

About myself



Winn Voravuthikunchai

Founder & CEO BOTNOI GROUP

<https://www.linkedin.com/in/dr-winn-voravuthikunchai-05070163>



2008 --- Computer Vision --- 2013

2014 --- Data Science --- 2019

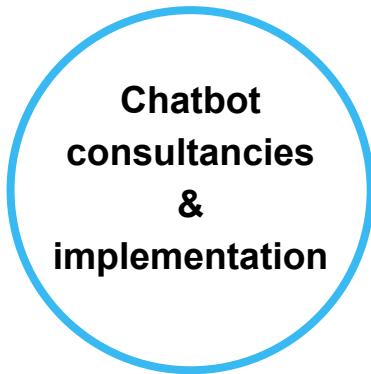
2018 --- Localised AI -->

My career path in AI

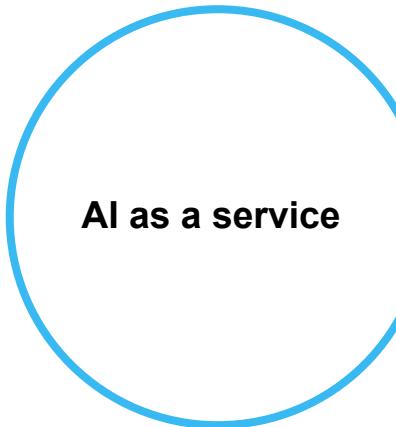


About BOTNOI

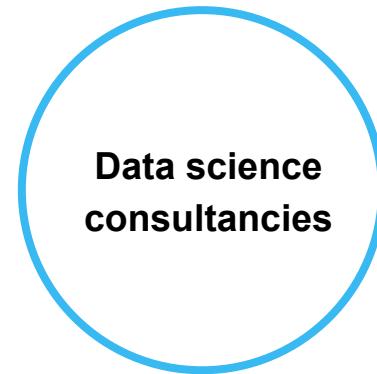
www.botnoigroup.com



- For enterprises
- For SMEs
- For social good



- Natural Language Processing
- Computer Vision
- Speech recognition



- AI & Data science coaching
- AI & Data science consult



Chatbot



botnoi

๙๗

1,806,644

Friend chatbot



LINE BOT Award 2017



BOTNOI

Consulting



~ 30 corporate customers

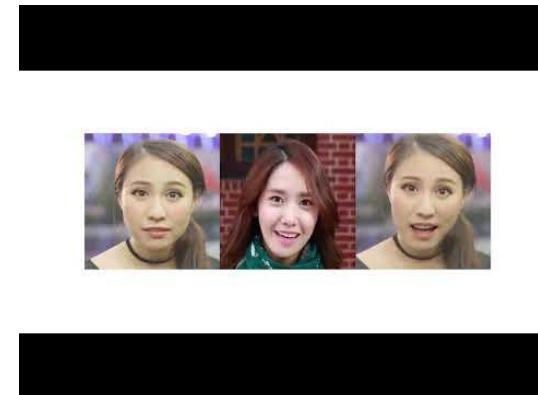
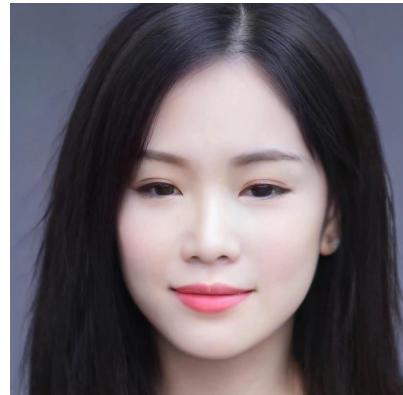


<https://lineforbusiness.com/th/line-oa-store/apps/botnoi-sme-platform>



AI

www.botnoigroup.com



Data Science

The screenshot shows a Facebook group page with the following details:

- Group Name:** Botnoi AI & Data science classroom
- Group Description:** กลุ่มสาระฯ ได้ดูน้องชื่อ Botnoi Consulting
- Post Preview:** A post by Dr. Wenn Voravutkunchai featuring a cartoon robot character.

Our AI & DS community

<https://www.facebook.com/groups/2421985951170978>

The screenshot shows a Medium publication page with the following details:

- Title:** Botnoi Classroom—Machine Learning 01
- Author:** ARTHANEUPON PRATOMBIT
- Date:** Nov 15 - 3 min read
- Content Preview:** สำหรับผู้เริ่มต้น Medium post ที่จะอธิบาย ขั้นตอนการทำงานของเครื่องเรียนรู้ที่ได้ ถูกพัฒนาขึ้นมา ซึ่งจะเป็นการอธิบาย Machine Learning สำหรับ...

Our medium publication

<https://medium.com/botnoi-classroom/machine-learning-01-1f3a2a2a2a2a>



Previous shopee event



Pool of data scientists & ai engineers ready for outsourcing (short & long term)

<https://datasciencehub.botnoi.ai/>

The screenshot shows a dark-themed website for "Data Science HUB". At the top, there's a navigation bar with links for "ABOUT", "OUR SCIENTISTS", "DATA SCIENCE", "CLIENTS", and "REQUEST". Below the navigation, a banner states: "Our data scientists are flexible and ready to tackle any short or long-term projects. We offer a broad range of skills, from the newest trainee to the most seasoned senior data scientist." The main content area features four cards, each with a profile picture and a title. The first card is for "TRAINEE" with 60 members. It describes them as students or interns at Botnoi who have a grasp on the basics of data science. The second card is for "JUNIOR DATA SCIENTIST" with 8 members. It describes them as new data scientists with months of real-world experience. The third card is for "DATA SCIENTIST" with 4 members. It describes them as having a couple years of experience and being able to formulate use cases and create business solutions. The fourth card is for "SENIOR DATA SCIENTIST" with 3 members. It describes them as having 5+ years of experience and being capable in all things data science, able to work at the management level.

