ISTE-VIT

Deep Dive Into DL

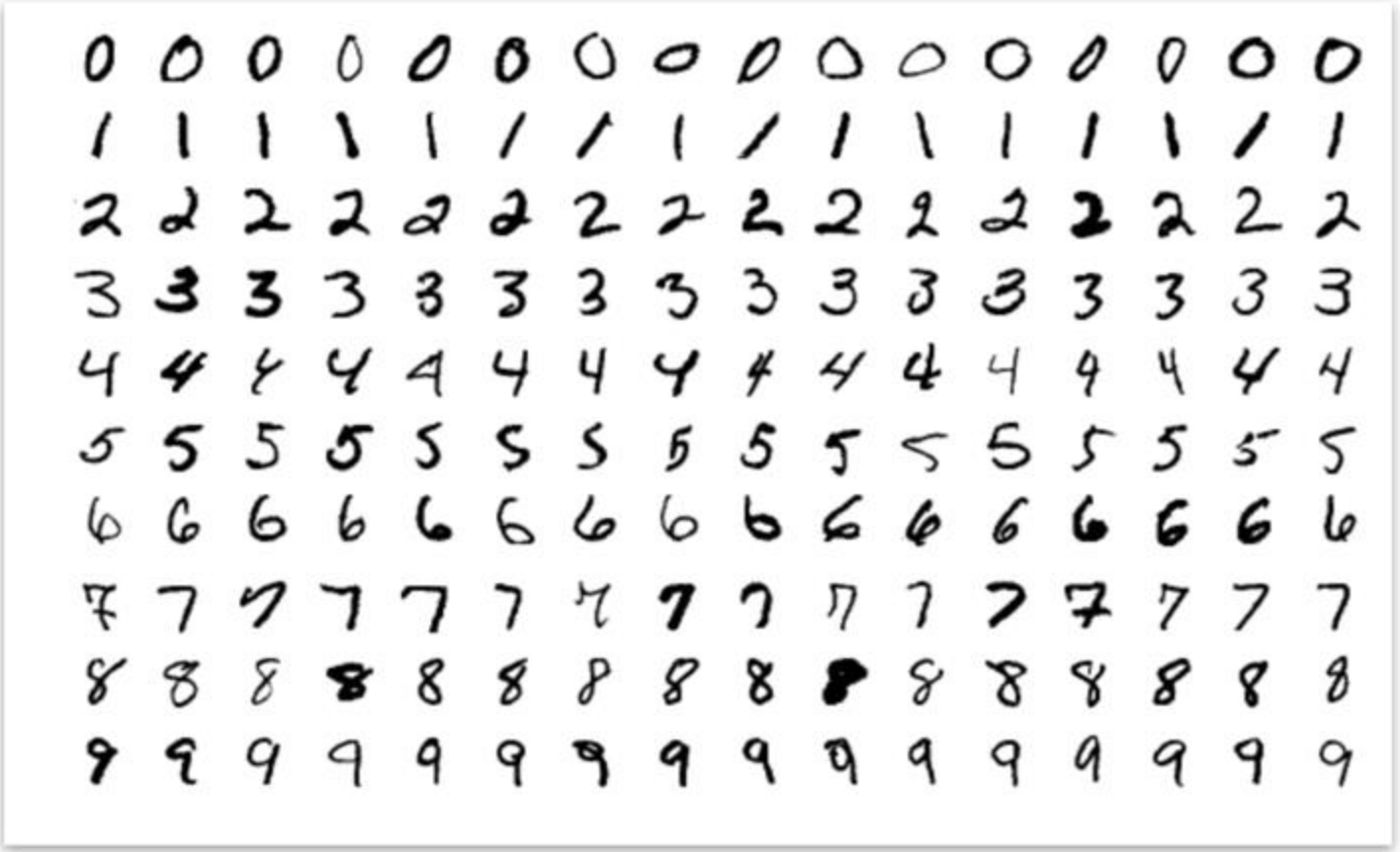
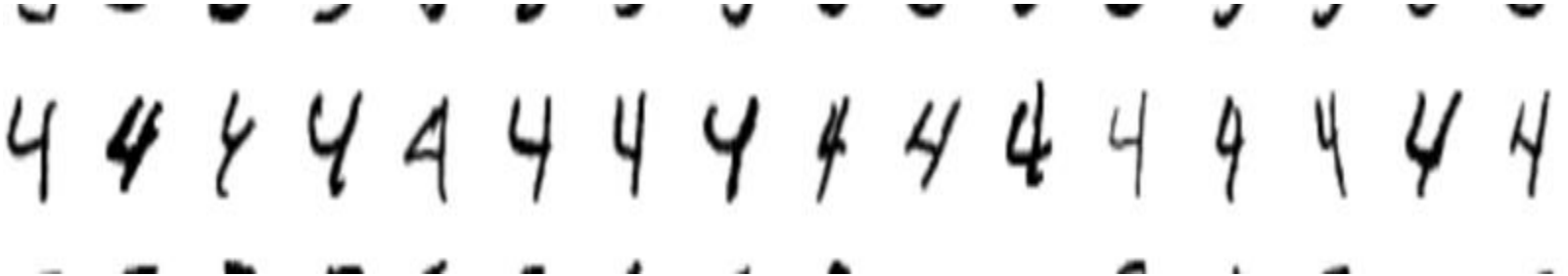
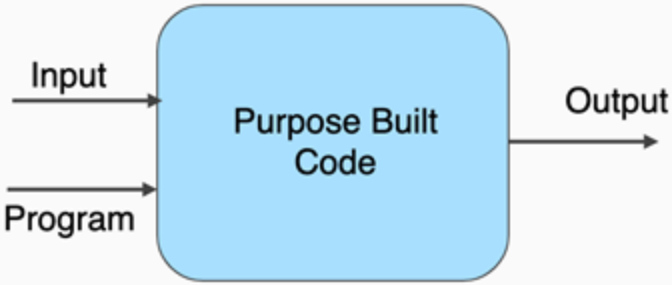
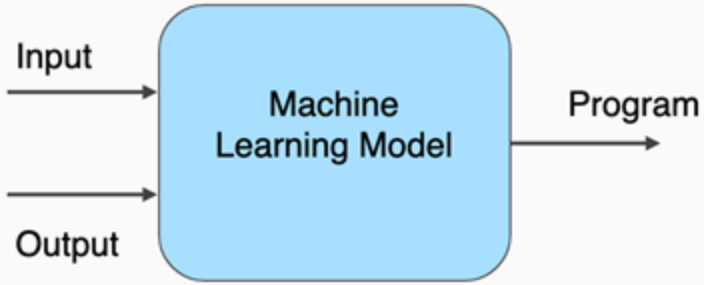


Image Of The Number 4



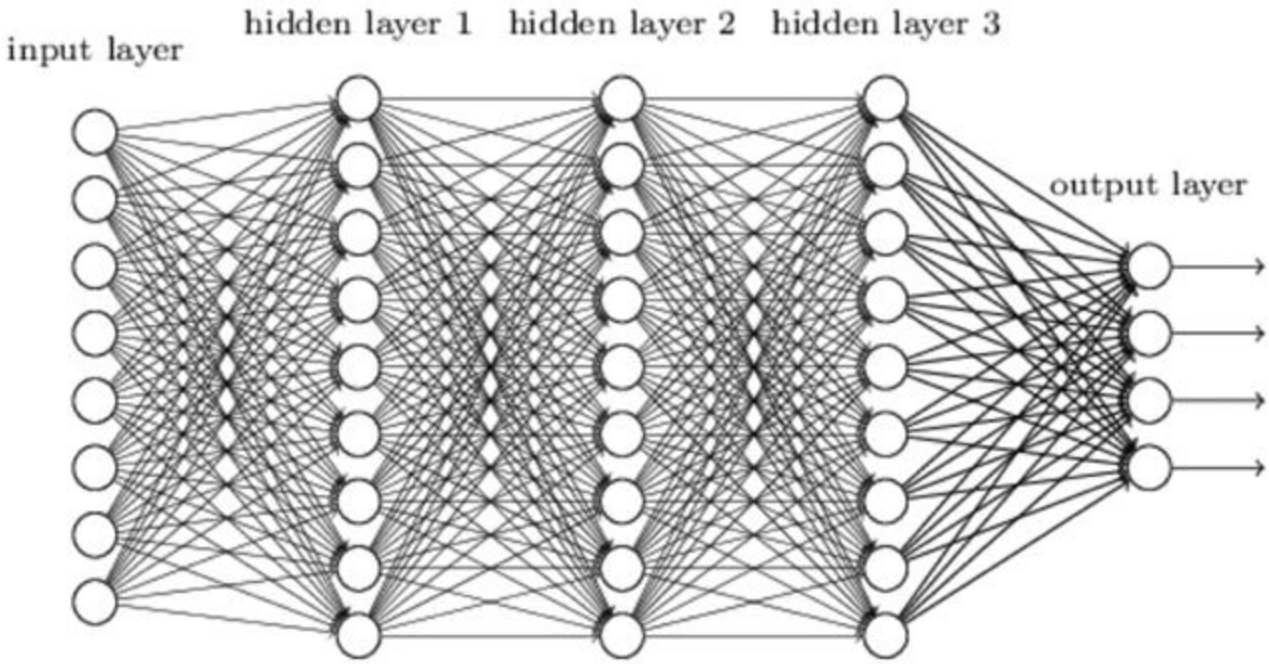
What is Machine Learning?





The Data Science Journey

Neural Networks

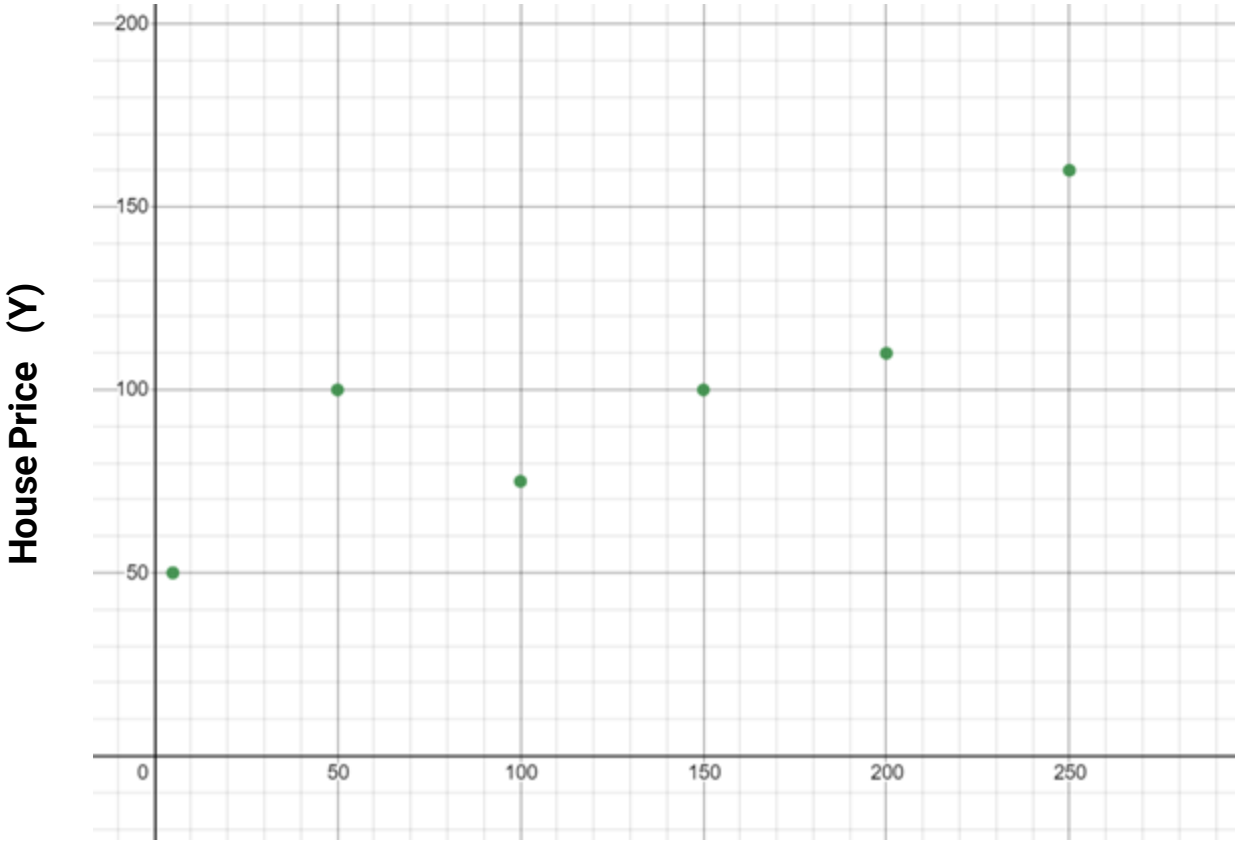


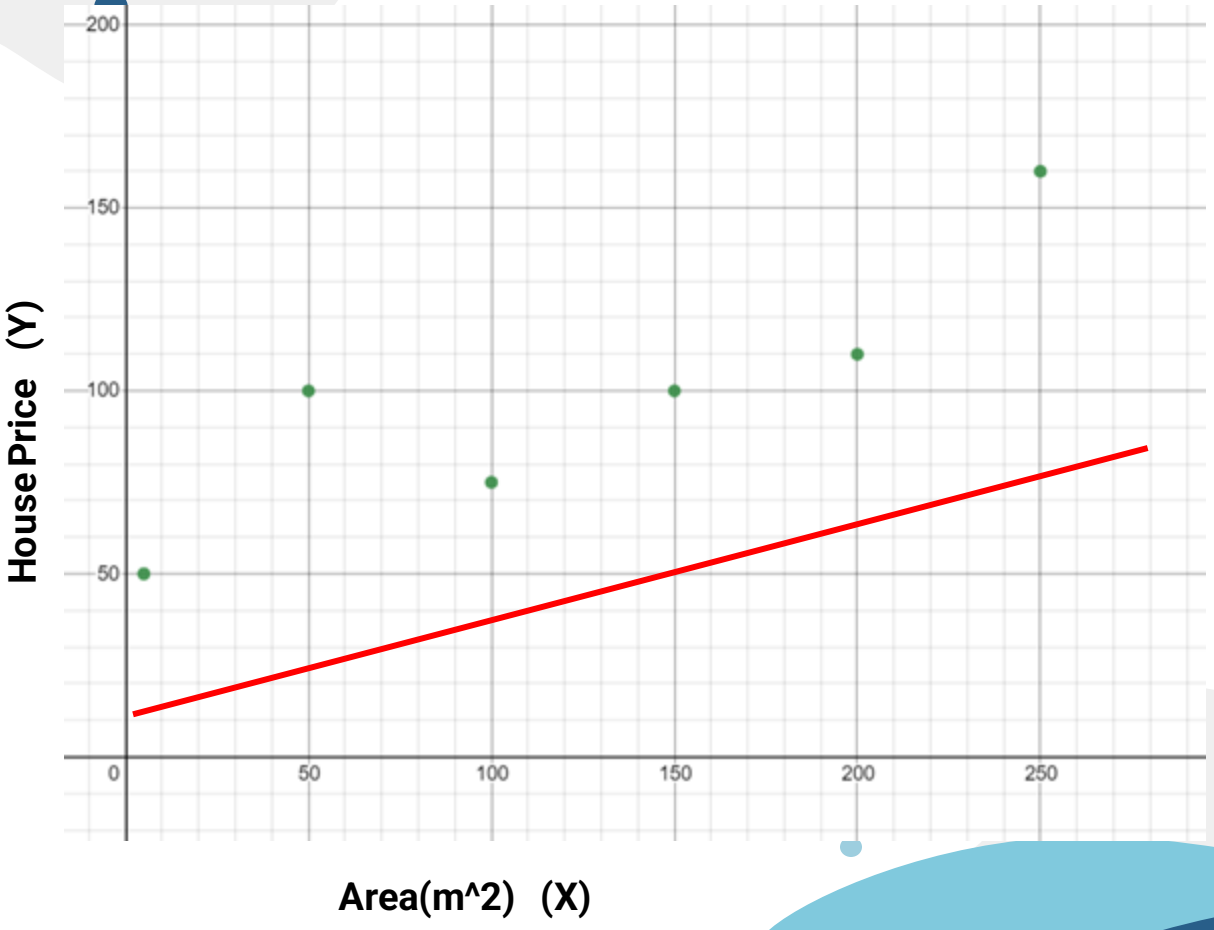
What a Neural Network actually does?

