

Introduction to Machine Learning & TensorFlow

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Co-Founder, PH CHI

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CENTER FOR
COMPLEXITY &
EMERGING
TECHNOLOGIES

I'm on twitter!



The image shows a Twitter profile page for Jordan Deja (@jordandoinwork). The header features a large background image of a person in a blue hoodie with a 'Google' logo, and a circular profile picture of Jordan Deja. Below the header, the profile information is displayed: name, handle, bio, location, and website. The stats section shows 17K tweets, 1,304 following, 1,557 followers, 13.8K likes, and 1 moment. The 'Tweets' tab is selected, showing a tweet from GDG Philippines. The 'Your Tweet activity' section shows a bar chart of tweet impressions over the last 24 hours.

Jordan Deja
@jordandoinwork

Master of Science 🎓💡 | Asst Prof,
DLSU CCS 🖥️💻 | HCI & Machine
Learning 📱💻 | COMET Seamless 🌟

📍 Planet Goks | G406
🌐 spark.adobe.com/page/A1gpP/

Tweets **Tweets & replies** **Media**

You Retweeted

GDG Philippines @gdgphilippines · 3h
Stage is set! Starting in a bit. #io17extendedmanila #gdg #gdgph #io17extended

Your Tweet activity
Your Tweets earned **13,102 impressions** over the last 24 hours

12PM 12PM

[View your top Tweets](#)

..and on facebook

The image is a screenshot of a Facebook profile page for a user named Jordan Deja. The profile picture shows a man with glasses and a dark jacket. The cover photo is a silhouette of a person walking in a modern, brightly lit space. The page layout includes a top navigation bar with the Facebook logo, the user's name, and search and notification icons. Below the cover photo, there are tabs for Timeline, About, Friends (3,218), Photos, and More. The left sidebar contains an 'Intro' section with a bio: 'I use the mouse with my left hand. @jordandoinwork' and a list of workplaces: 'Assistant Professor at De La Salle University', 'Worked at University of Santo Tomas', and 'Studied Machine Learning at De La Salle University'. The main content area shows a 'Create a Post' section with a prompt 'What's on your mind?' and options for 'Photo/Video', 'Feeling/Activity', and a dropdown menu. Below this is a post from 'Pierce Jonota' with a photo and the text 'Rooting and looking forward to the awsm peeps named Jordan Deja and, of'. The right sidebar features a 'CONTACTS' list with names like John Edel Tamani, Ljubomir Cabaluna, Kim Dalanon, Troy Mirafuentes, Rafael Cabredo, Paul Lim, Micael Andrei Barlaan, and Jj Trinidad. Below the contacts is a 'GROUP CONVERSATIONS' section with a group named 'ジョンマゲ' (John Mage) and members 'Ralph, Roy, Migs, 6 others'. At the bottom right, there is a search bar and icons for settings and help.

Jordan Deja

Timeline About Friends 3,218 Photos More

1 Pending Item

Intro

I use the mouse with my left hand.
@jordandoinwork

Assistant Professor at De La Salle University
Worked at University of Santo Tomas
Studied Machine Learning at De La Salle University

Create a Post Photo/Video Album Live video Life Event

What's on your mind?

Photo/Video Feeling/Activity ...

Pierce Jonota 12 hrs · 1 person · 1 photo

Rooting and looking forward to the awsm peeps named Jordan Deja and, of

CONTACTS


- John Edel Tamani
- Ljubomir Cabaluna
- Kim Dalanon
- Troy Mirafuentes
- Rafael Cabredo
- Paul Lim
- Micael Andrei Barlaan ...
- Jj Trinidad

GROUP CONVERSATIONS


- ジョンマゲ
Ralph, Roy, Migs, 6 others

Search

...also LinkedIn



[Home](#)[My Network](#)[Jobs](#)[Messaging](#)[Notifications](#)[Me](#)[Work](#)[Try Premium for Free](#)



Update background photo

Jordan Deja

CHI Researcher

De La Salle University • De La Salle University

Region IVA - Calabarzon, Philippines • 500+

Jordan is currently a researcher in human computer interaction, integrating machine learning and empathic computing. He leads a team of researchers and undergrads working on HCI, in the COMET Lab of DLSU CCS. He is c...

[See more](#)

★ 113 Who's viewed your profile


234 Views of your post in the last 7 days

30 Weekly search suggestions

Add new profile section

Edit your public profile

Add profile in another language



70% off limited time only

Automated back-up and scheduling functions let you focus on your business.

