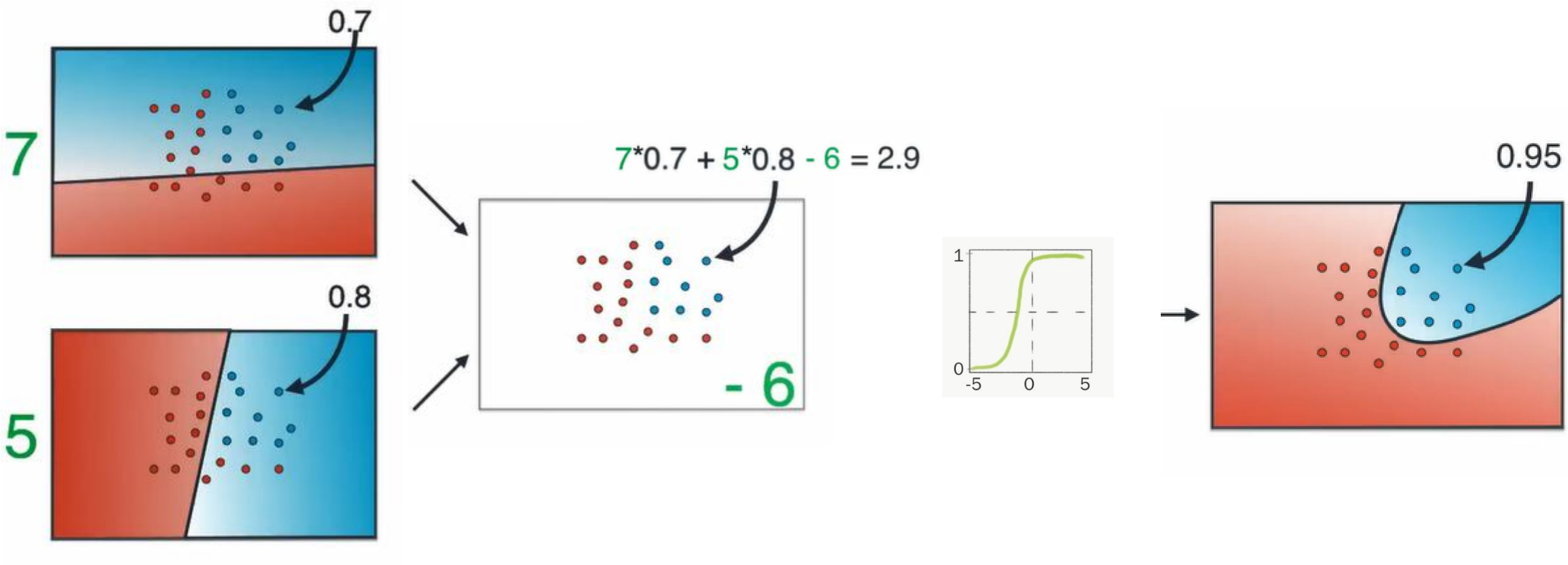


Neural Network



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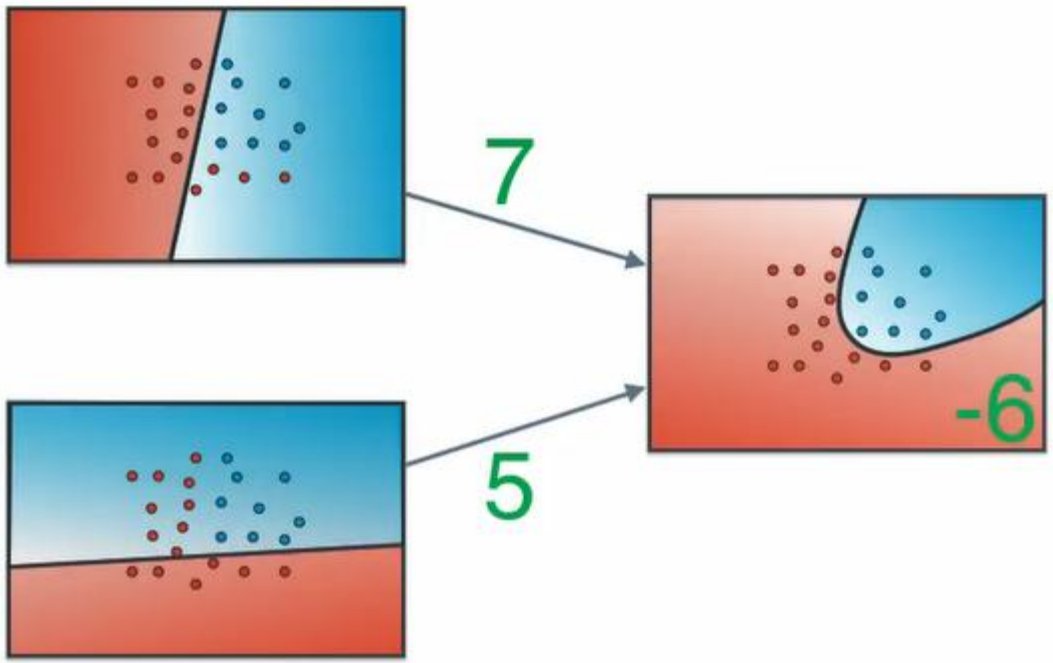