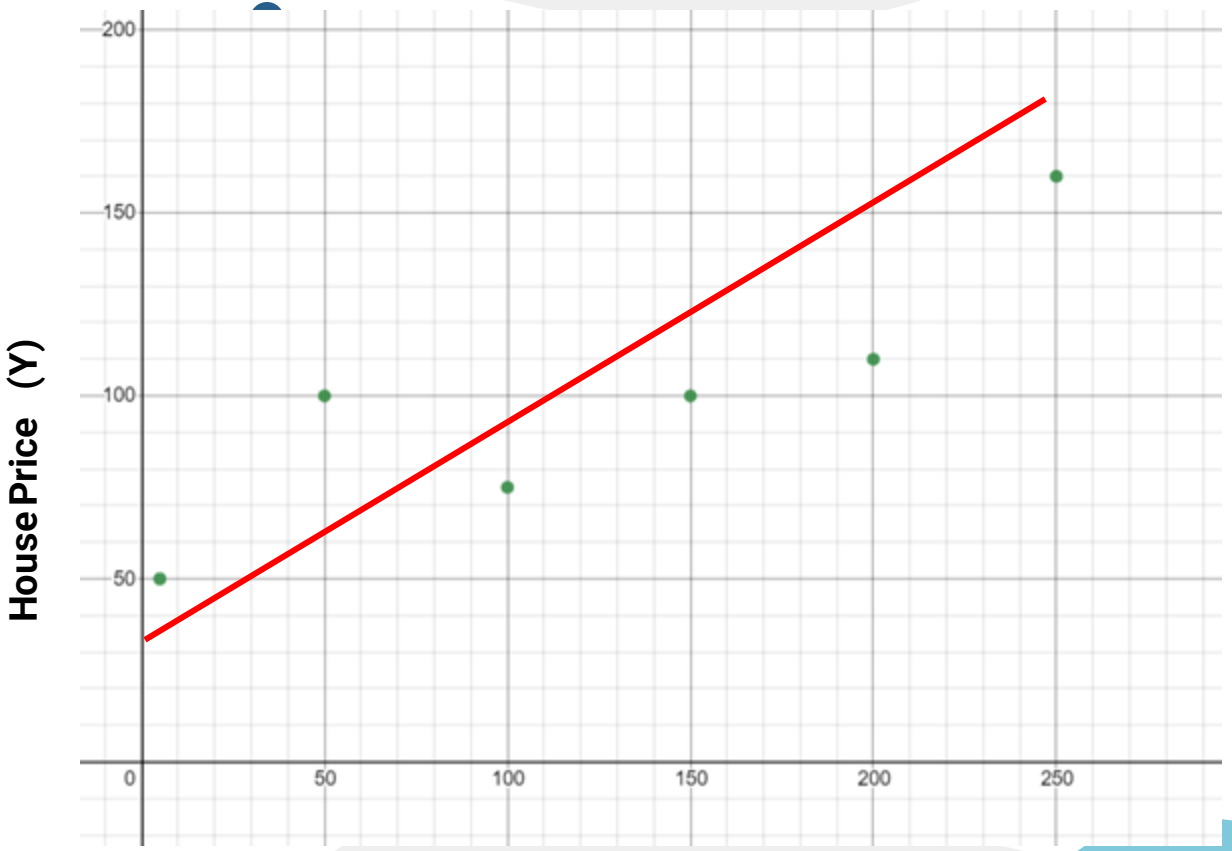
Linear Regression

You Are A Real Estate Seller!

Area of the House(m^2)	Price of the House(in Lakhs)
5	50
50	100
100	75
150	50
200	110
250	162

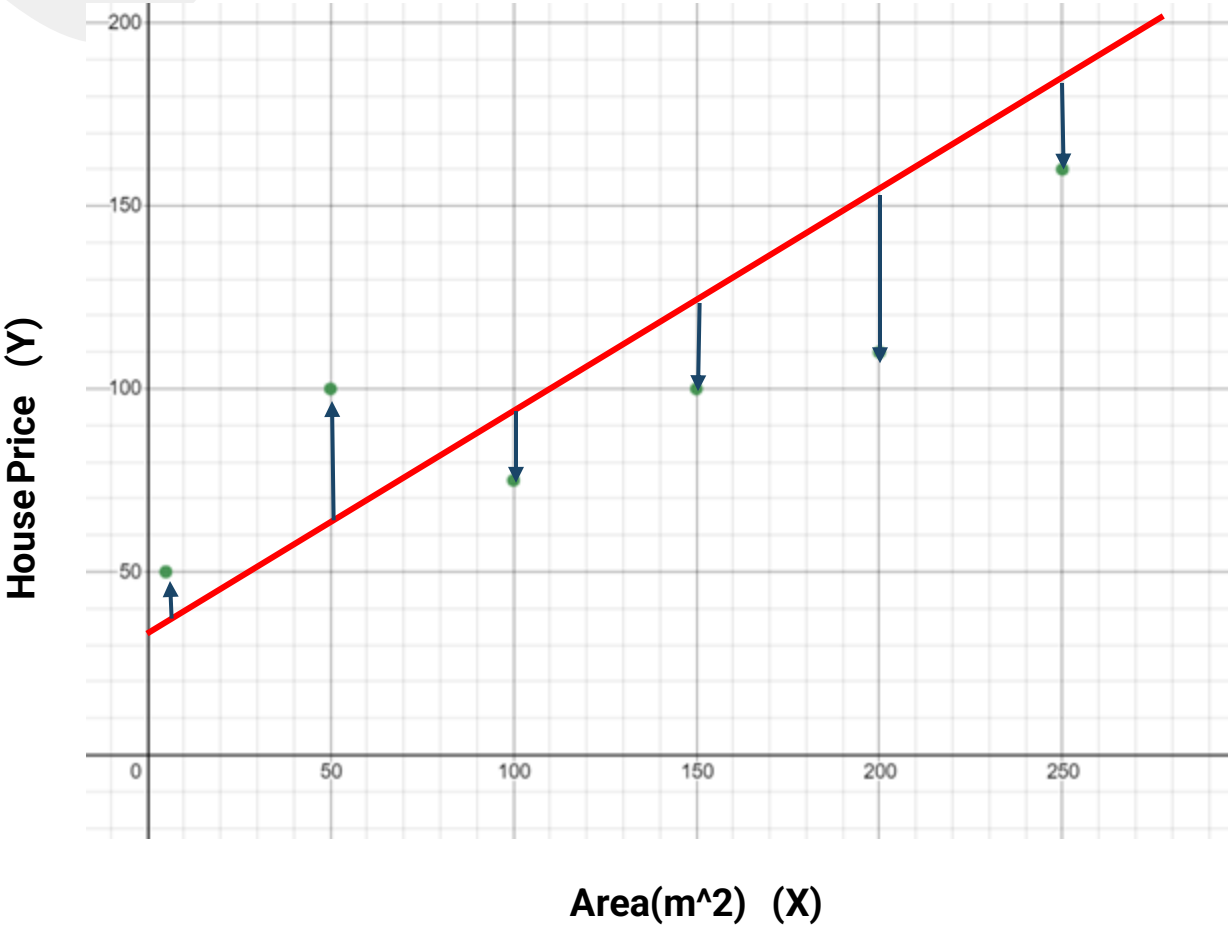

House Price (Y)
200
150
100
50
0
50
100
150
200
250
Area(m^2) (X)


House Price (Y)
200
150
100
50
0
50
100
150
200
250
Area(m^2) (X)


House Price (Y)
200
150
100
50
0
50
100
150
200
250
Area(m^2) (X)

Linear Regression:

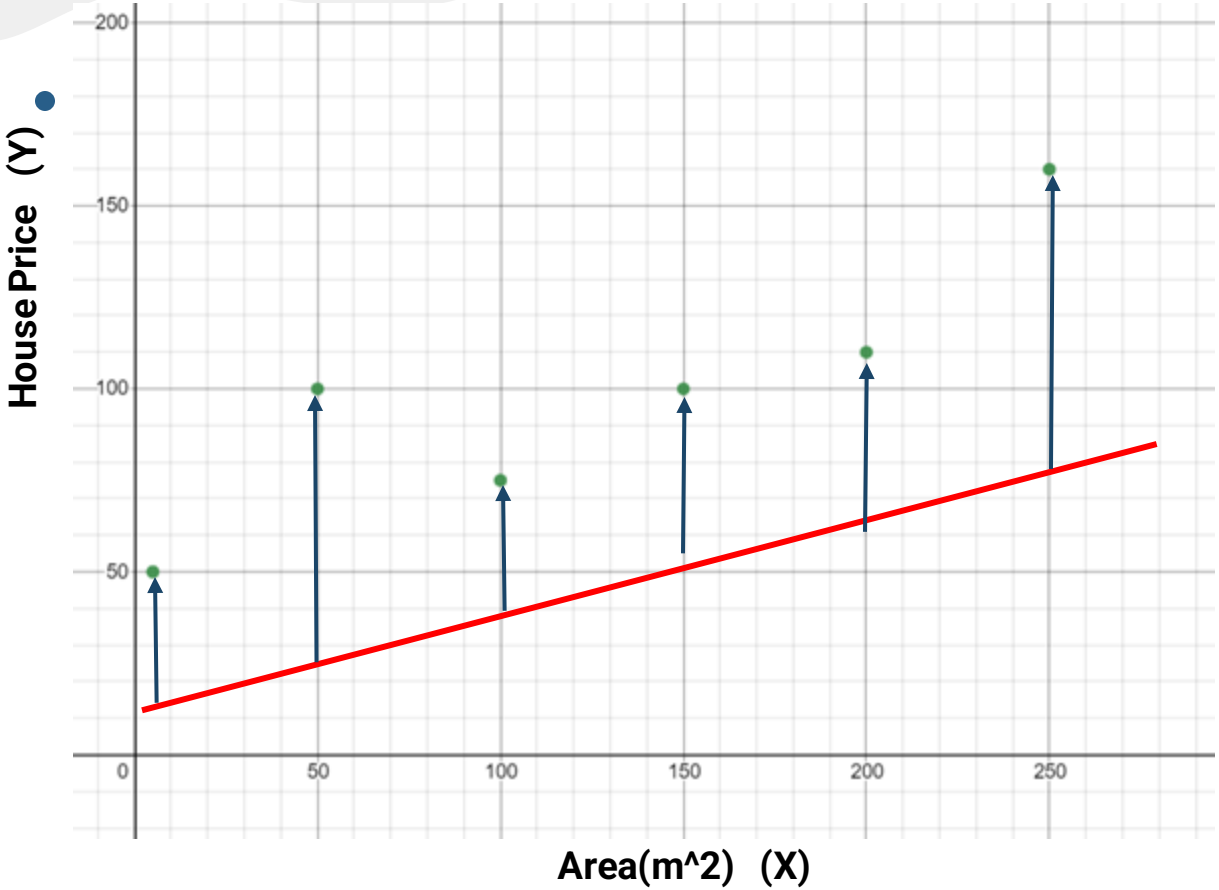
Linear Regression is a method of finding a straight line that best fits a set of points.

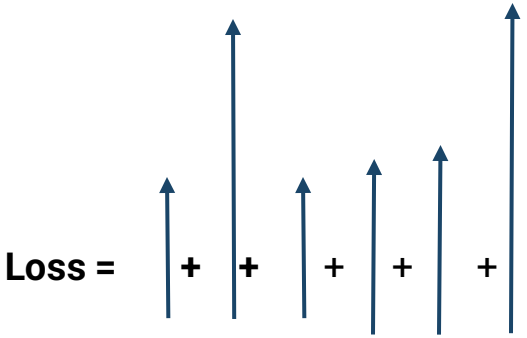

House Price (Y)
200
150
100
50
0
50
100
150
200
250
Area(m^2) (X)

Loss:

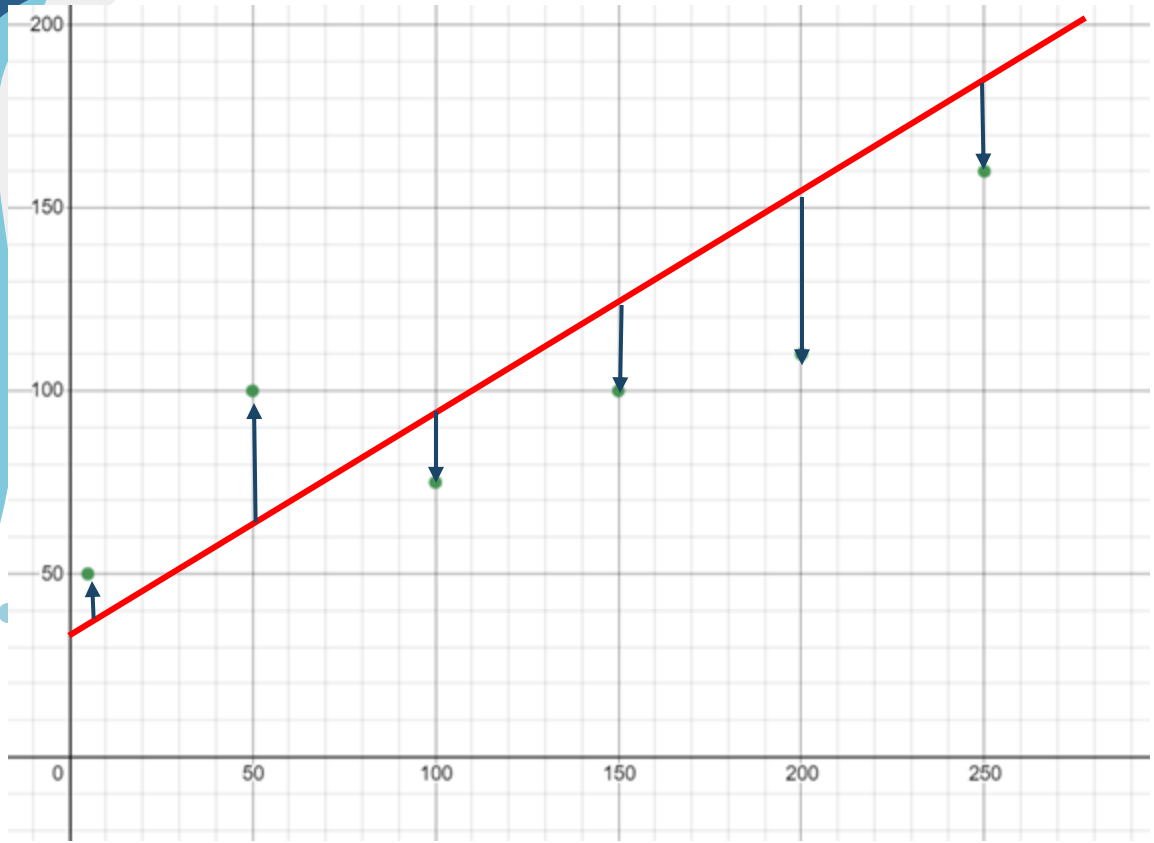
Loss is a penalty for a bad prediction. That is loss is a number indicating how bad the model's prediction is on a single example. If the model's prediction is perfect the loss is zero, otherwise the loss is greater.