Category	Members	Description
Trainee	60	Students or interns at Botnoi who have a grasp on the basics of data science. Filled with potential as personnel or manpower for your business.
Junior Data Scientist	8	New data scientists who have months of real-world experience under their belt, and can undertake various data tasks on their own. Build your data science team with them as the core components!
Data Scientist	4	Data scientists with a couple years of experience, and are able to formulate use cases and create business solutions. They are able to work independently, and are ready for immediate deployment.
Senior Data Scientist	3	Data scientists with 5+ years of experience, and are capable in all things data science. They can work at the management level and can easily lead a team of data scientists on their own.



Machine Learning & Image Classification

Agenda

Overview

Machine Learning

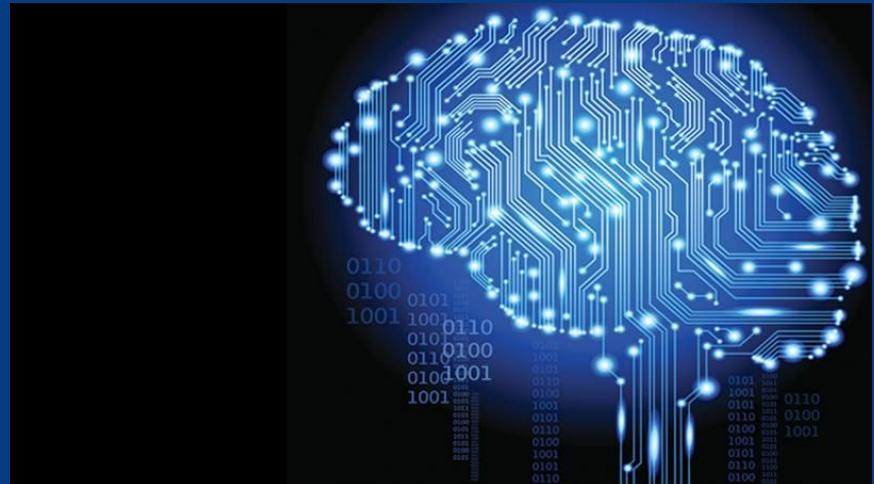
Cost function

Gradient descent

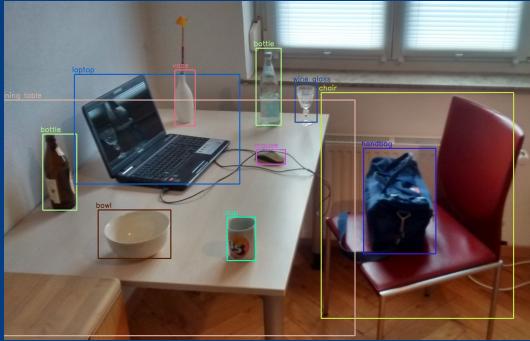
Linear regression implementation (colab)

Image classification example (colab)

Human Intelligence VS Artificial Intelligence



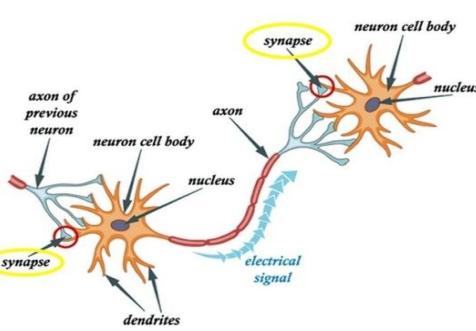
AI applications



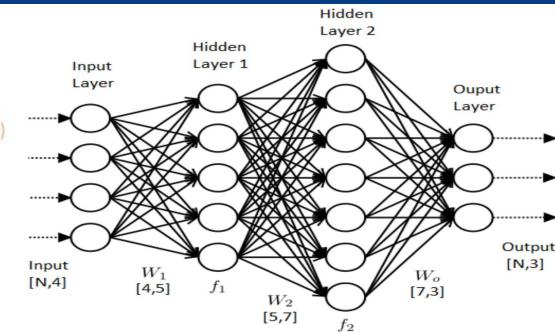
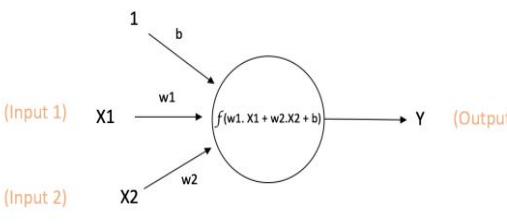
- Computer Vision
- Natural Language Processing
- Speech recognition
- Text to speech
- Data science