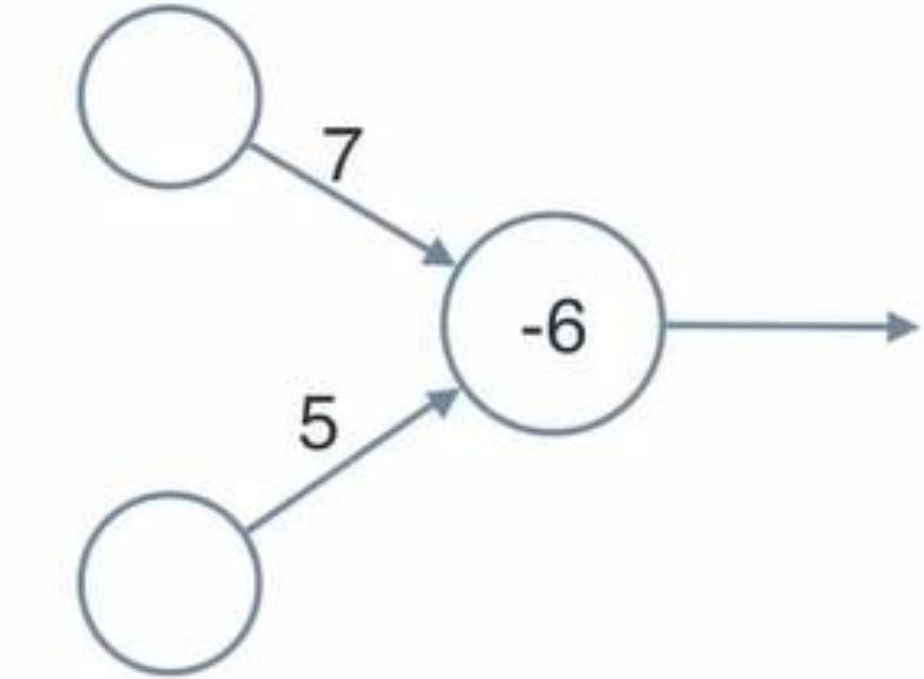
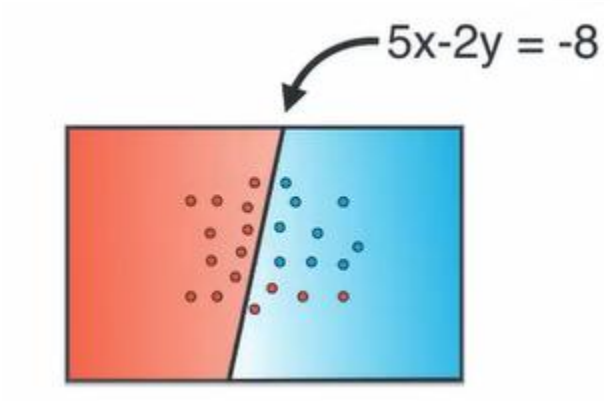
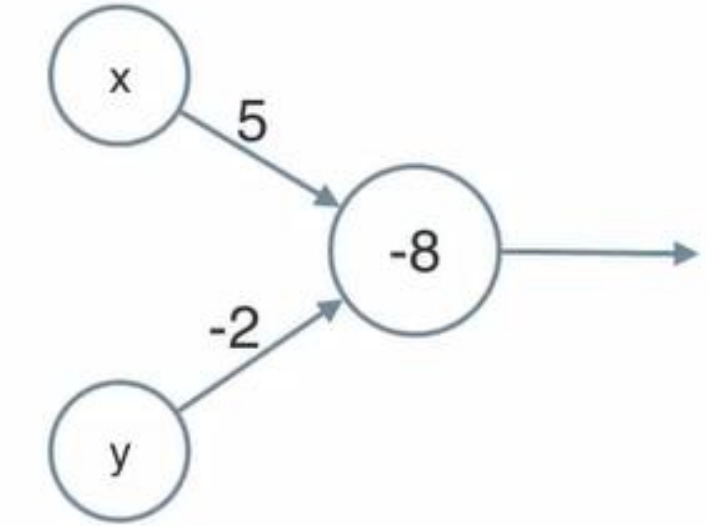
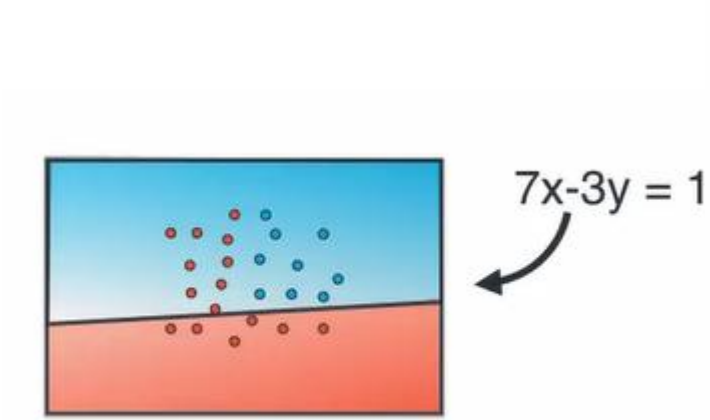