High Loss

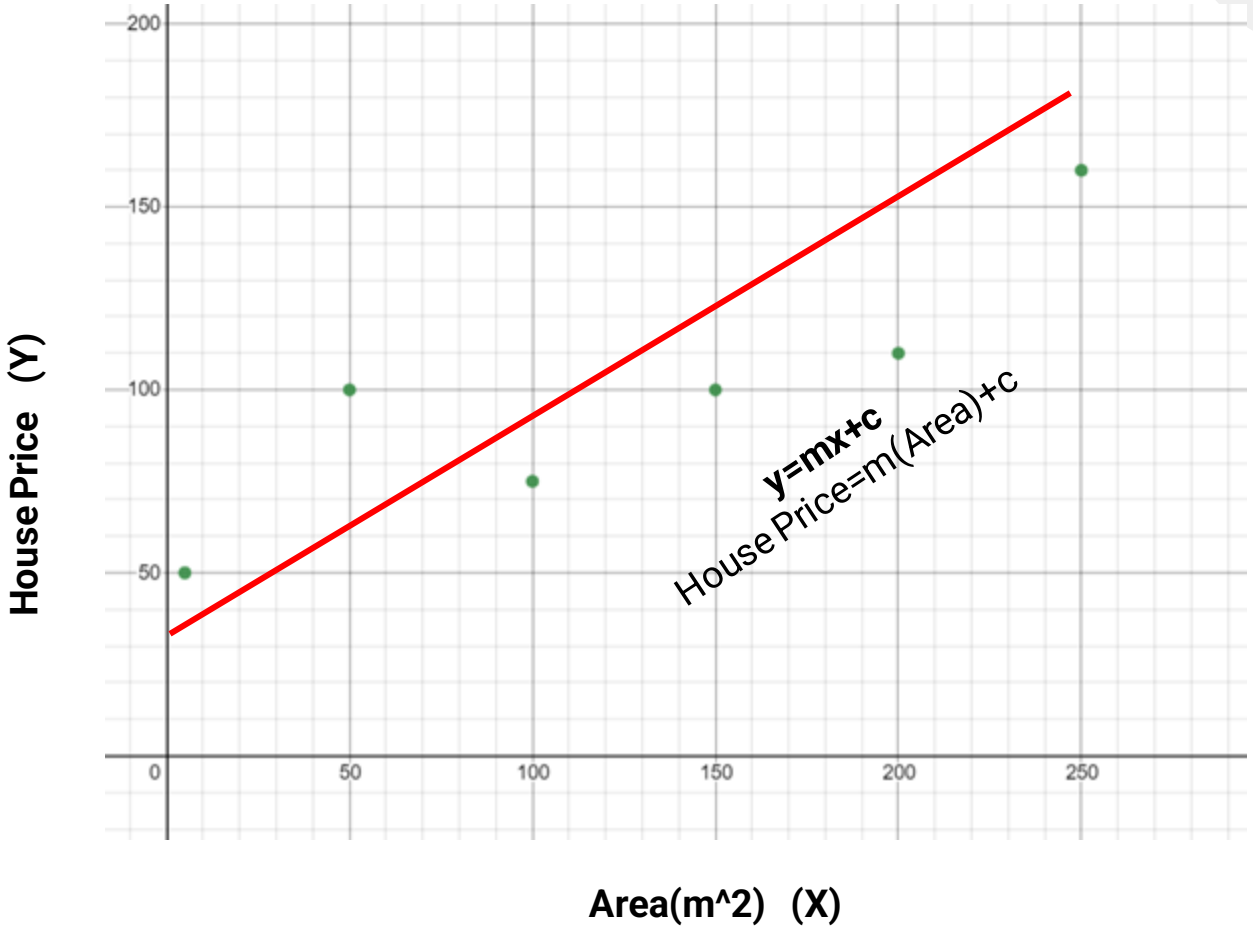


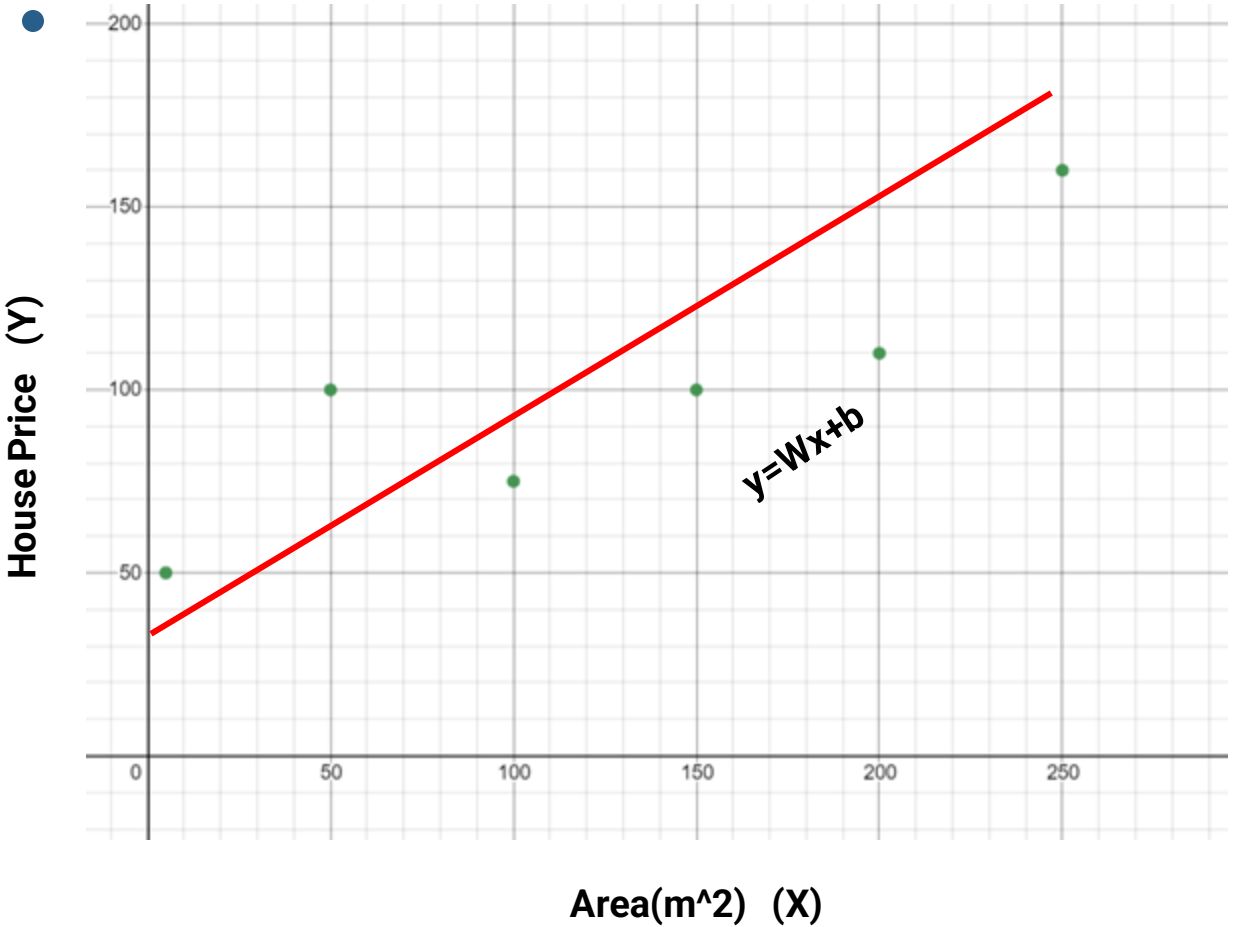


Low Loss



Loss = ↑ + ↓ + ↓ + ↓ + ↓ + ↓

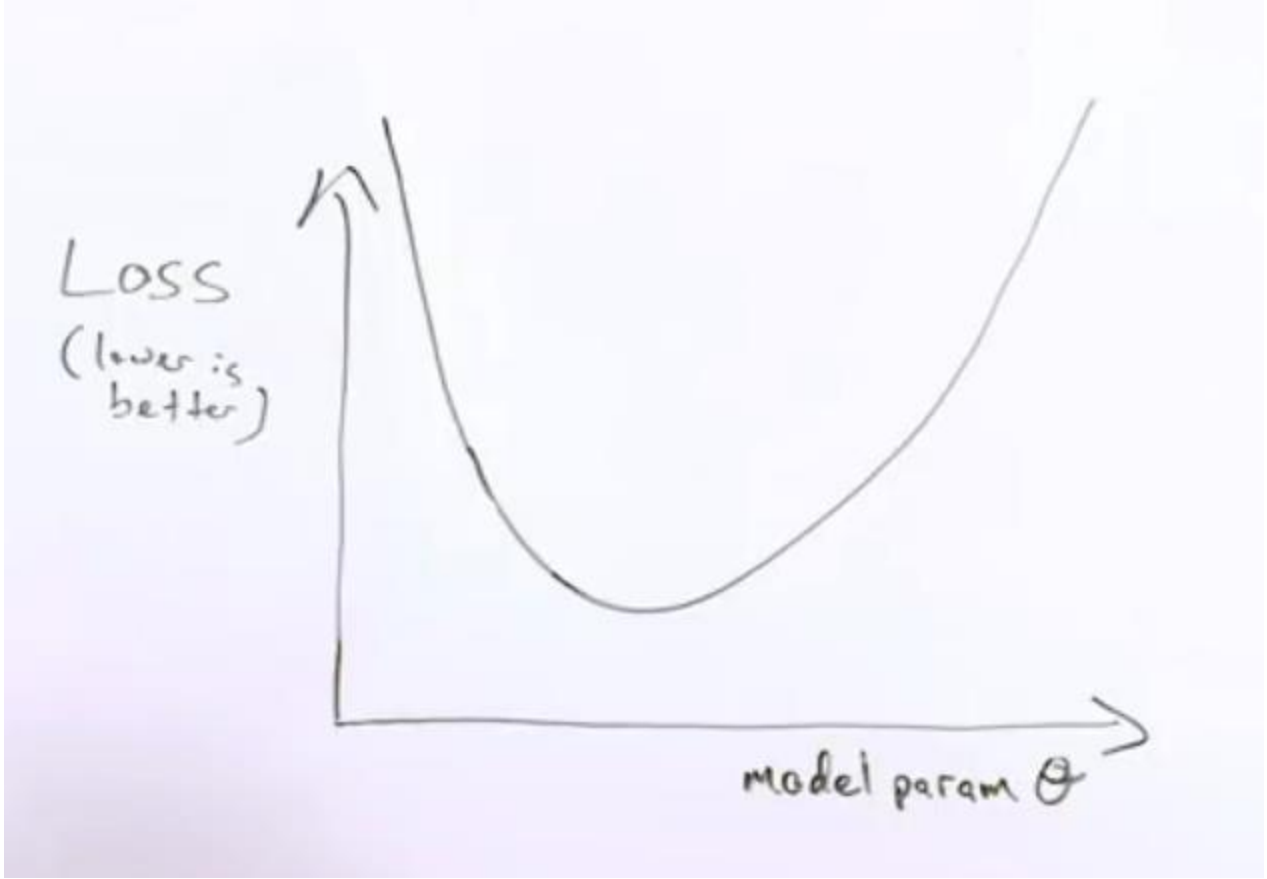

House Price (Y)
200
150
100
50
0
50
100
150
200
250
y=mx+c
House Price=m(Area)+c
Area(m^2) (X)


House Price (Y)
200
150
100
50
0
50
100
150
200
250
y=Wx+b
Area(m^2) (X)

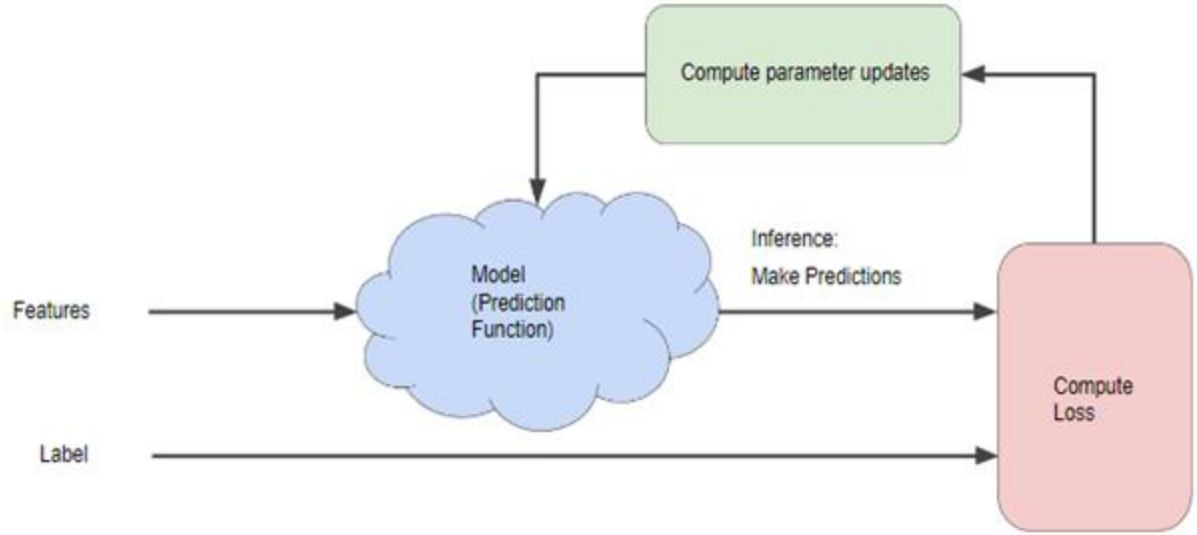
What Is Training A Model?

Training a model is an art of finding the best values to multiply with input to get an answer.