See connections (500+)

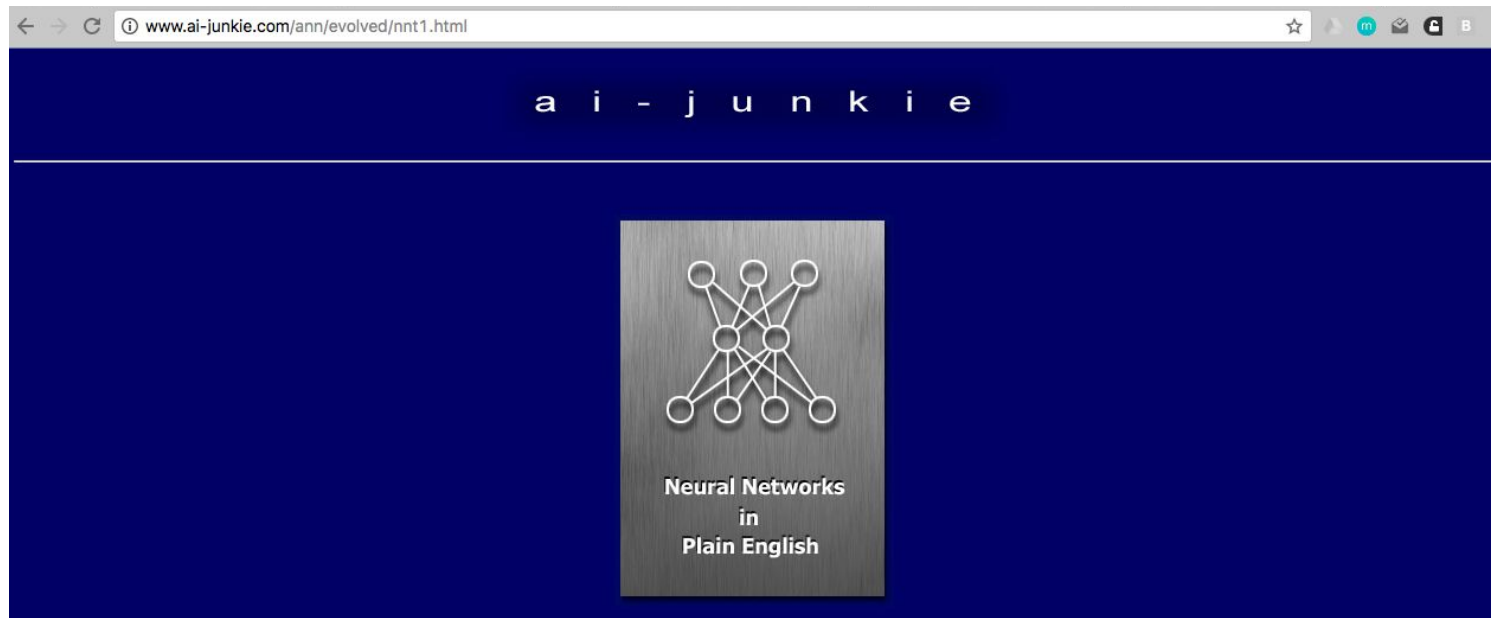
Contact and Personal Info

Jordan's Profile, Websites, Phone, Email, Twitter, and Birthday

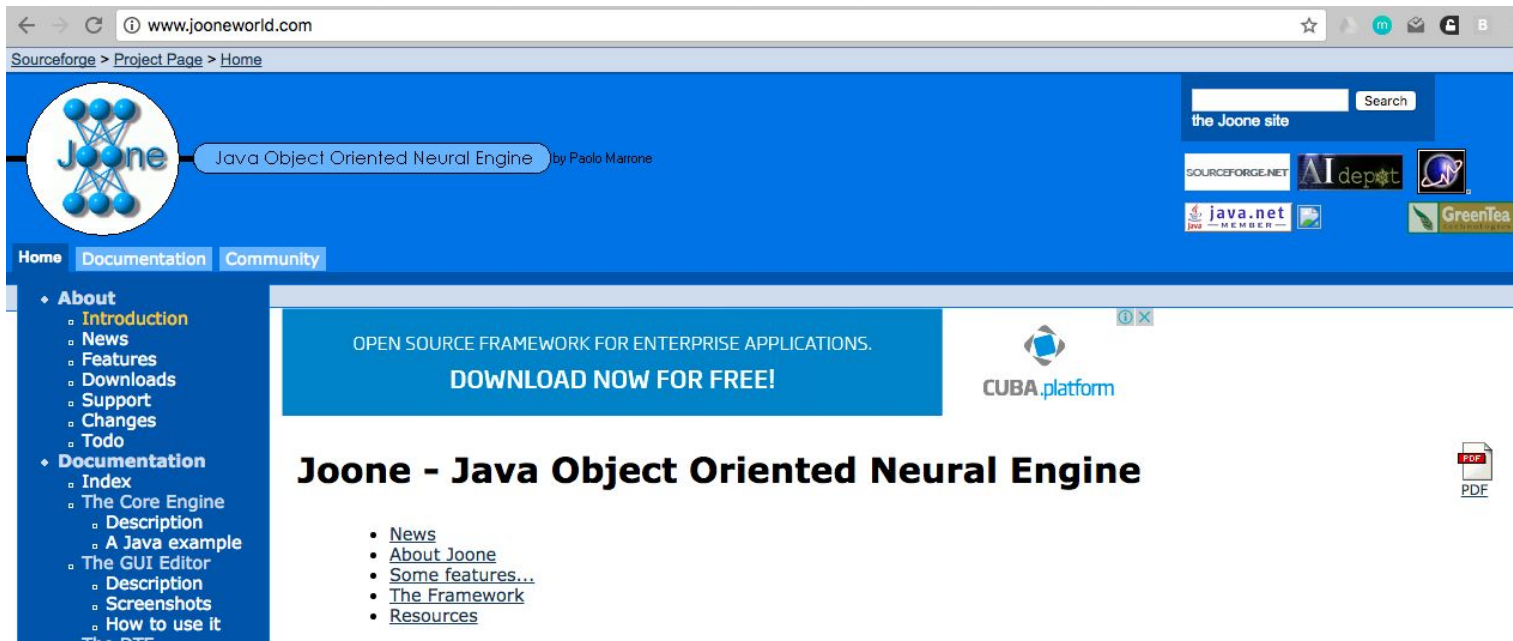
Show more

Messaging

my AI journey began in 2007



there was JOONE in 2008



The screenshot shows the website www.jooneworld.com in a web browser. The page has a blue header with the JOONE logo (a circular network diagram) and the text "Java Object Oriented Neural Engine by Paolo Marrone". A search bar is in the top right. Below the header is a navigation bar with "Home", "Documentation", and "Community" links. The left sidebar contains a menu with "About" (Introduction, News, Features, Downloads, Support, Changes, Todo) and "Documentation" (Index, The Core Engine, The GUI Editor, Screenshots, How to use it). The main content area features a blue banner with the text "OPEN SOURCE FRAMEWORK FOR ENTERPRISE APPLICATIONS. DOWNLOAD NOW FOR FREE!" and the CUBA.platform logo. Below this is the title "Joone - Java Object Oriented Neural Engine" and a list of links: News, About Joone, Some features..., The Framework, and Resources. A PDF icon is visible in the bottom right corner.

Sourceforge > Project Page > Home

the Joone site

SEARCH

SOURCEFORGE.NET

AIdepot

java.net

GreenTea

Home Documentation Community

• **About**

- Introduction
- News
- Features
- Downloads
- Support
- Changes
- Todo

• **Documentation**

- Index
- The Core Engine
 - Description
 - A Java example
- The GUI Editor
 - Description