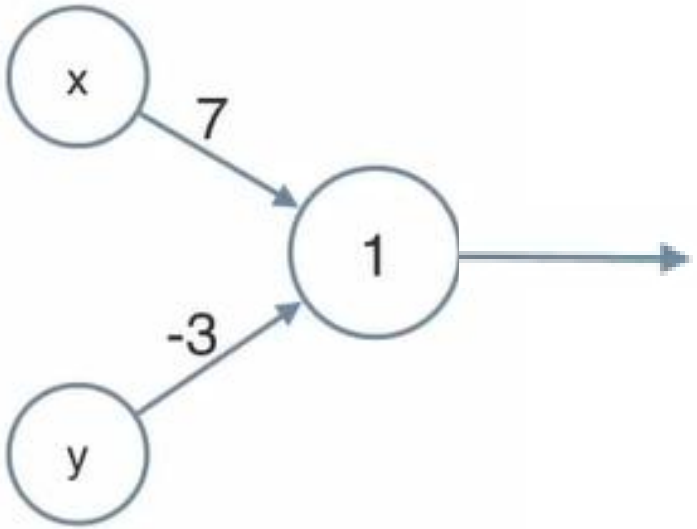


Neural Network



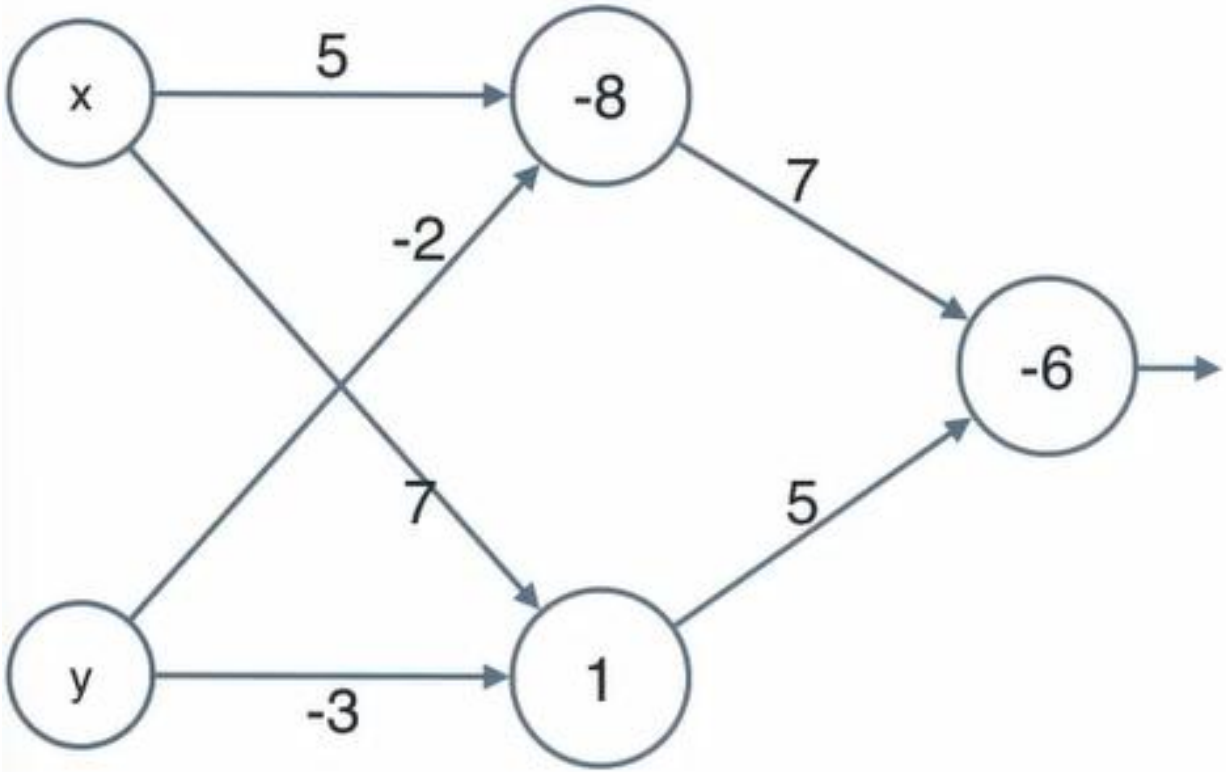