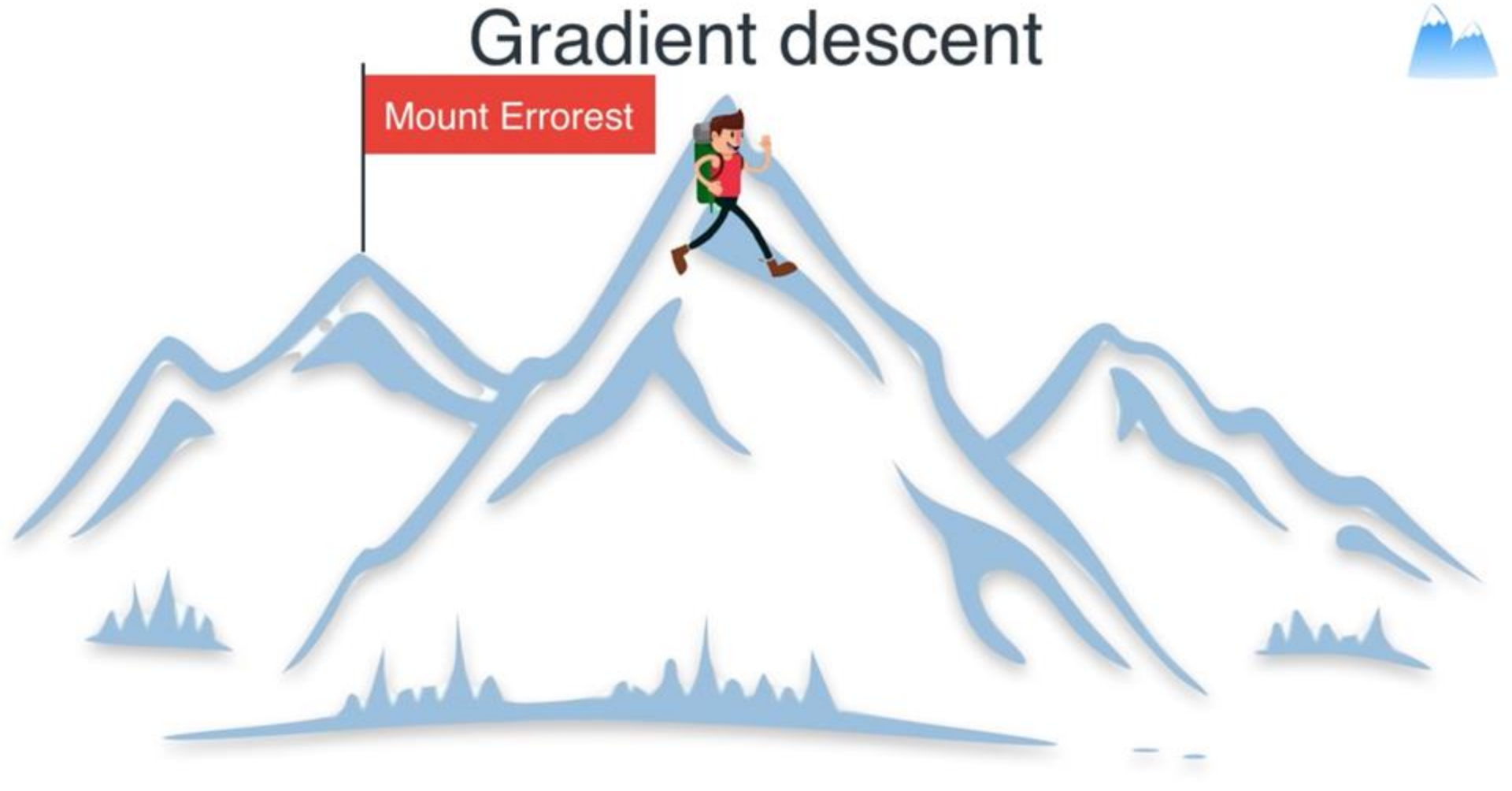
Gradient Descent



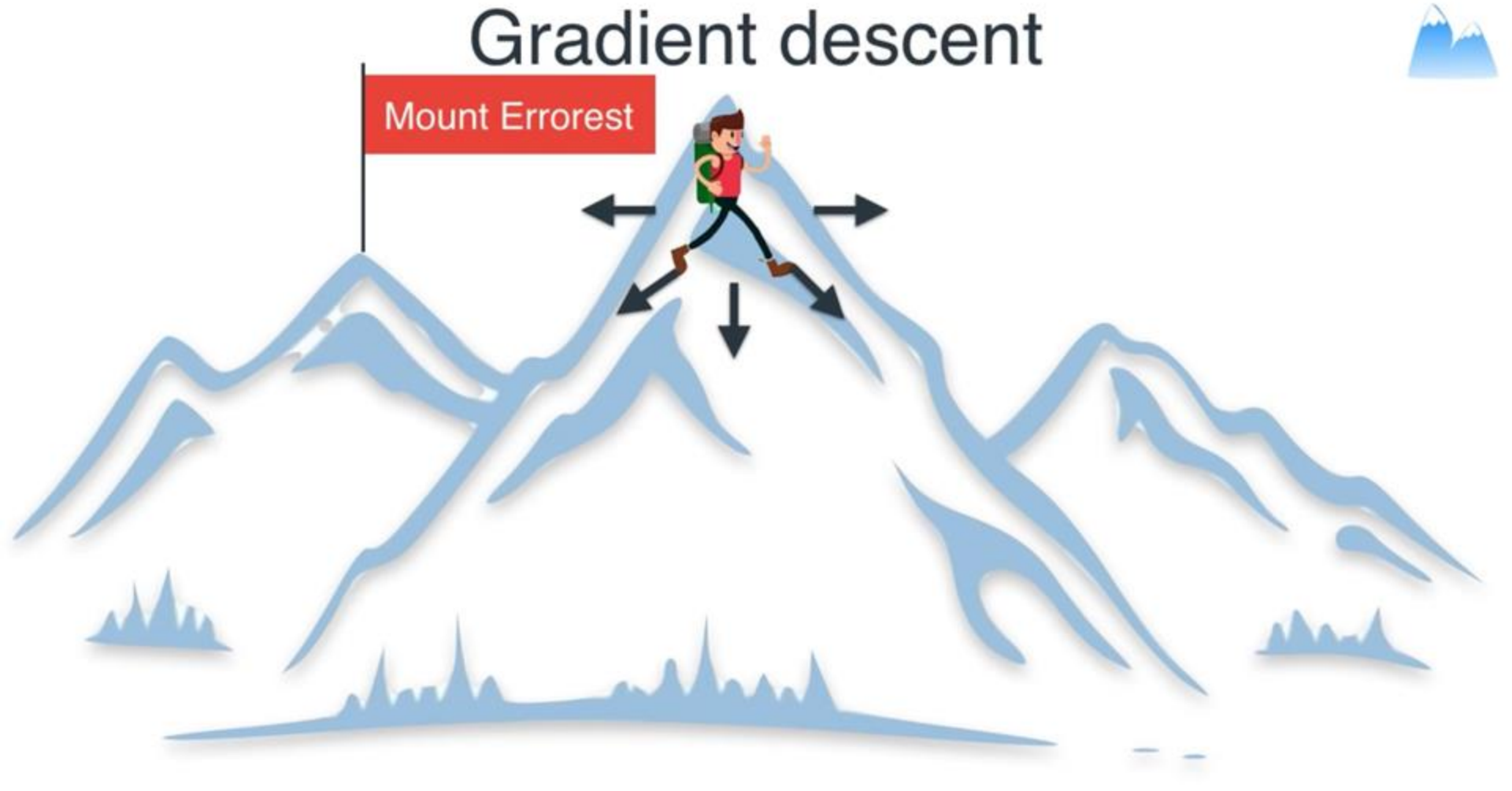
Approach To Find The Best Parameters



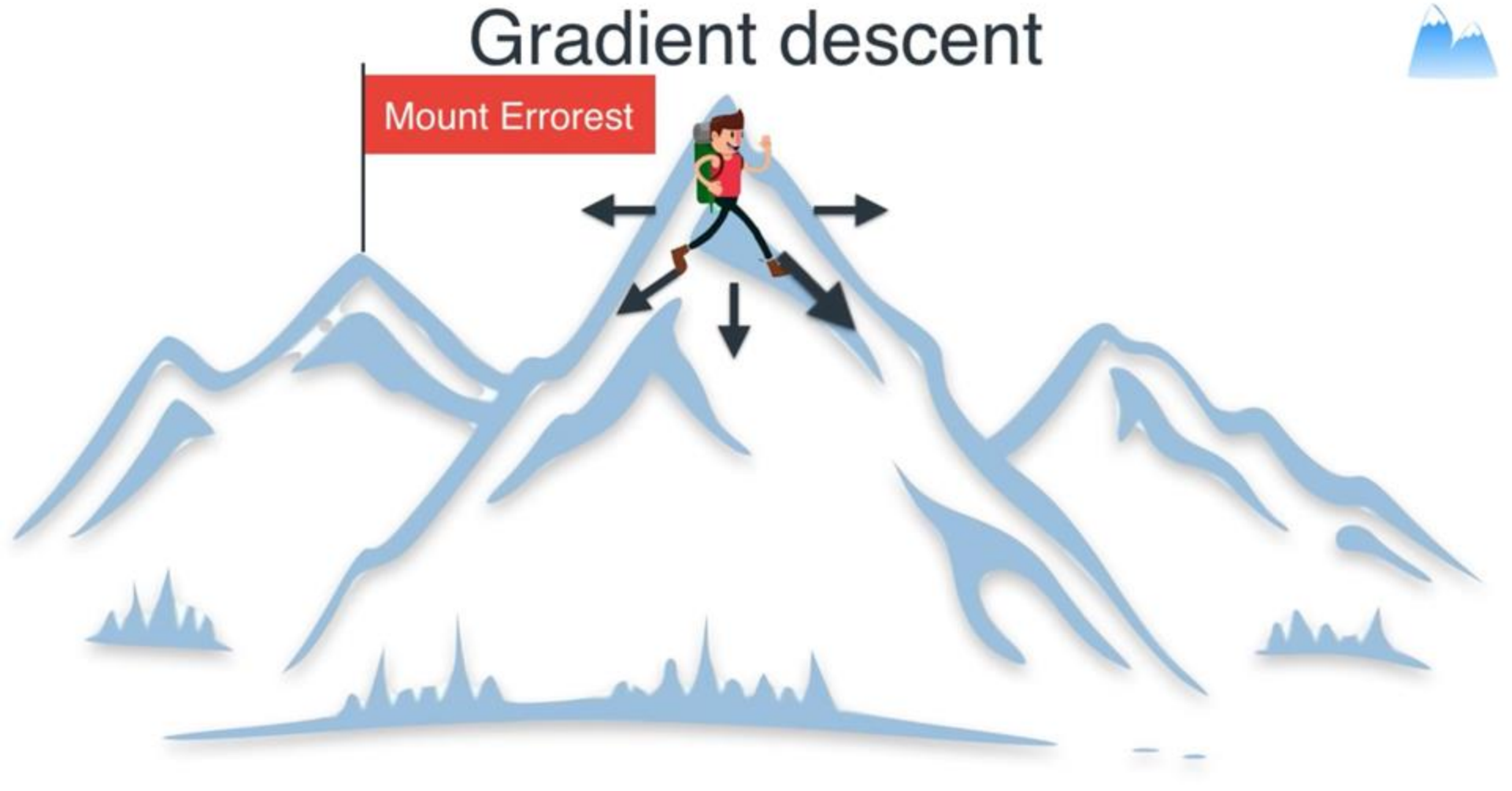
Gradient descent



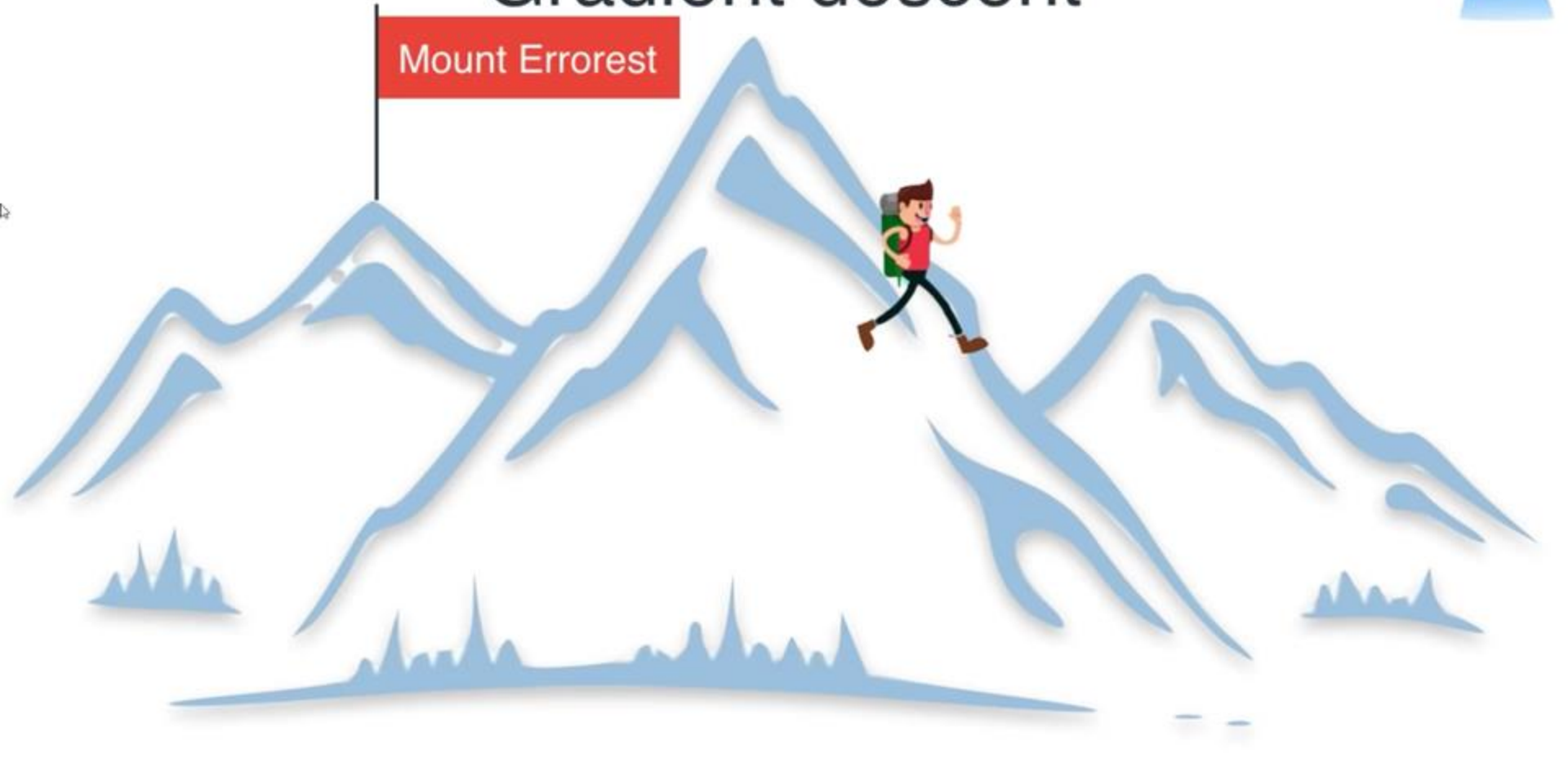
Gradient descent



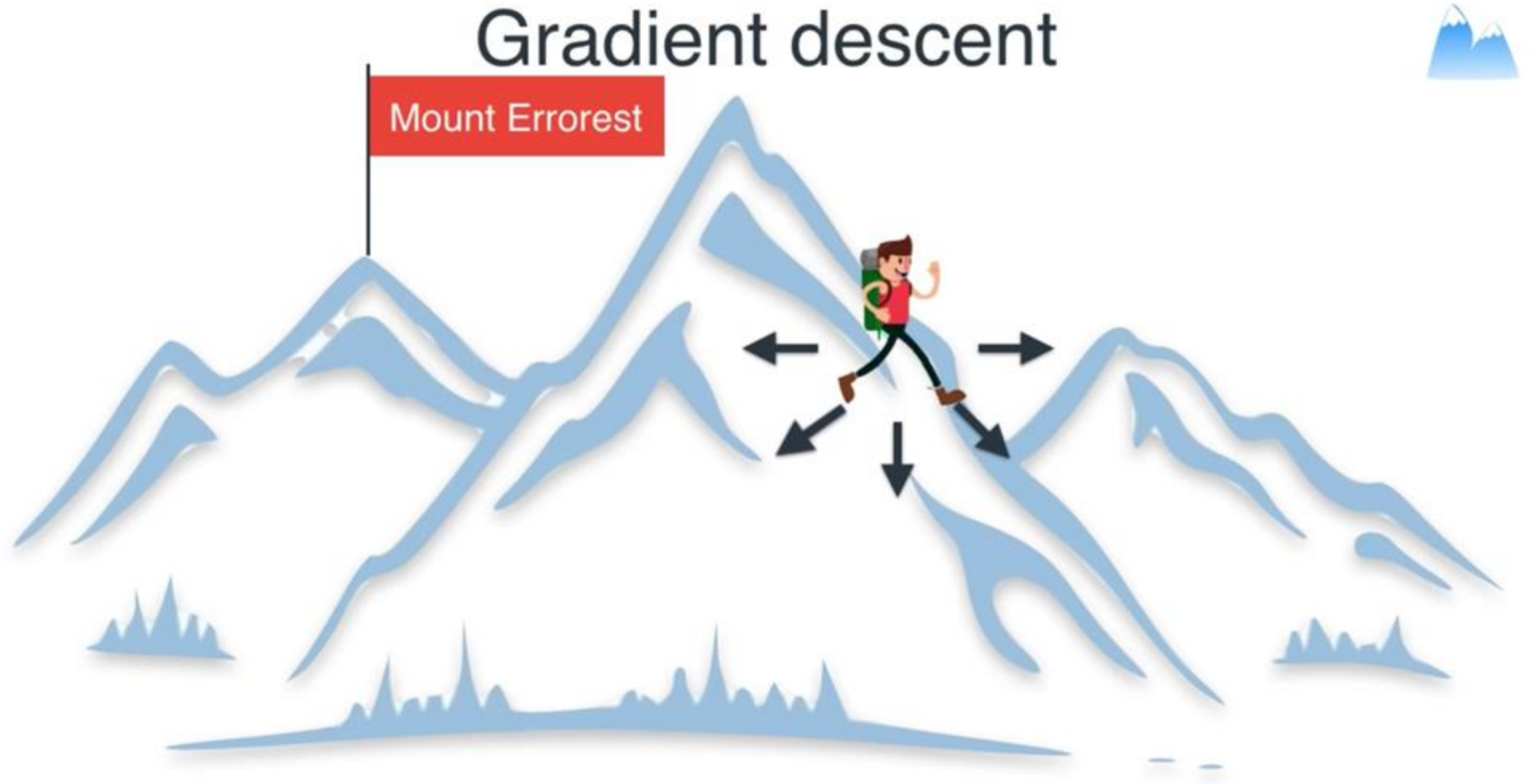
Gradient descent



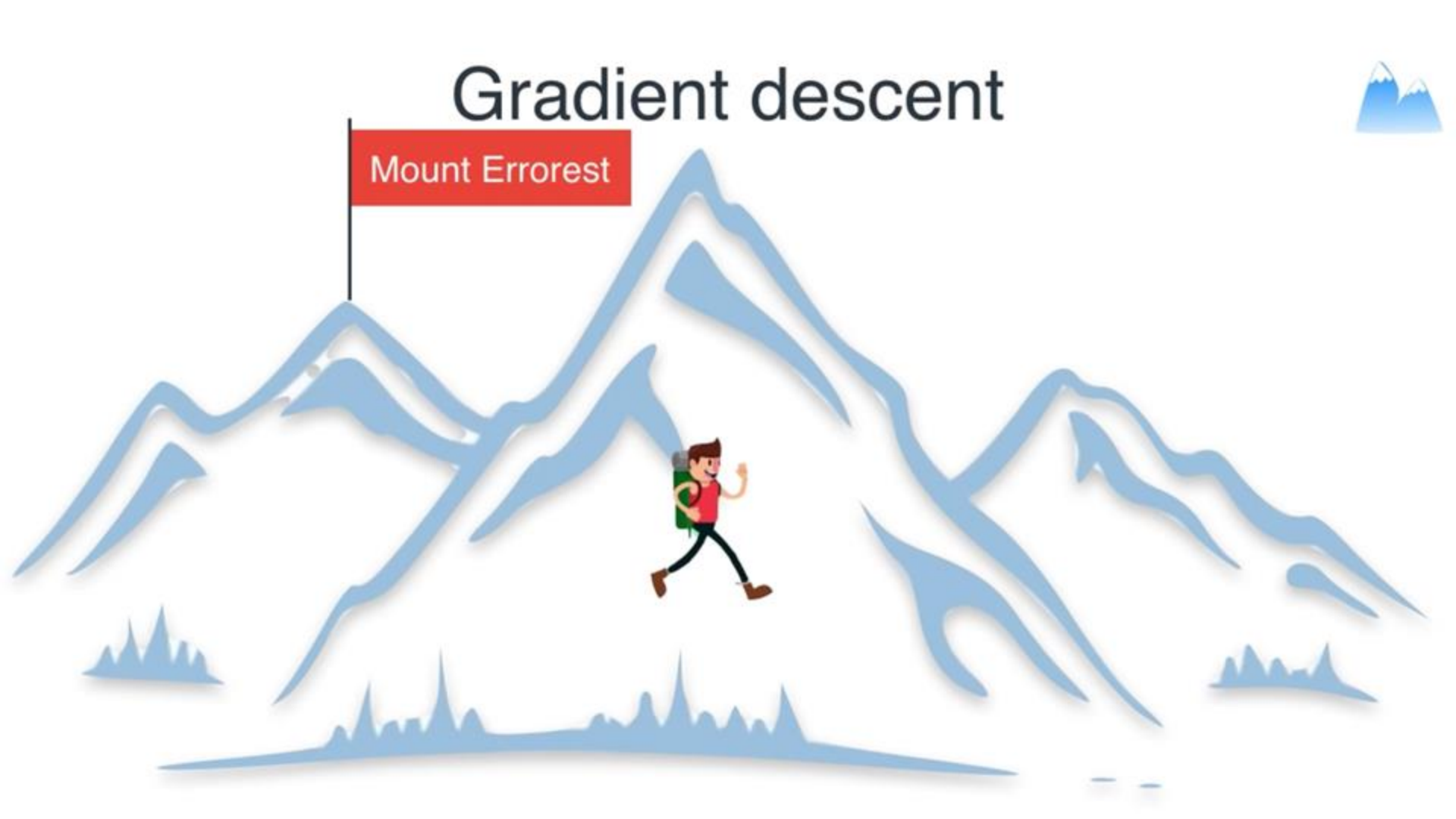
Gradient descent



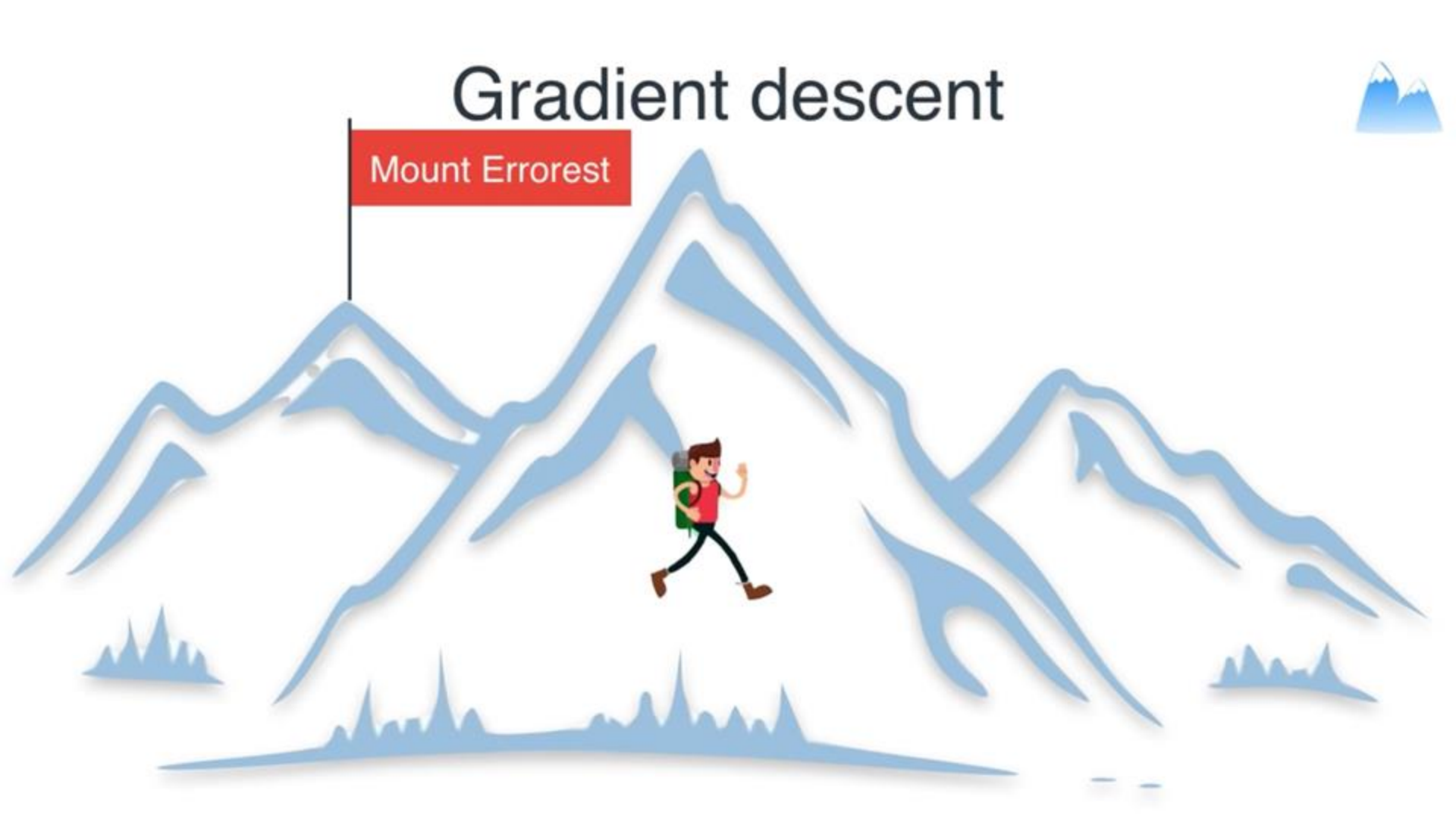
Gradient descent



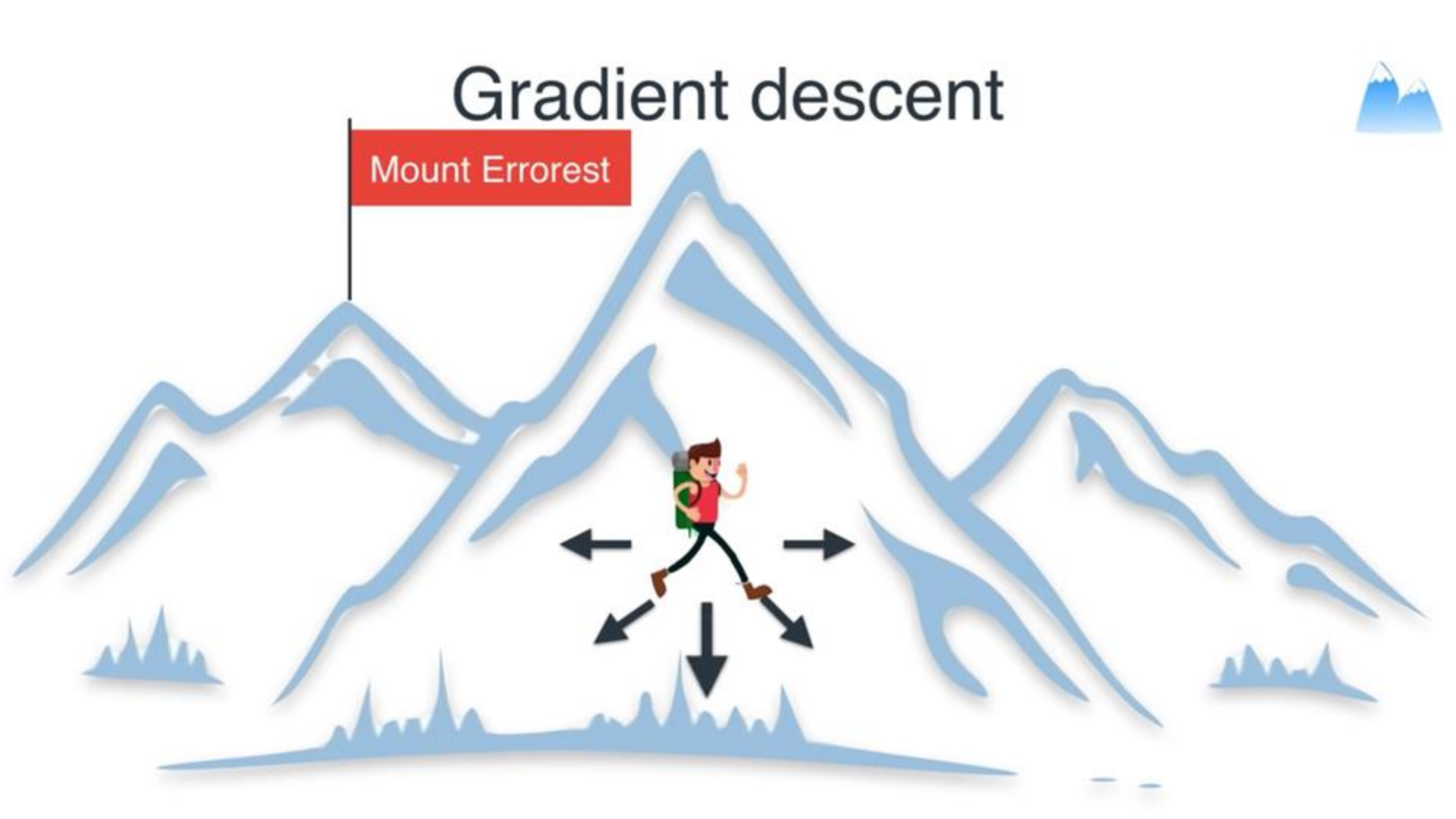