 - Screenshots
 - How to use it

OPEN SOURCE FRAMEWORK FOR ENTERPRISE APPLICATIONS.

DOWNLOAD NOW FOR FREE!

CUBA.platform

Joone - Java Object Oriented Neural Engine

- [News](#)
- [About Joone](#)
- [Some features...](#)
- [The Framework](#)
- [Resources](#)

PDF

the AI hype

There's so much movement in the field of AI, the real world is having difficulty in adjusting.





Artificial Intelligence

Refers to the discipline involving the study and the development of intelligent, sentient machines.

- Marvin Minsky



Machine Learning

A subfield of Computer Science & AI that gives the computers the ability to learn without being explicitly programmed

- Arthur Samuel



formally...

A computer program is said to learn from an experience E with respect to some task T and some performance measure P , If its performance on T as measured by P , improves by some experience E .

- Tom Mitchell



Learning to play checkers

Task: playing checkers

Performance measure: percent of games won against opponents

Experience: playing practice games against itself

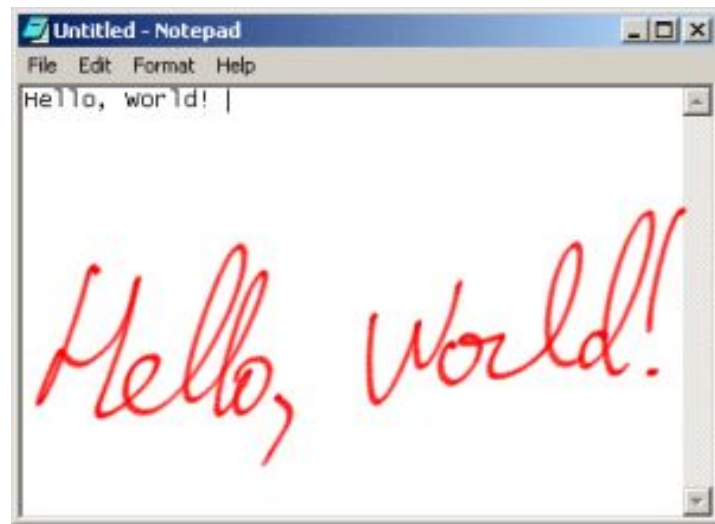


Handwriting recognition

Task: recognizing and classifying handwritten words within images

Performance measure: percent of words correctly classified

Experience: database of handwritten words with given classifications



"A computer program is said to learn from experience E with respect to some task T and some performance measure P , if its performance on T , as measured by P , improves with experience E ."