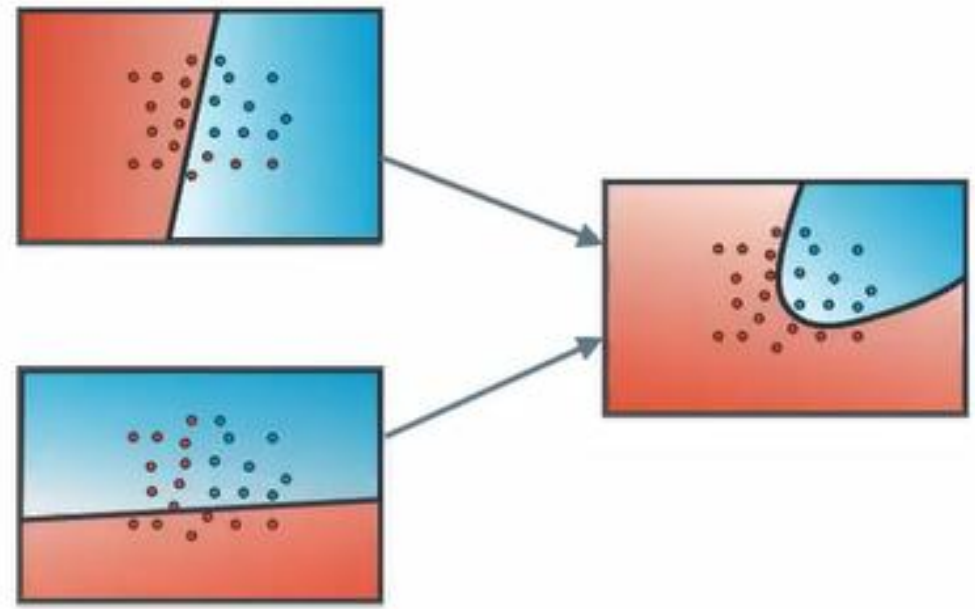




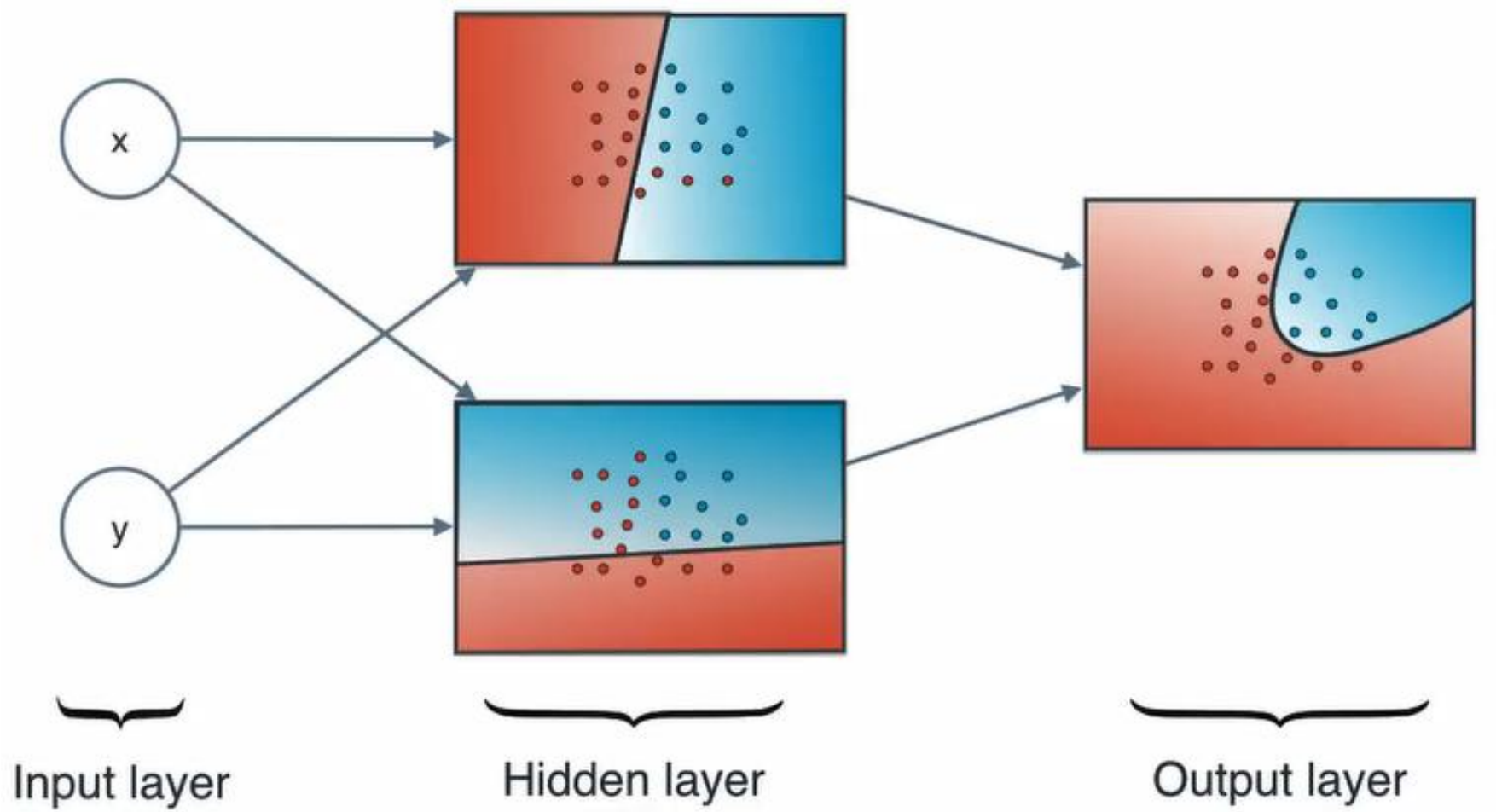
HOW TO COMBINE THEM ?