Brain & Neurons

Human



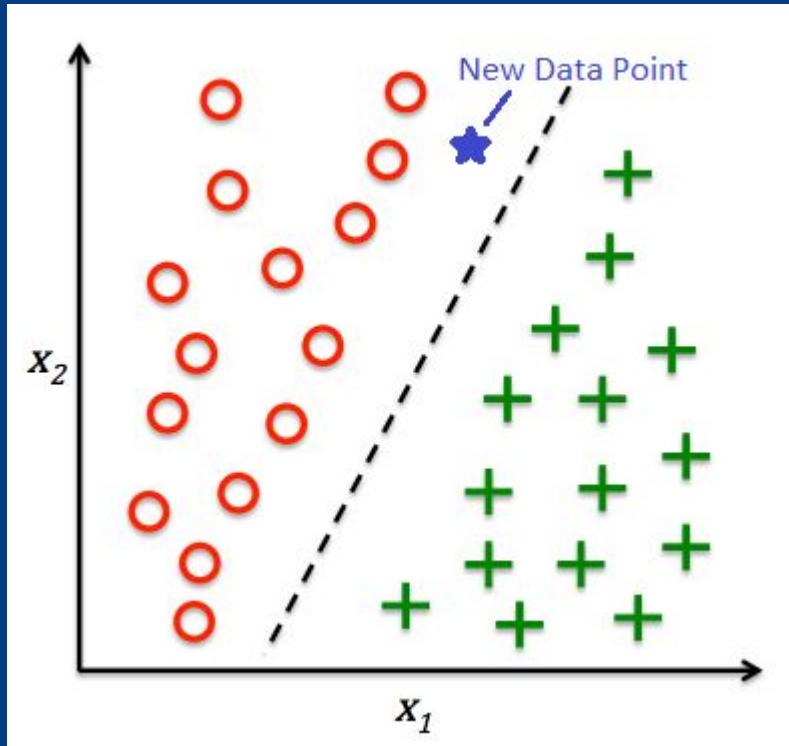
Artificial



Human Learning - Supervised Learning

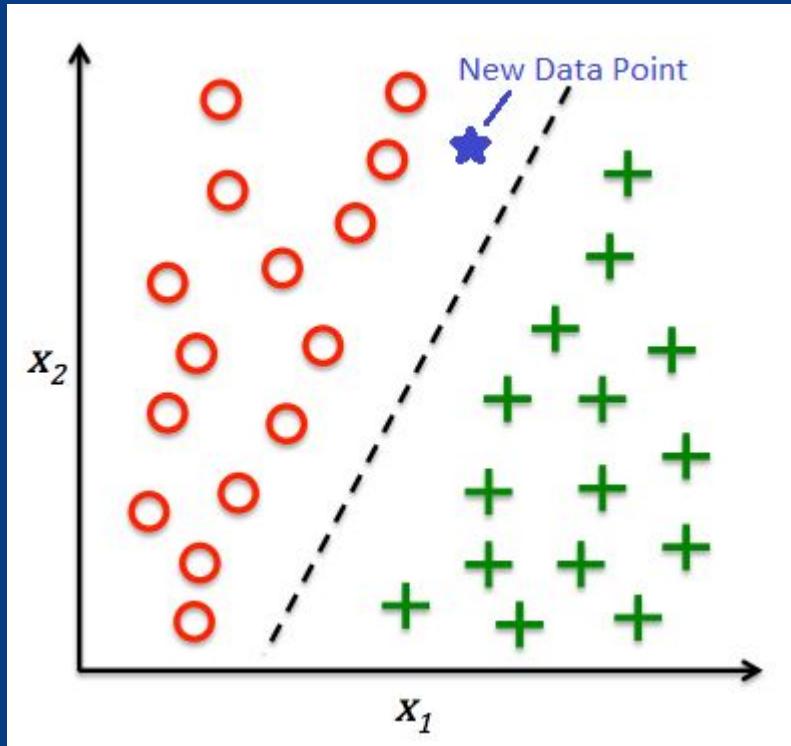


Machine Learning



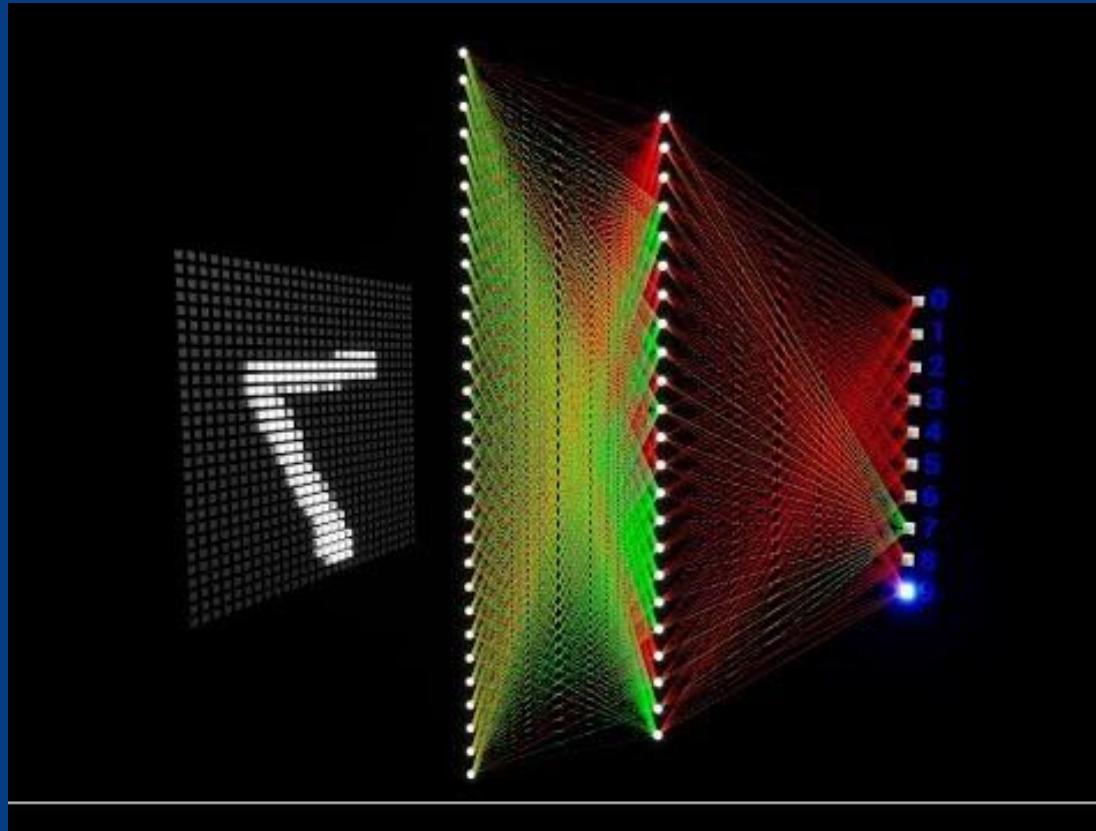
- Learn model (black line) to separate red and green data
- X_1 X_2 are called features
- Red and Green are called training data
- Star is new data point to predict