Pop quiz!

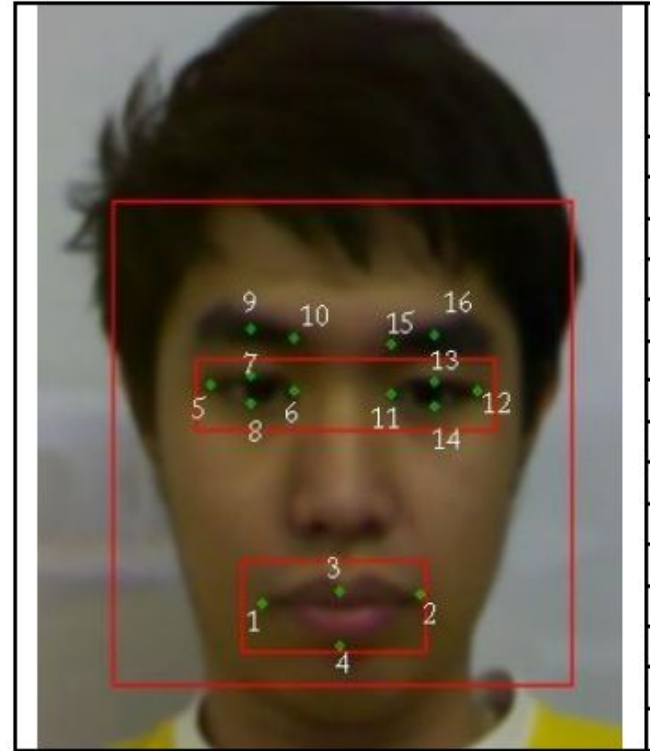
Suppose your email program watches which emails you do or do not mark as spam, and based on that learns how to better filter spam. What is the task T in this setting?

- T** A. Classifying emails as spam or not spam.
- E** B. Watching you label emails as spam or not spam.
- P** C. The number (or fraction) of emails correctly classified as spam/not spam.
- D. None of the above—this is not a machine learning problem.

Facial recognition

How do we teach a computer if a face is sad or happy?

Facial action points, regions of interest, manhattan distance = emotion





“Learning is experience..

...everything else is just information

- Albert Einstein



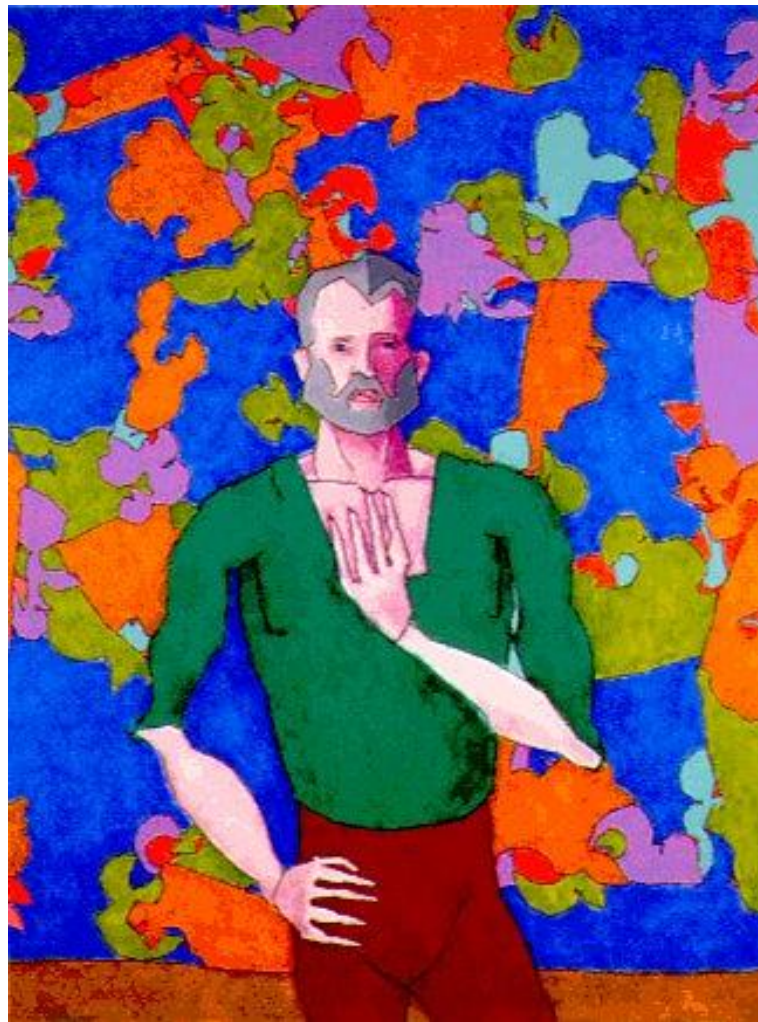
ALVINN (1994)

Autonomous Land Vehicle in Neural Network (ALVINN) travelled from the US West Coast to the East Coast, totally unmanned. The trip took 6days.