Gradient descent



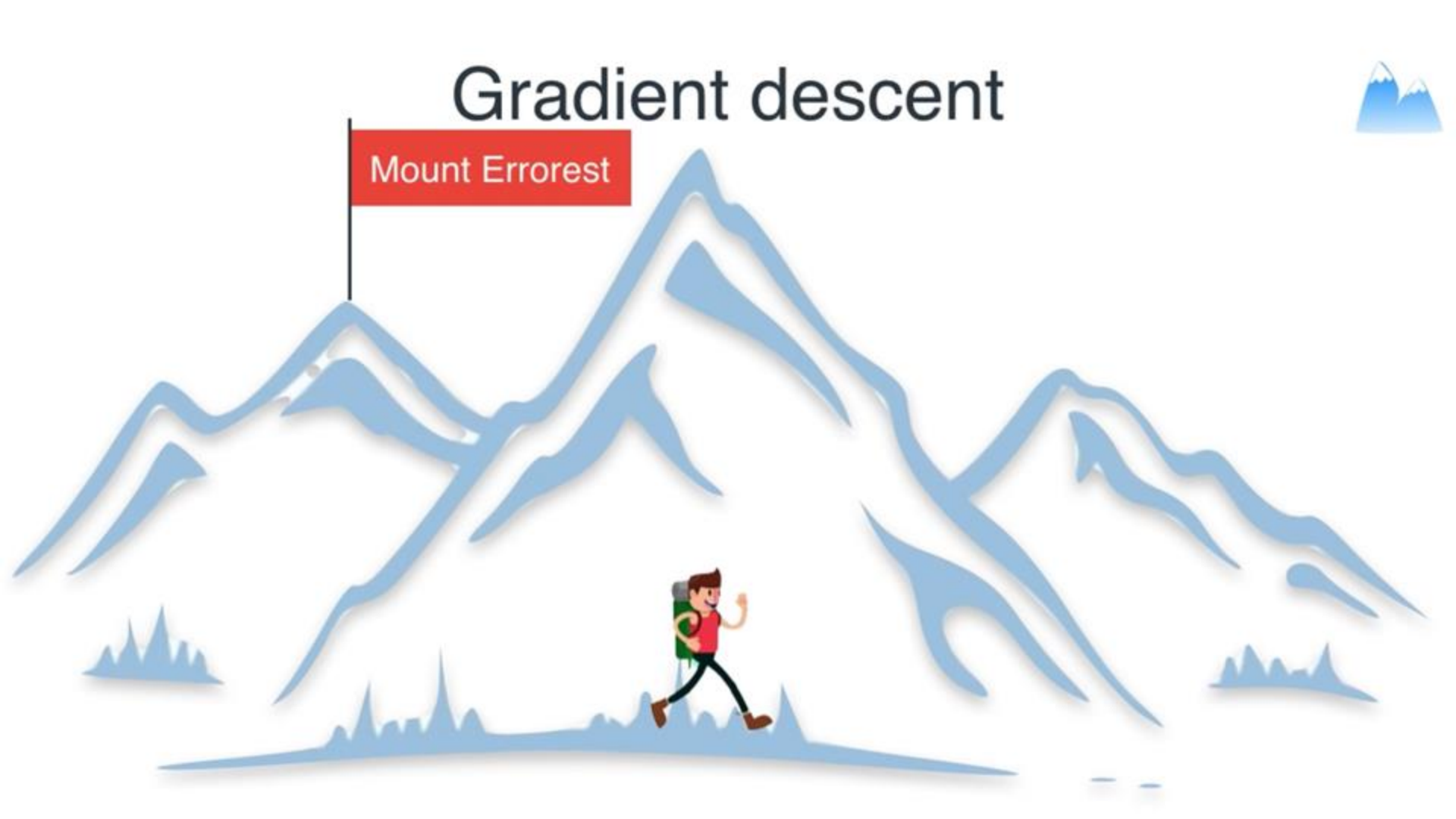
Gradient descent



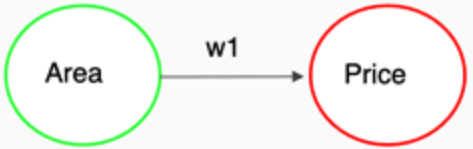
Gradient descent



Gradient descent

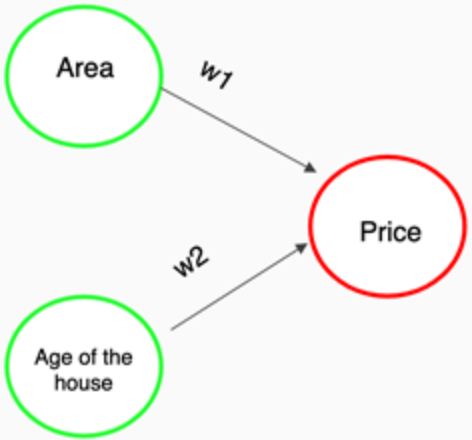


Linear Regression With 2 Inputs



Price = w1(Area) +b

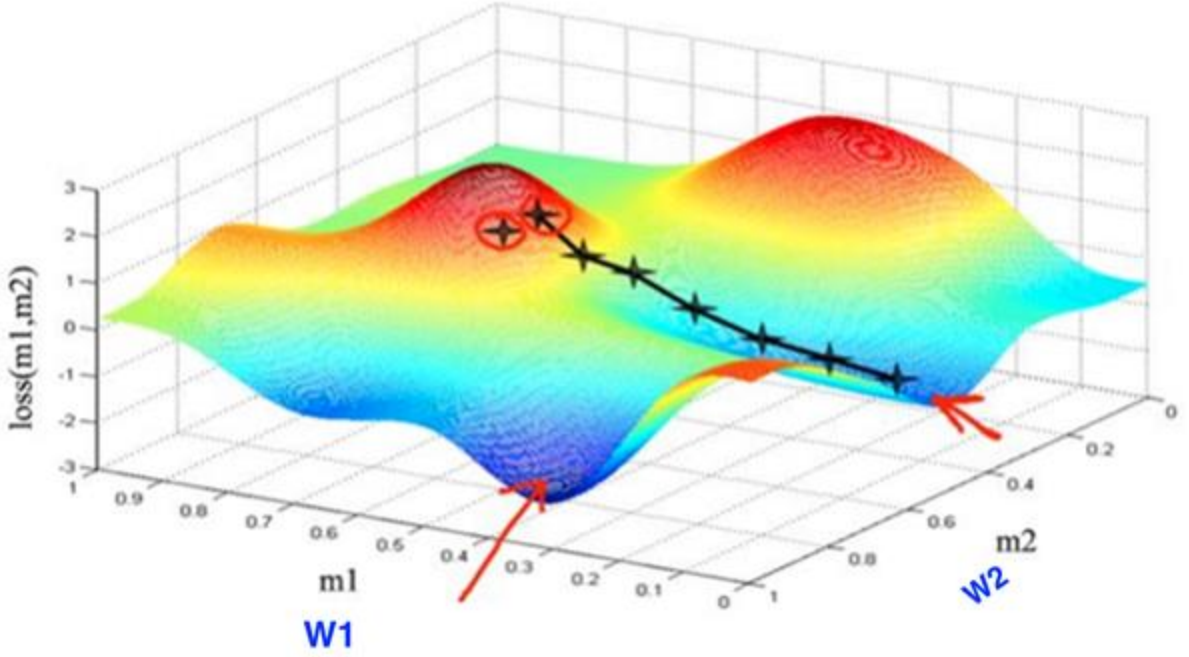
y=w1x1 +b



Price = w1(Area)+w2(Age of the house) +b

y=w1x1 +w2x2 +b

Gradient Descent in 2-D



Logistic Regression

Predicting Coin Flips?

- Imagine the problem of predicting probability of Heads for bent coins