Machine Learning



- Learn model (black line) to separate red and green data
- X_1 X_2 are called features
- Red and Green are called training data
- Star is new data point to predict

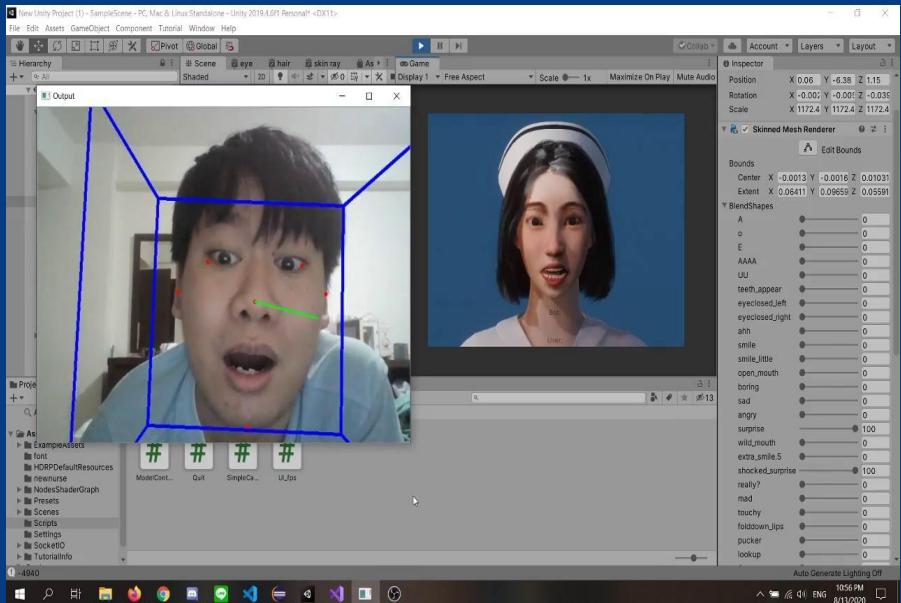
Machine Learning - Supervised Learning



Applications - Computer Vision



Object Detection



Emotion recognition

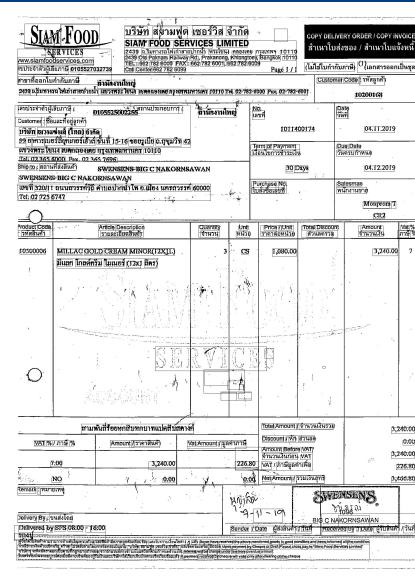


BOTNOI

Applications - Computer Vision



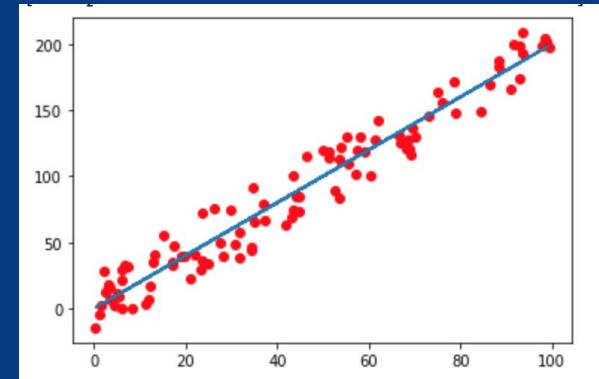
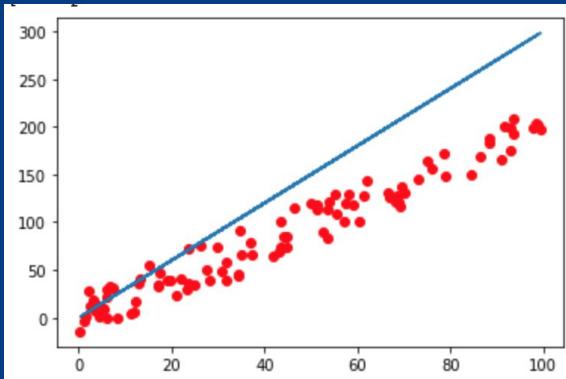
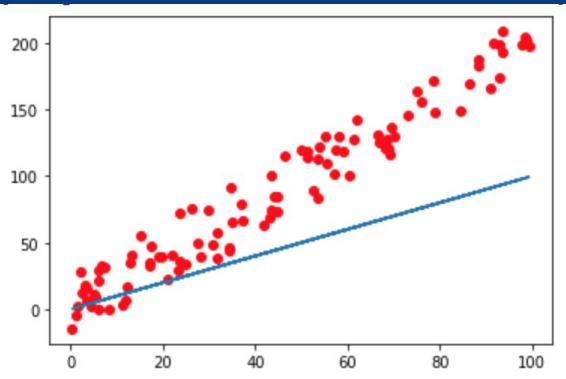
Digital Human