AARON (1998)

AARON was a computer that was trained to paint in the style of the different artists from the Renaissance



<https://www.autodraw.com/>



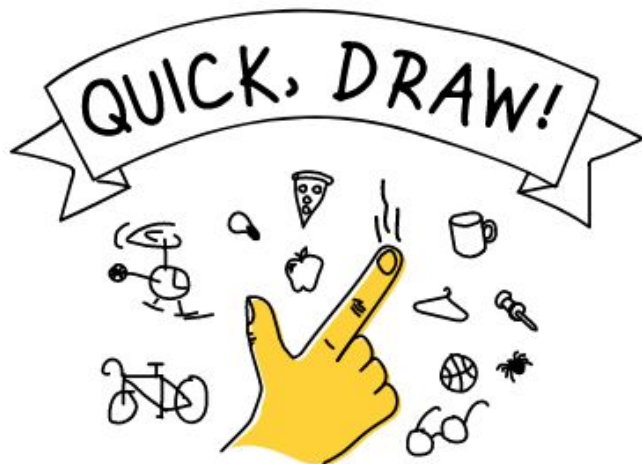
AutoDraw

Fast drawing for everyone.

Start Drawing

Fast How-To*

<https://quickdraw.withgoogle.com/>



Can a neural network learn to recognize doodling?

Help teach it by adding your drawings to the [world's largest doodling data set](#), shared publicly to help with machine learning research.

Let's Draw!

<https://aiexperiments.withgoogle.com/sound-maker/view/>

NSYNTH: SOUND MAKER

Make unusual new sounds
with machine learning.

⏮ PLAY

[How It works](#)

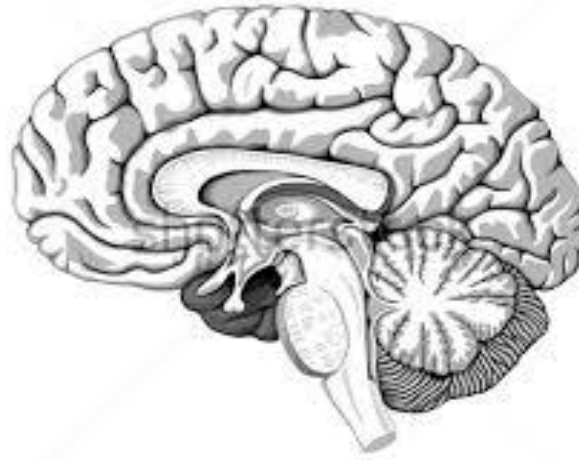
<https://aiexperiments.withgoogle.com/ai-duet/view/>