Neural Network

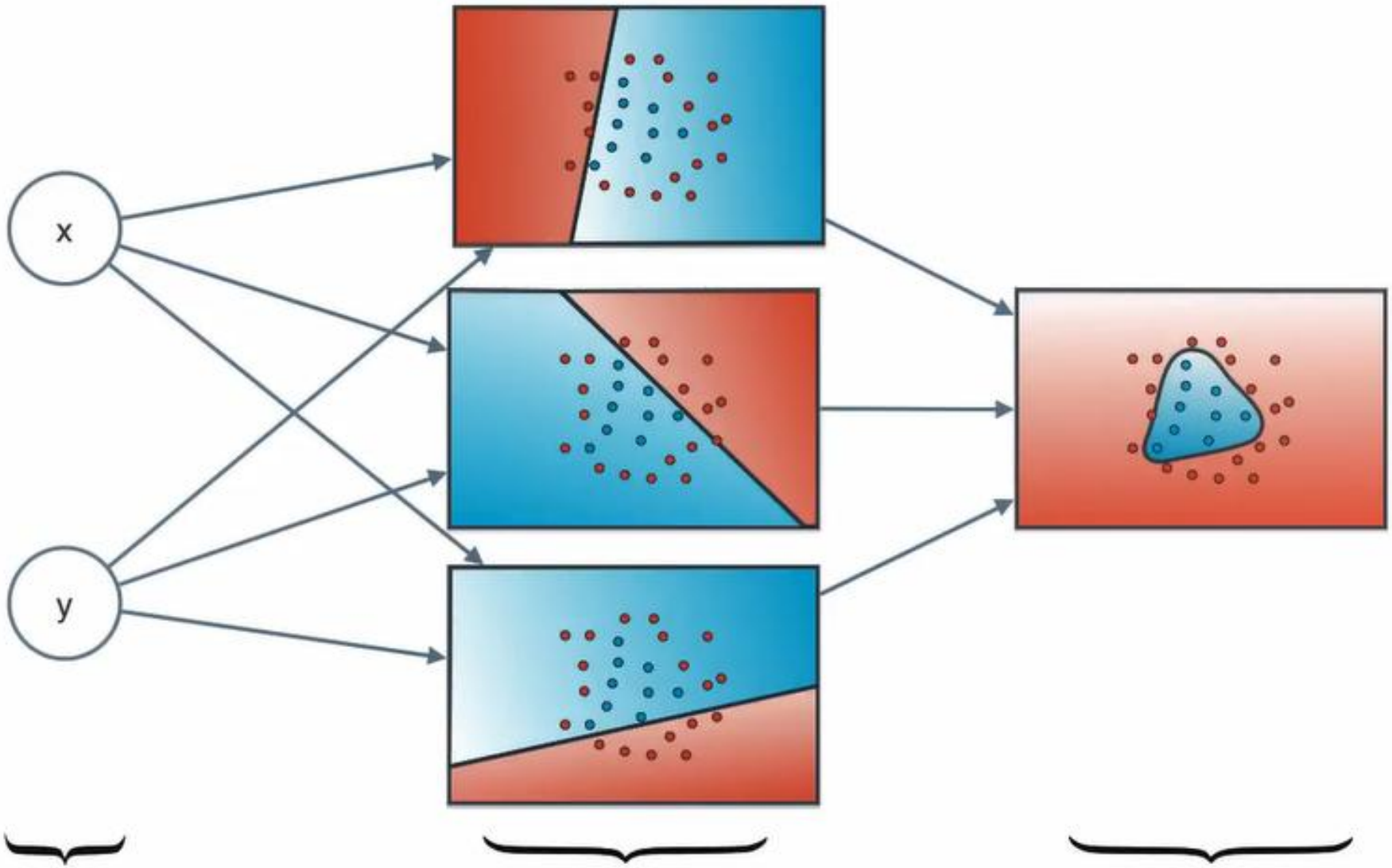




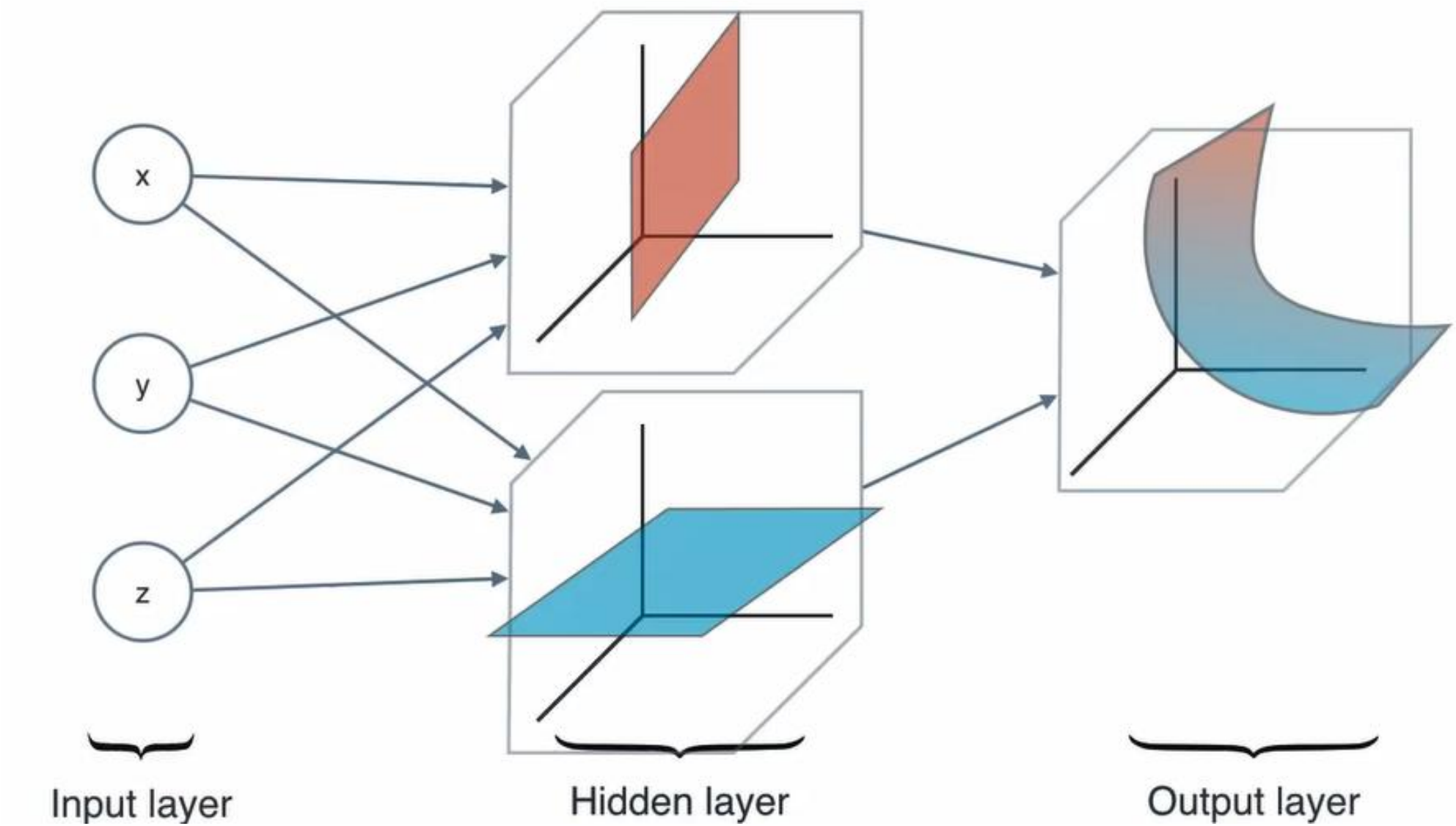