Document segmentation & Optical Character recognition

	text	pred
6	www.siamfoodservices.com/ทางประจําว่าด้วยเรื่องภาษี...	seller_tax_no
12		10201692
17	0105s510013สถานประกอบการ :	customer_tax_no
20		22.11.2019
21		1011411600
25		30 Days
26		term_of_payment
33		22.12.2019
34		due_date
35		Monprom T
45	DORY CUBB 20-30g (IKG X 10)	salesman
46		1003753
47		product_code
49		850.00
51	เนื้อปลาคราฟ์ น้ำเนื้าเต้า 20-30 กجم	ppu
57		unit
60		0.00
72		discount
75		vat_amt
		net_amt

Linear regression - best line that fits through the data

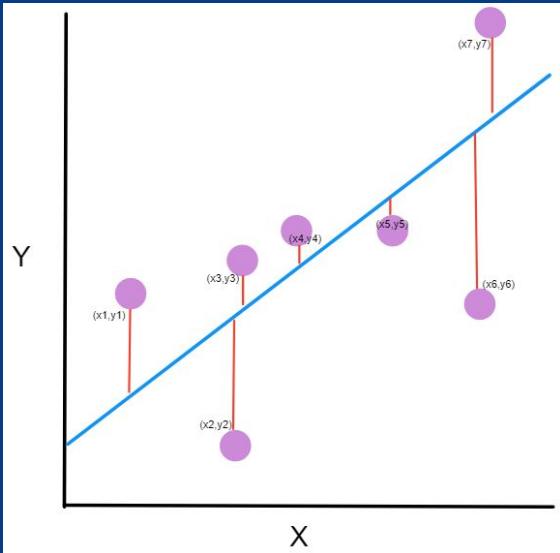


- Which line is the best?
- How to quantify?

Steps

1. Define prediction equation
2. Initially assign random weights
3. Calculate predictions
4. Define cost function
5. Differentiate cost function
6. Adjust weights by subtracting the derivative at the current weight

Error function



$$MSE = \frac{1}{n} \sum_{i=1}^n (Y_i - \hat{Y}_i)^2$$

$$MAE = \frac{1}{n} \sum_{i=1}^n |Y_i - \hat{Y}_i|$$

Calculus

Diff error function for linear regression (no intercept)

$$h = wx$$

$$j = \frac{1}{2} (y - h)^2$$

$$\frac{\partial j}{\partial w} = \frac{\partial j}{\partial h} \cdot \frac{\partial h}{\partial w}$$

$$\frac{\partial j}{\partial h} = (y - h) \cdot -1 = h - y$$

$$\frac{\partial h}{\partial w} = x$$

$$\frac{\partial j}{\partial w} = (h - y) \cdot x$$



Diff error function for linear regression

$$\hat{y} = w x + b$$

$$j(w) = \frac{1}{2} \sum (y - \hat{y})^2$$

$$\frac{\partial j(w)}{\partial w} = \frac{\partial j(w)}{\partial \hat{y}} \times \frac{\partial \hat{y}}{\partial w}$$

$$\frac{\partial j(w)}{\partial \hat{y}} = \sum (y - \hat{y}) x - 1$$

$$\frac{\partial \hat{y}}{\partial w} = x$$

$$\frac{\partial j(w)}{\partial w} = \sum [(y - (w x + b)) x - 1] x$$

$$\frac{\partial j(b)}{\partial b}$$

$$j(b) = \frac{1}{2} \sum (y - \hat{y})^2$$

$$\frac{\partial j(b)}{\partial b} = \frac{\partial j(b)}{\partial \hat{y}} \times \frac{\partial \hat{y}}{\partial b}$$