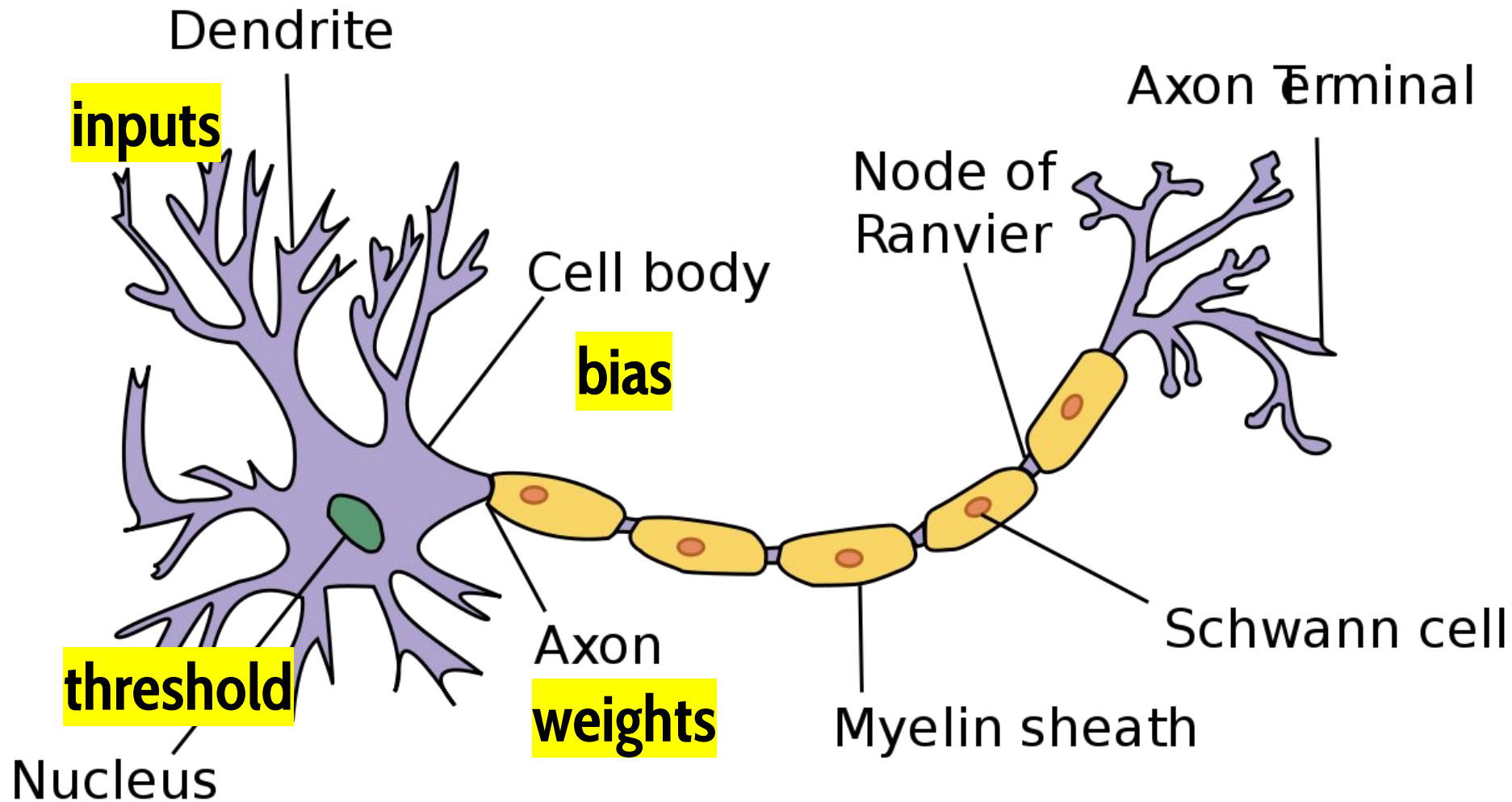


For more AI Experiments
and source code

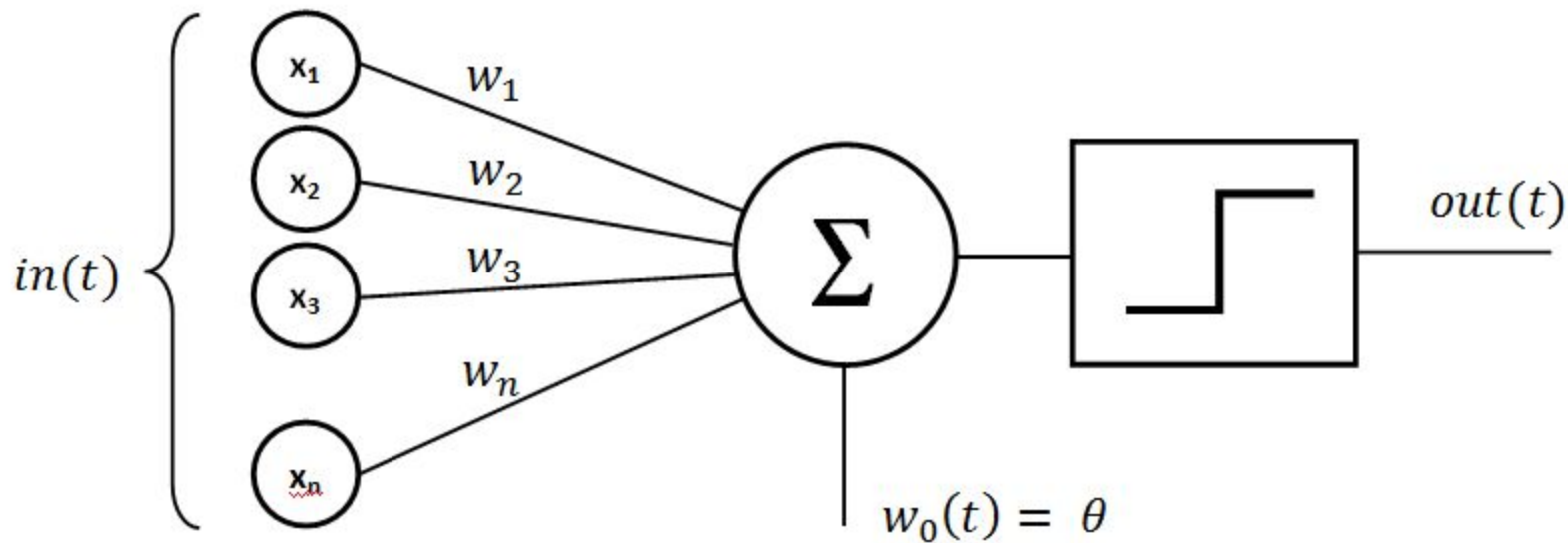
<https://aiexperiments.withgoogle.com/>

AI Systems were patterned like how the complex system of the brain works

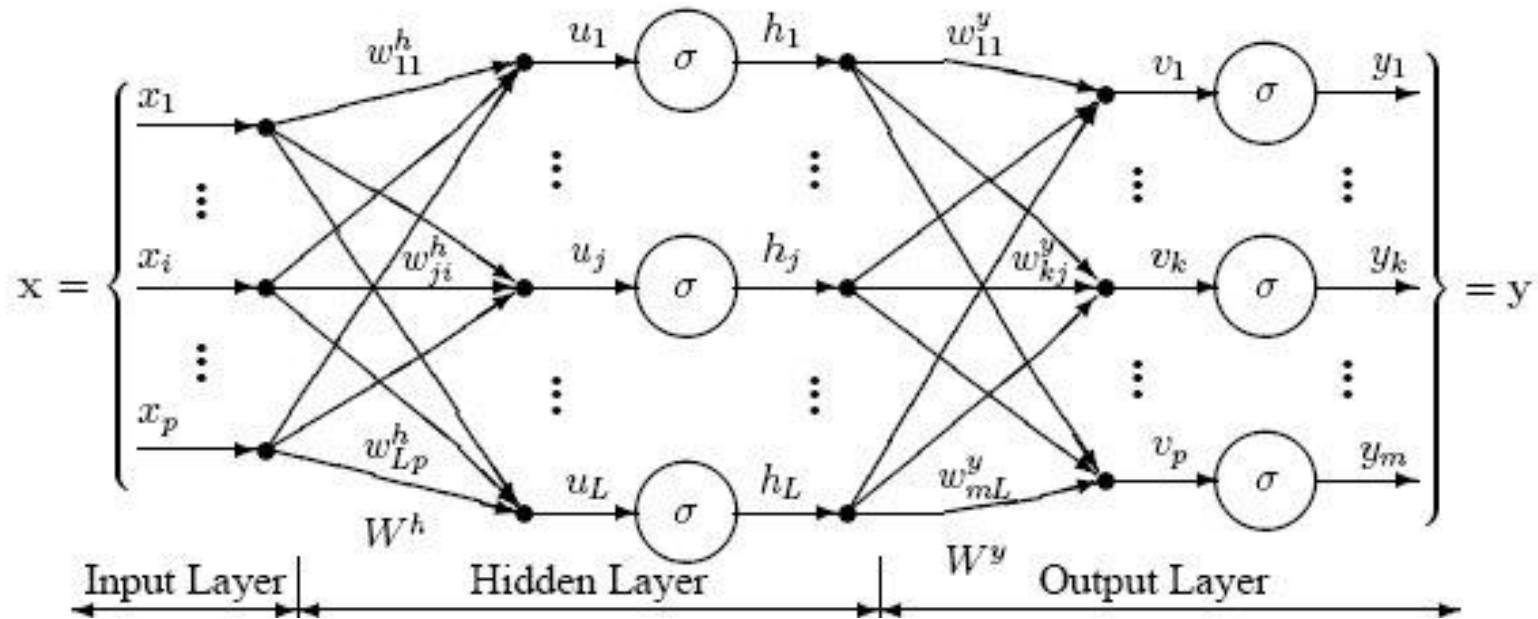




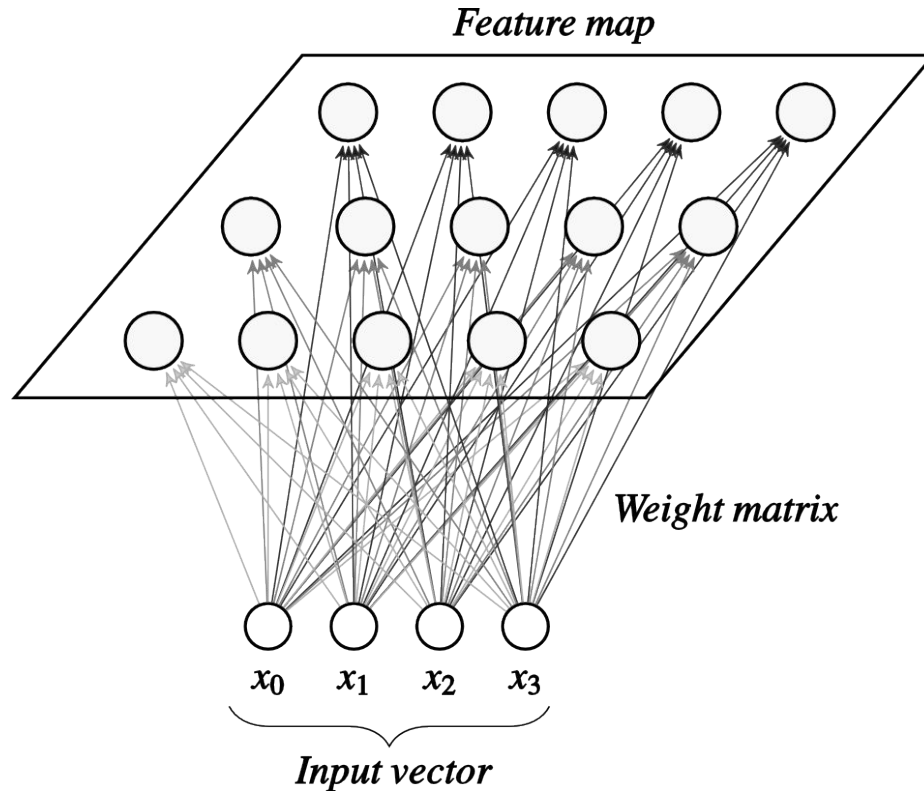
The Perceptron



A MultiLayer Perceptron