- You might use features like angle of bend, coin mass, etc.
- What's the simplest model you could use?
- What could go wrong?

Need for Activation Function

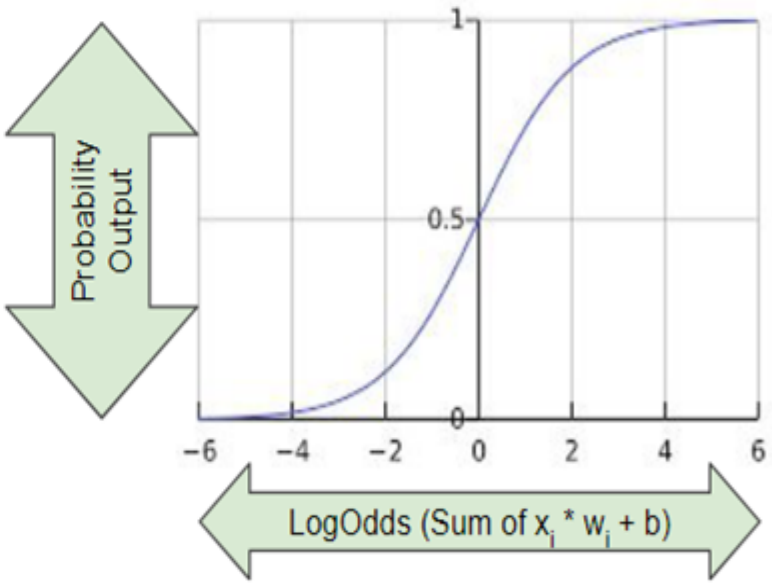
Fitting Values between 0 and 1:

$$y' = \frac{1}{1 + e^{-(w^T x + b)}}$$

Where:

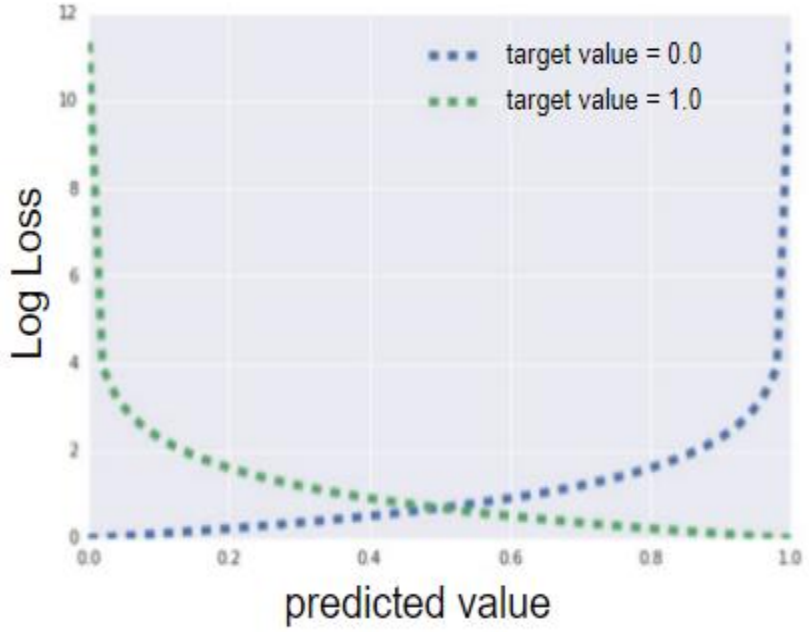
x: Provides the familiar linear model

$1 + e^{-(\dots)}$: Squish through a sigmoid

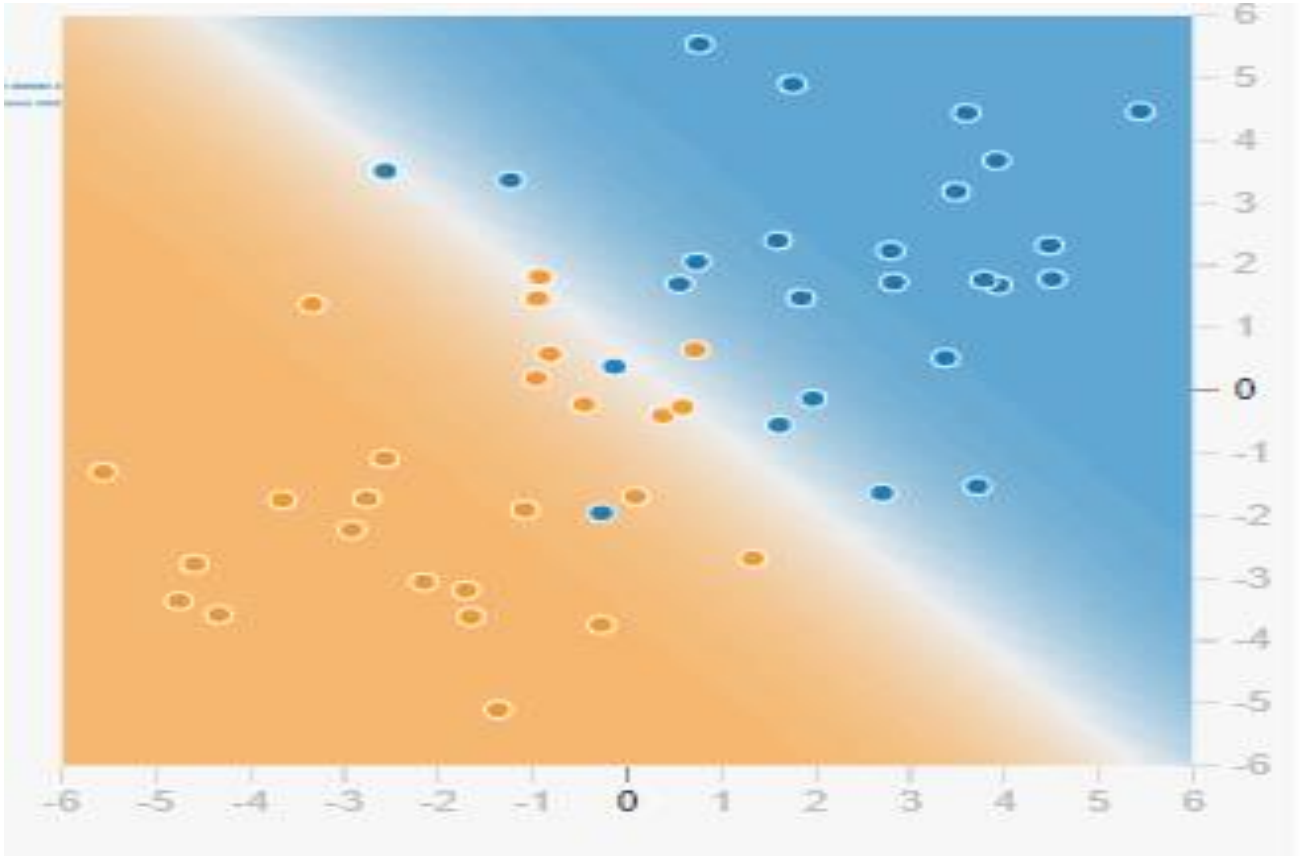


Loss Function:

$$LogLoss = \sum_{(x,y)\in D} -y\,log(y') - (1-y)\,log(1-y')$$

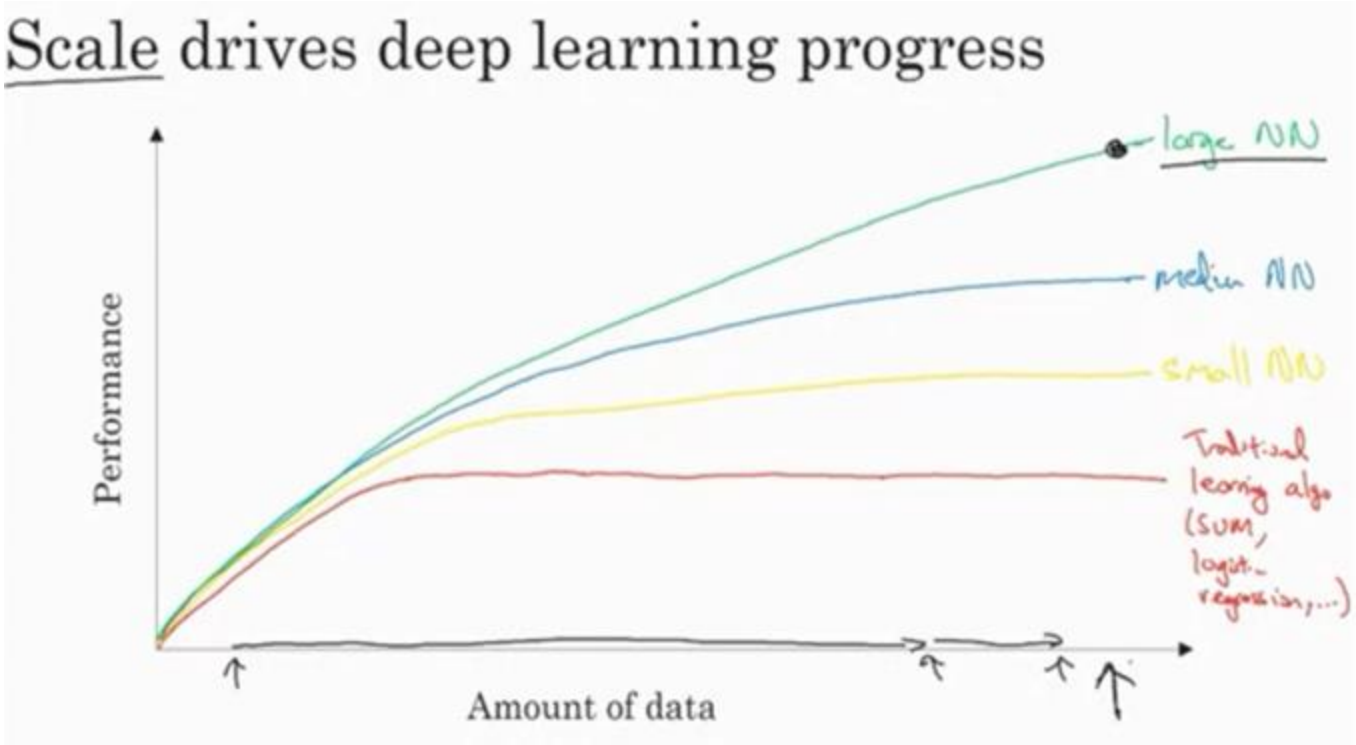


Logistic Regression In A Nutshell

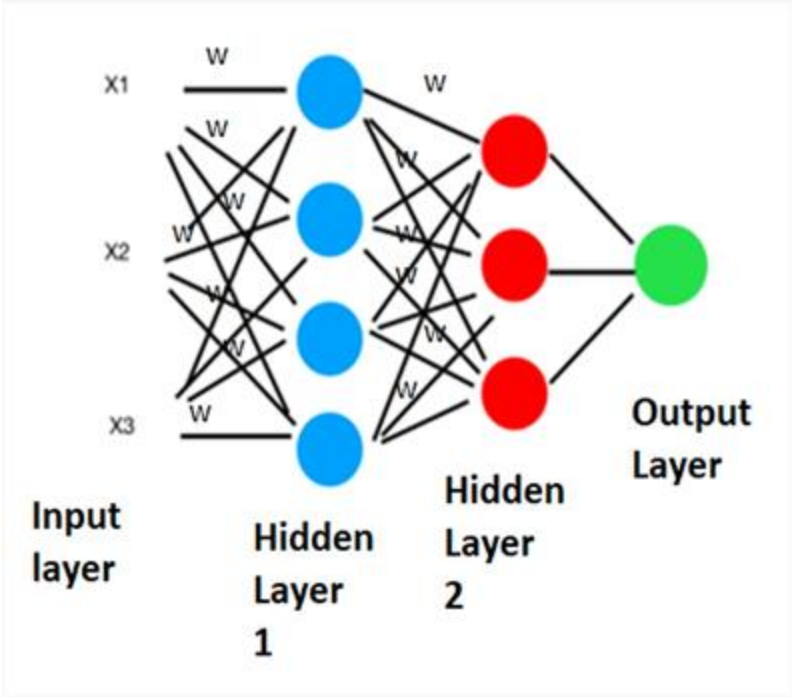


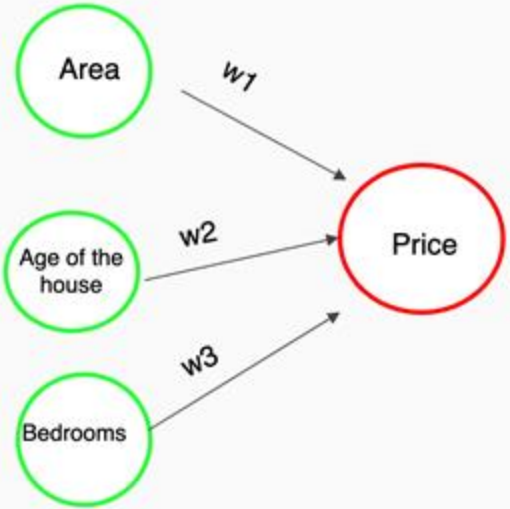
Why Deep Learning?

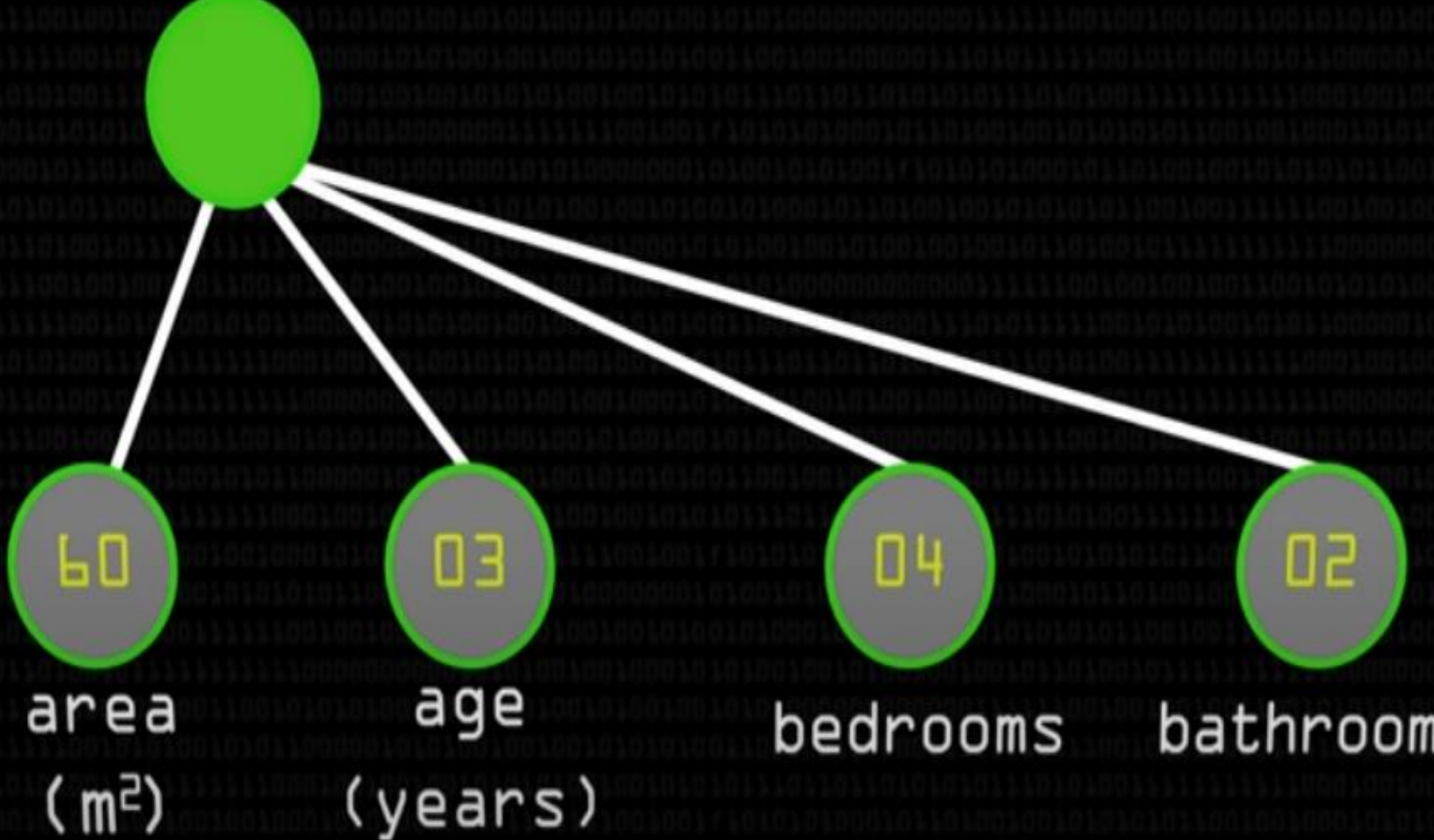
Scale drives deep learning progress



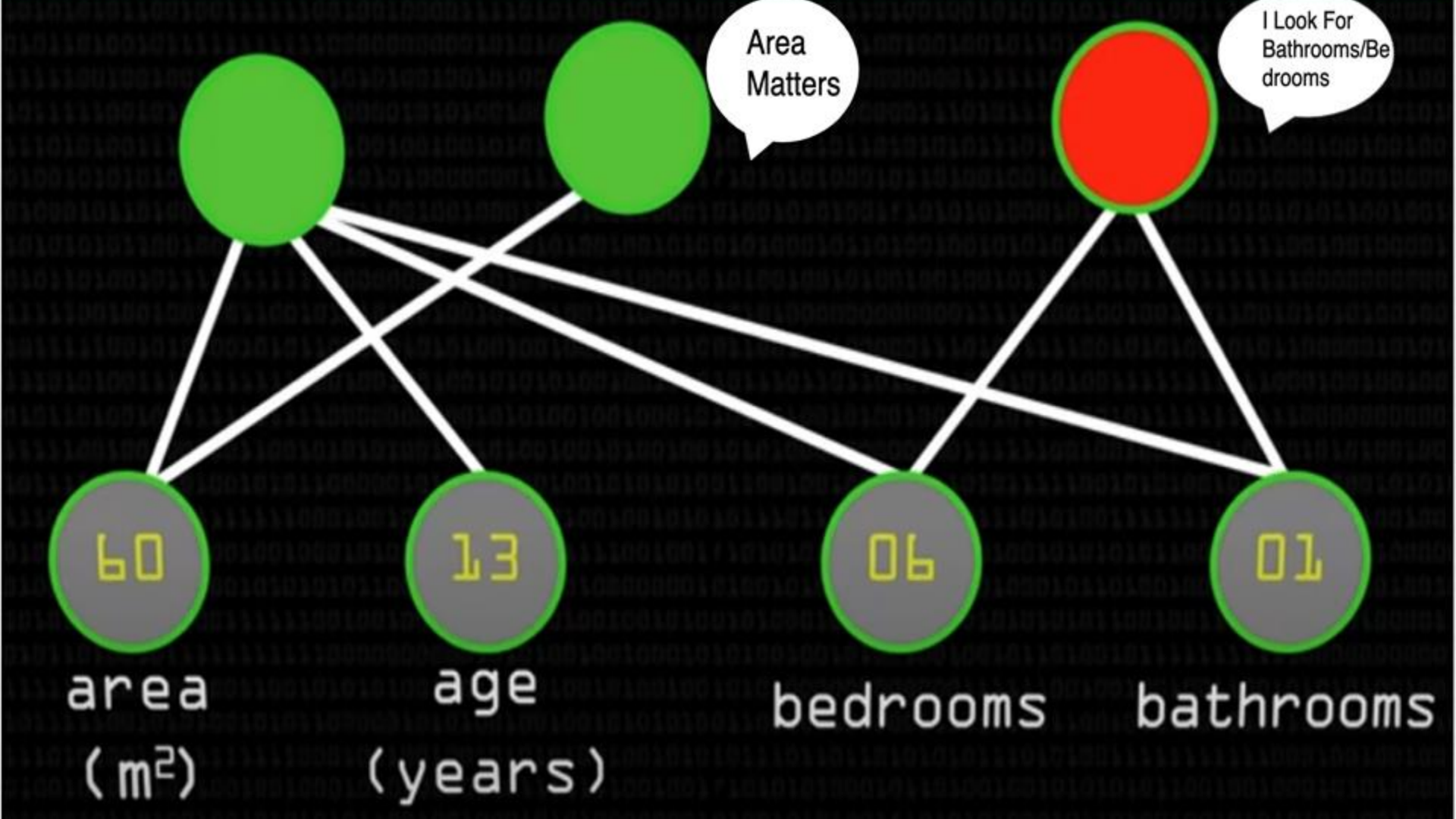
Neural Network Structure:



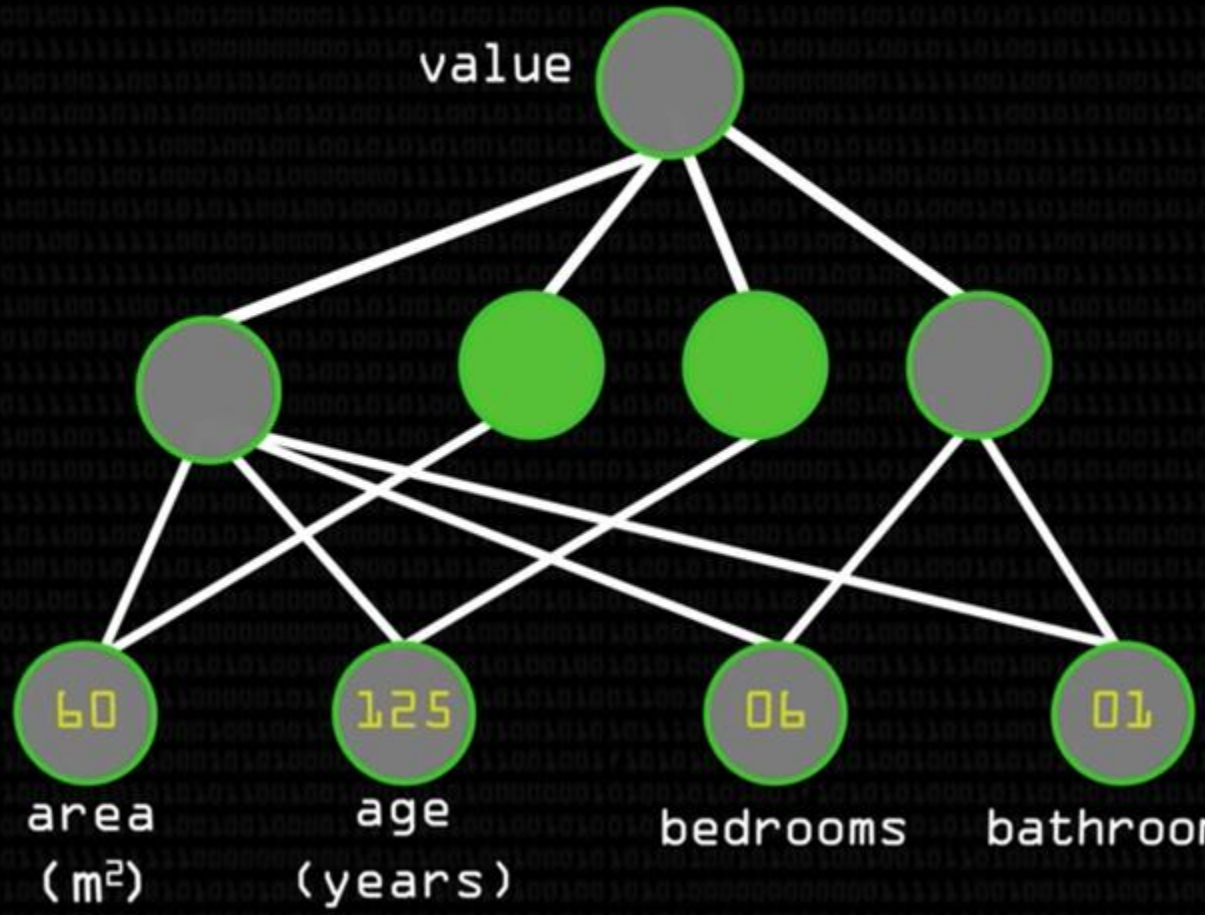



60
03
04
02
area
(m²)
age
(years)
bedrooms
bathrooms


Price
30
13
02
02
area
age
bedrooms
bathrooms


Area Matters
I Look For Bathrooms/Bedrooms
60
13
06
01
area (m²)
age (years)
bedrooms
bathrooms