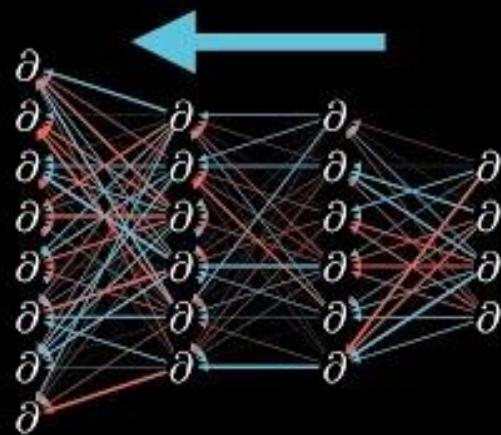
$$\frac{\partial j(b)}{\partial \hat{y}} = \sum (y - \hat{y}) x - 1$$

$$\frac{\partial \hat{y}}{\partial b} = 1$$

$$\frac{\partial j(b)}{\partial b} = \sum [y - (w x + b)] x - 1$$

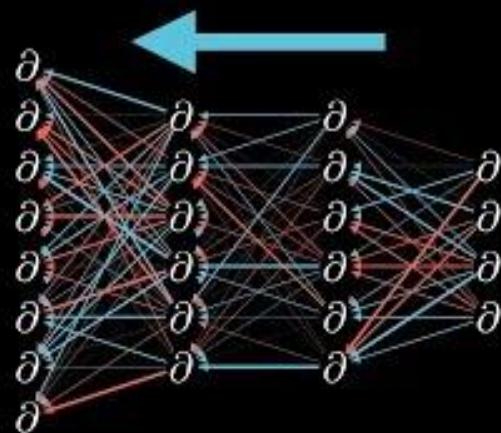
Backpropagation

Backpropagation calculus

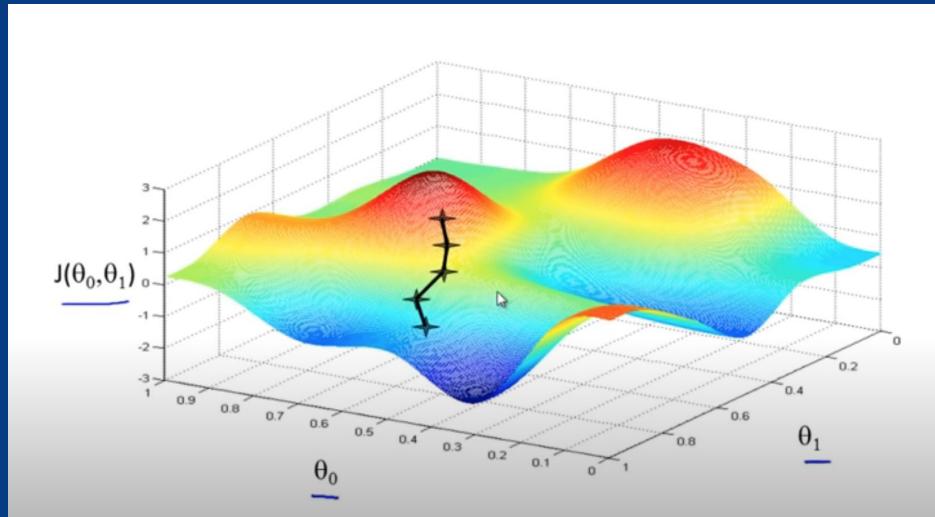


Backpropagation

Backpropagation calculus

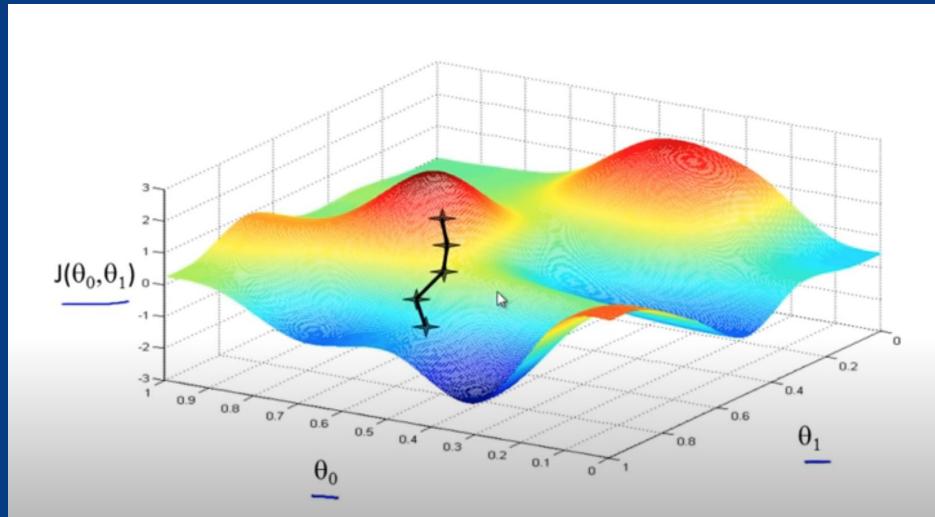


Error function



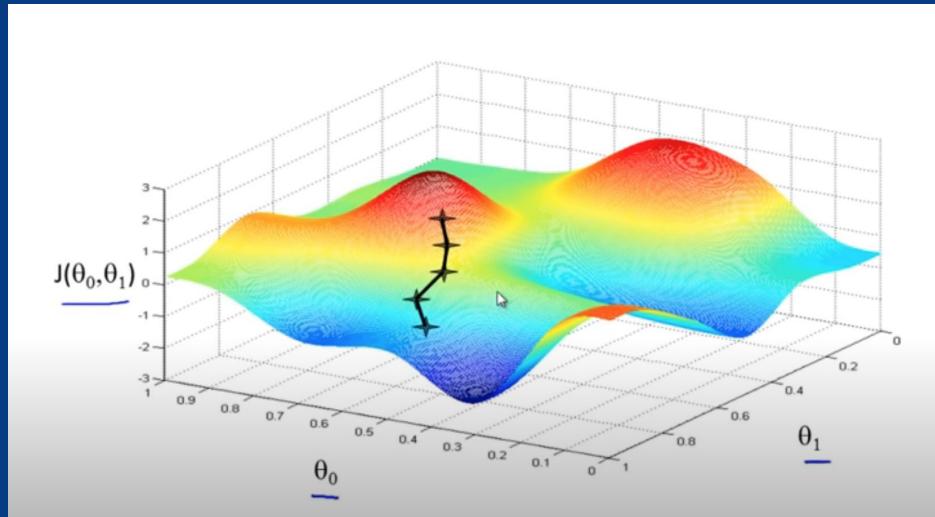
- Error function (loss function)
Input -> weights (parameter) of the variables
Output -> Total error
- Objective is to find the best weights that gives the lowest error