Neural Network



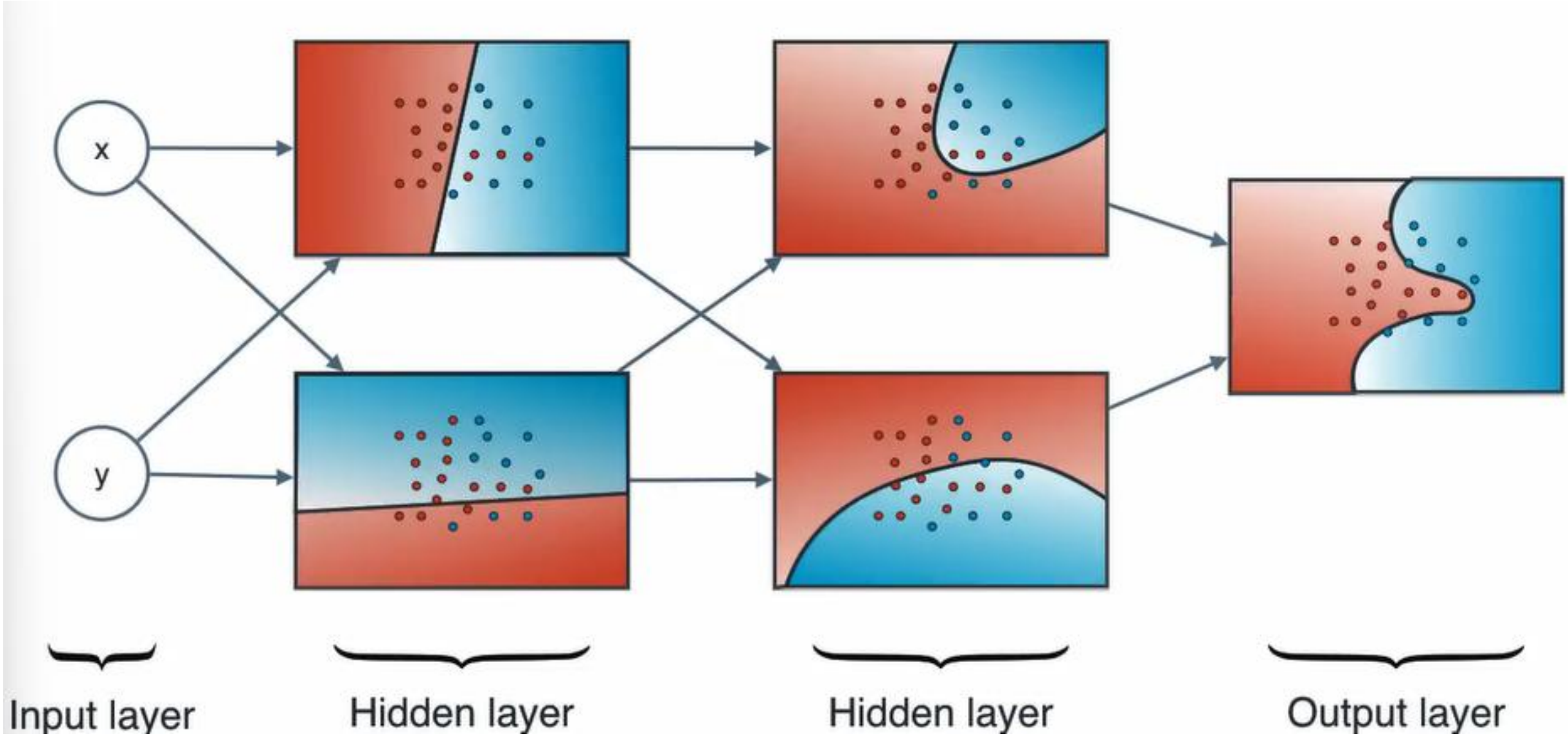
Neural Network