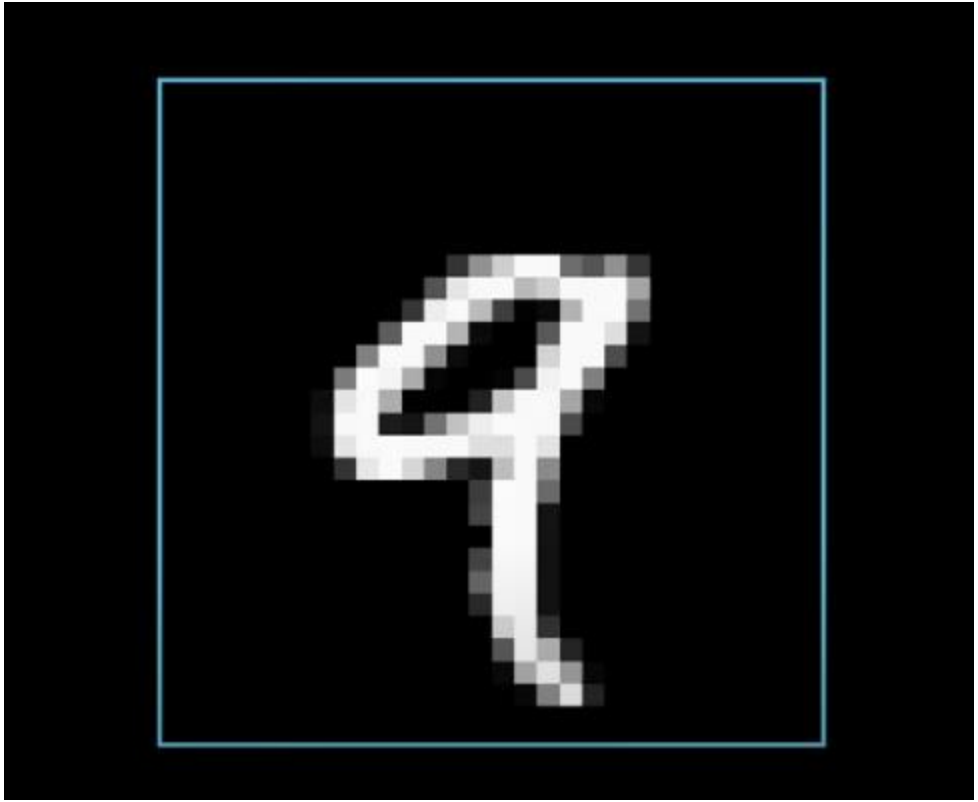
<'deep' learning>



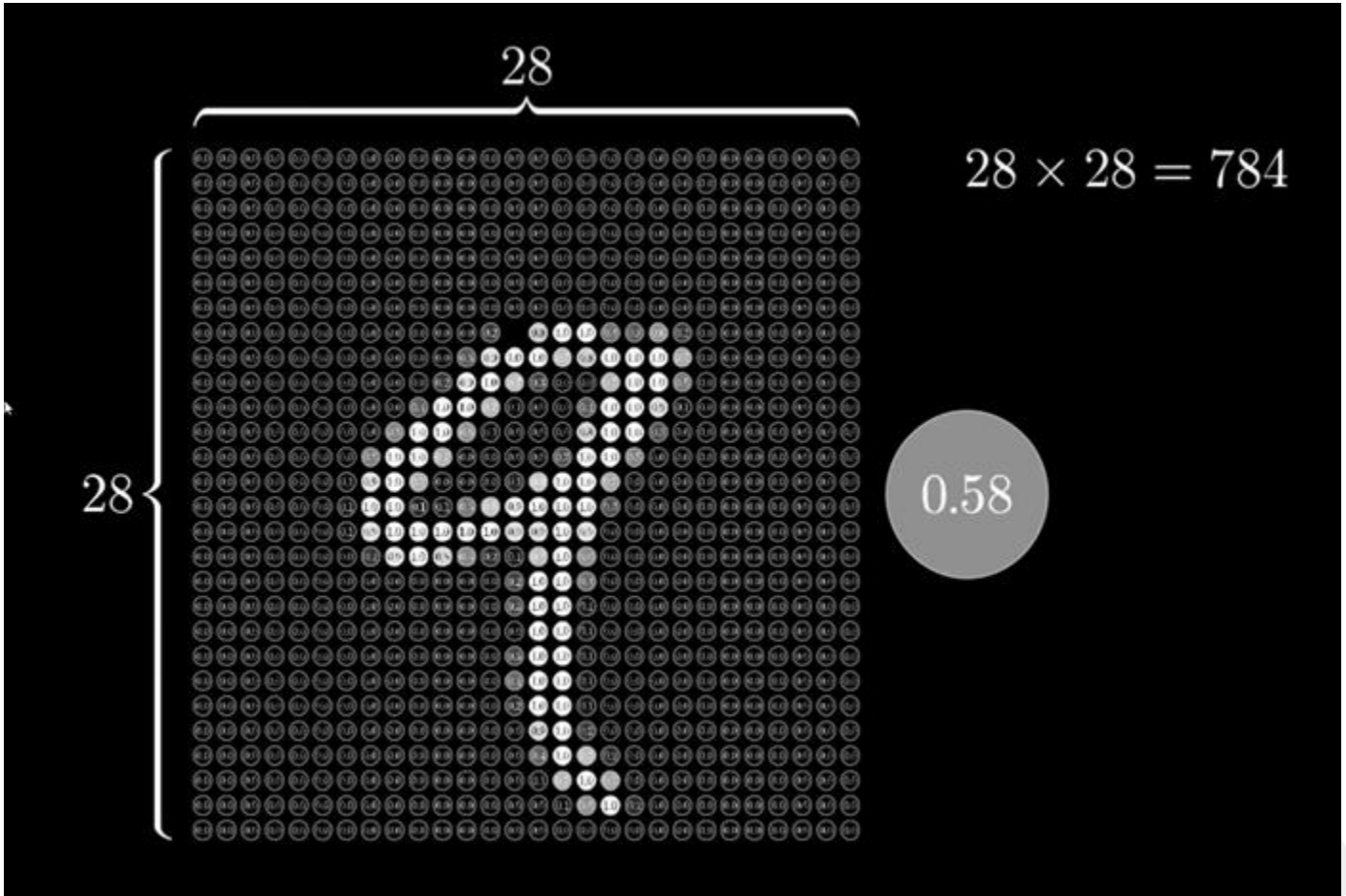
<C>

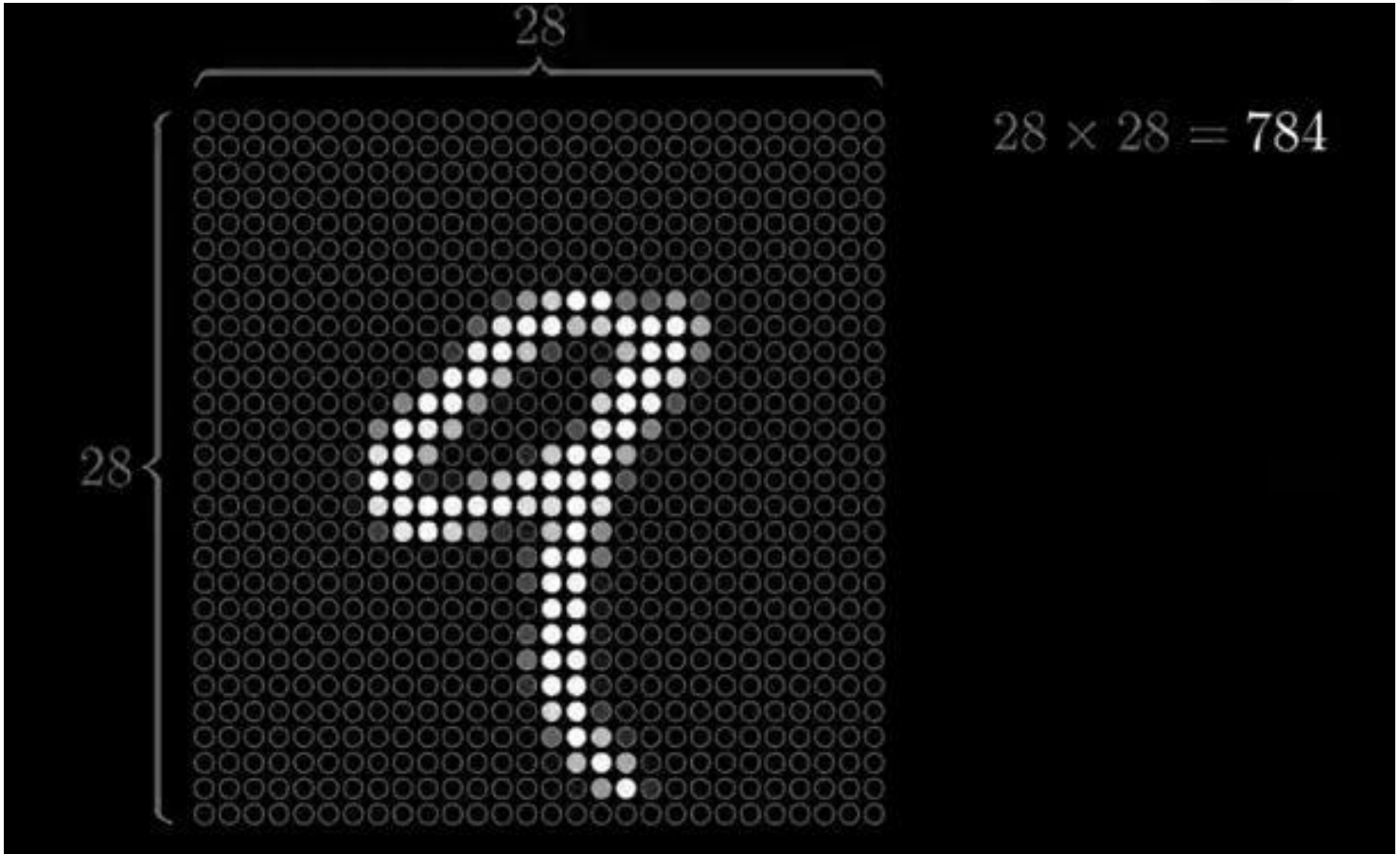
Handwritten Digit Classification

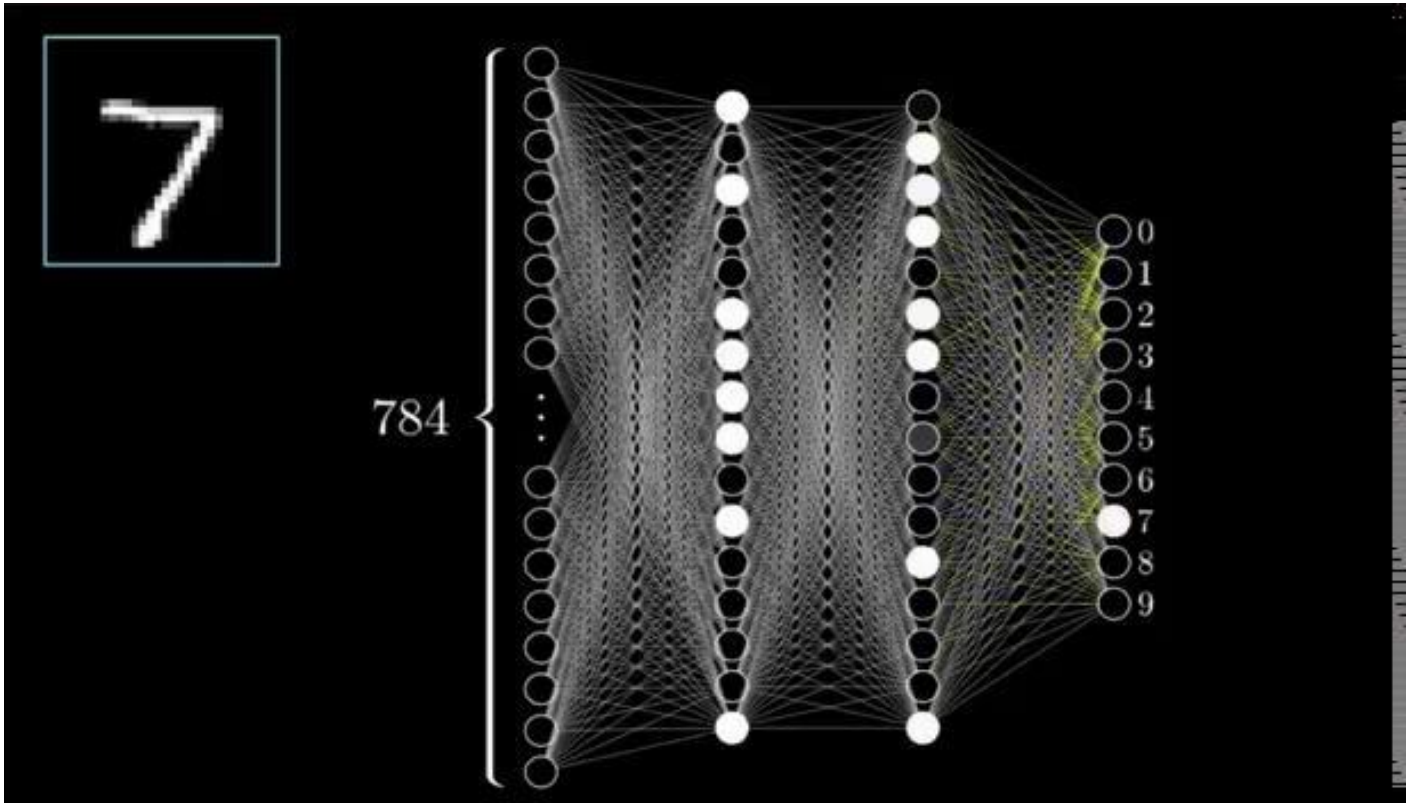
Image Of The Number 9



How Image is Represented in Computers?




28
28
28 × 28 = 784


784
0
1
2
3
4
5
6
7
8
9

Colab Notebook Link

Explore More On:

But what is a Neural Network? | Deep learning - YouTube

Deep Learning | Coursera

Intro to optimization in deep learning: Gradient Descent (paperspace.com)

Kaggle: Your Home for Data Science

Foundations of data science - Learn | Microsoft Docs

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