Error function



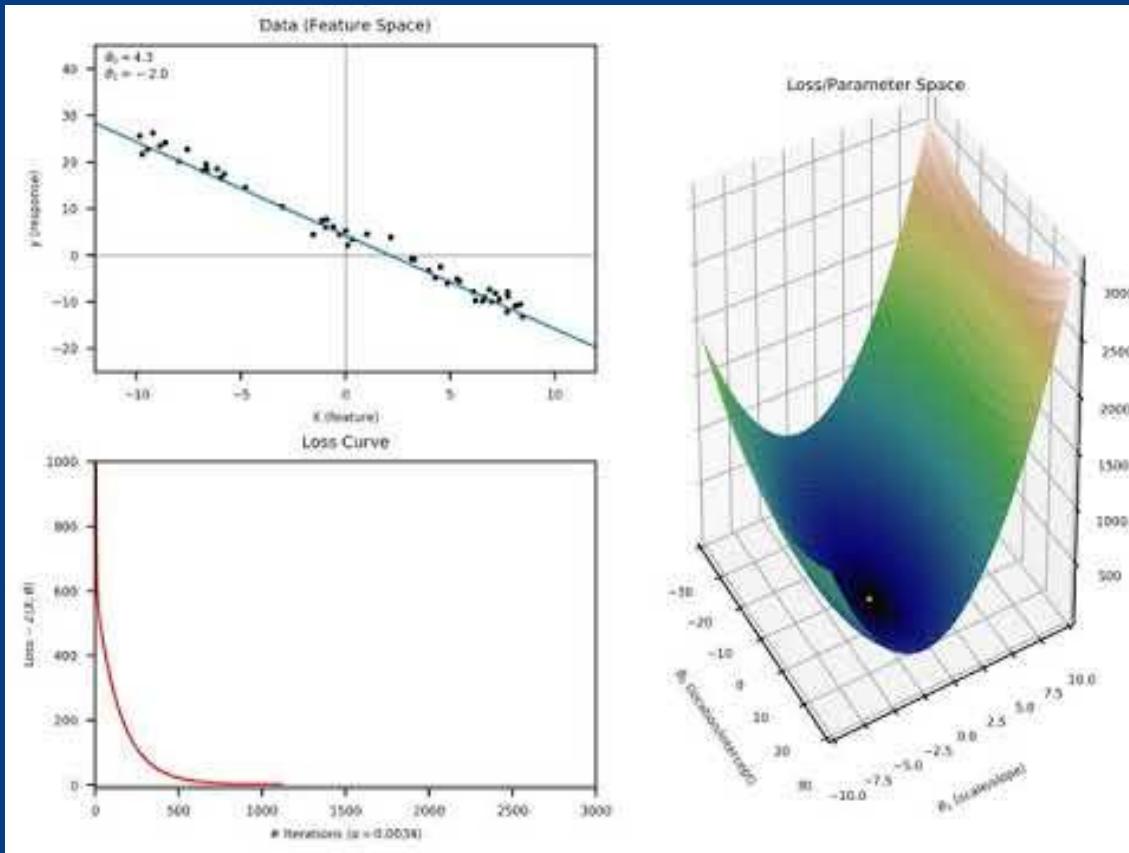
- Error function (loss function)
Input -> weights (parameter) of the variables
Output -> Total error
- Objective is to find the best weights that gives the lowest error

Error function

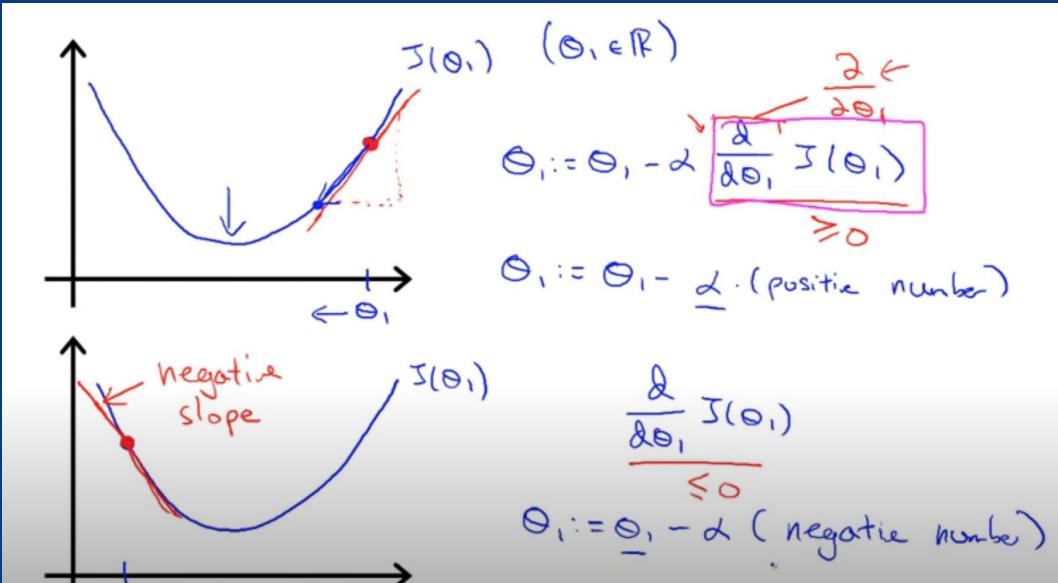


- Error function (loss function)
Input -> weights (parameter) of the variables
Output -> Total error
- Objective is to find the best weights that gives the lowest error