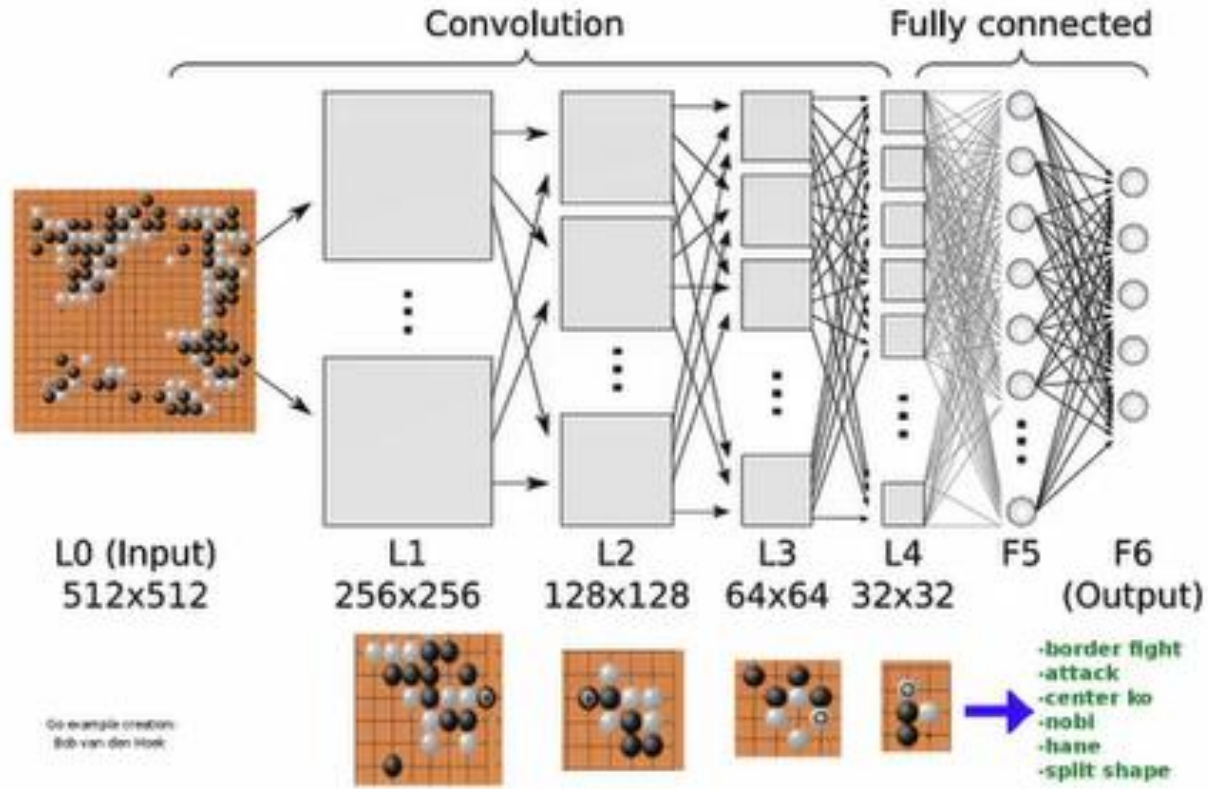
Neural Network



Neural Network

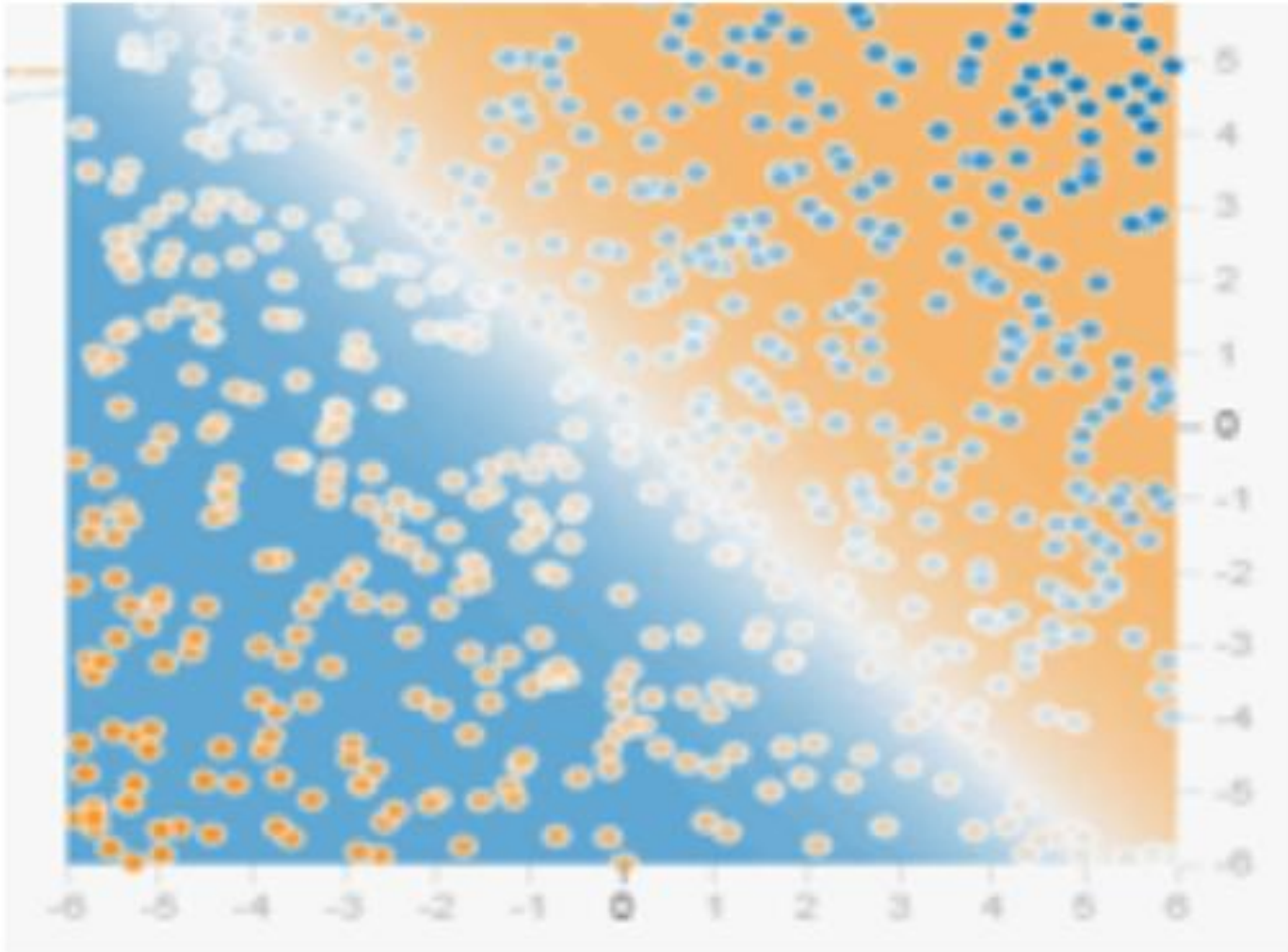


Neural Network



TensorFlow

Playground




That's all Folks!