How model learns



Gradient descent



Colab - cost minimization



<https://colab.research.google.com/drive/1tL8OzJrPTLoDsVqx6oz7kbvGVRLaMoaL?usp=sharing>

Machine Learning Pipeline

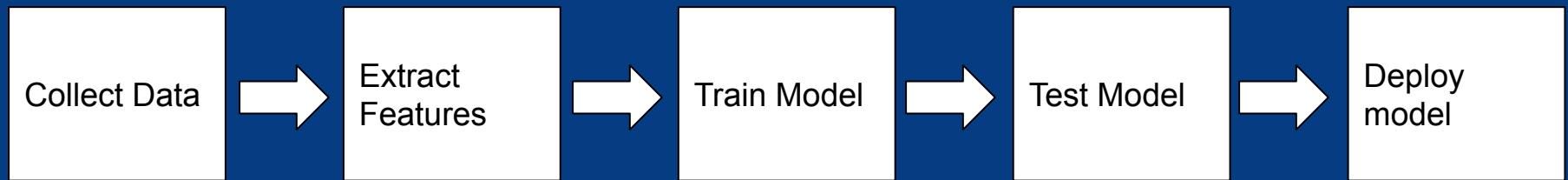
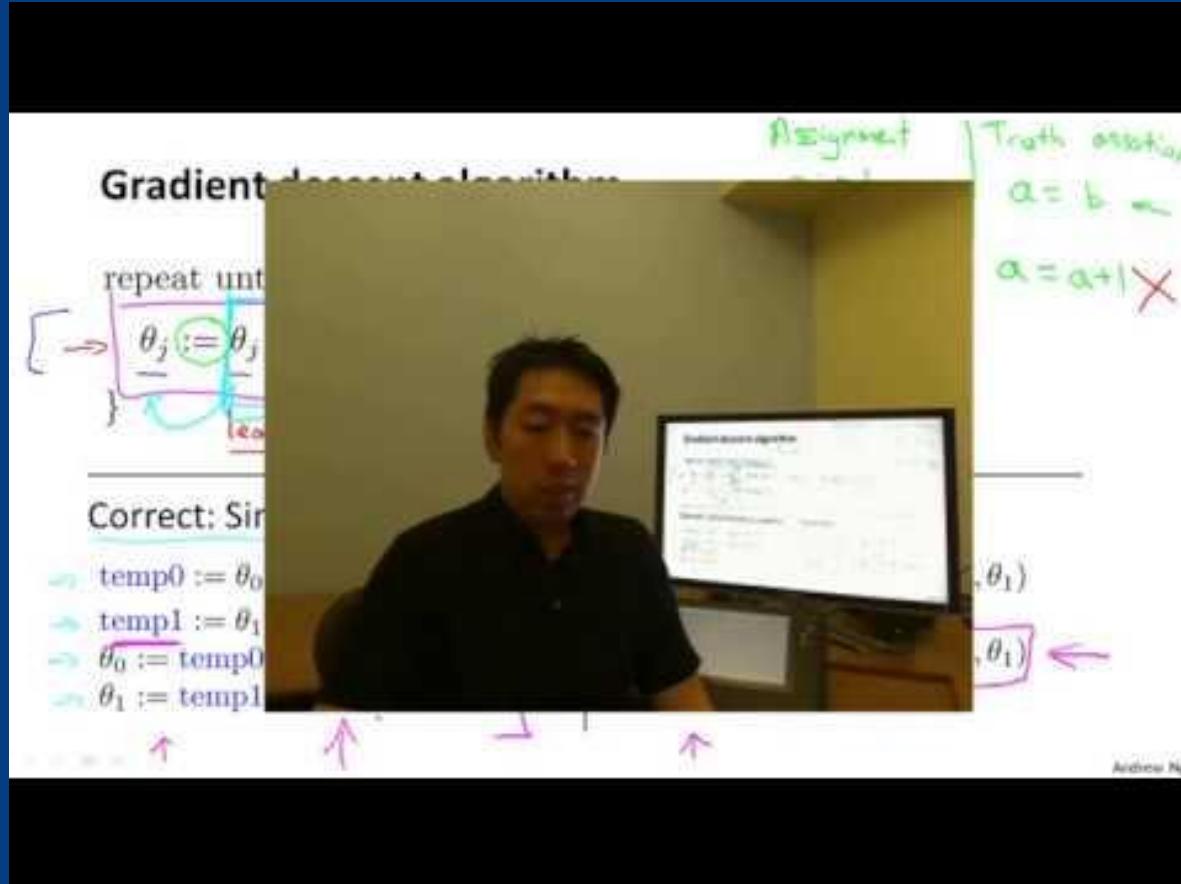


Image classification -> [Colab](#)

Thank you



More details



More details