Self-Organizing Maps (SOM)



T or F?





TensorFlow

An open-source software library for Machine Intelligence. Supports various machine learning algorithms used by Google in its products.

TF was create to build complex Neural Networks but is general enough to build a wide variety of ML algorithm or computation systems





TensorFlow?

- **Tensor** : N-dimensional array
 - 1-dimension: vector | 2-dimension: matrix
- **Flow** : Computation based on data flow graphs
- **TensorFlow** : Tensors flow through the graph
 - Edges represent the Tensors
 - Nodes represent the processing



INPUT

Which properties do you want to feed in?

+

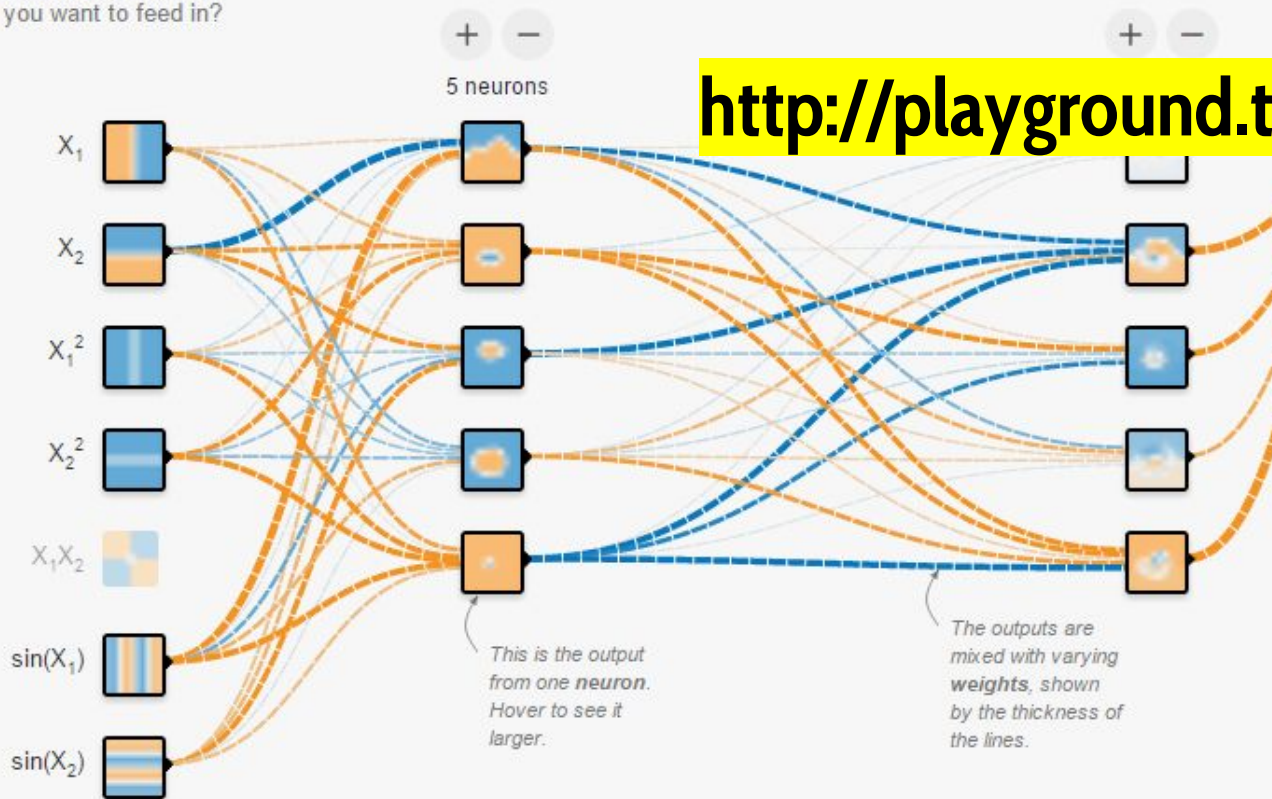
-

2 HIDDEN LAYERS

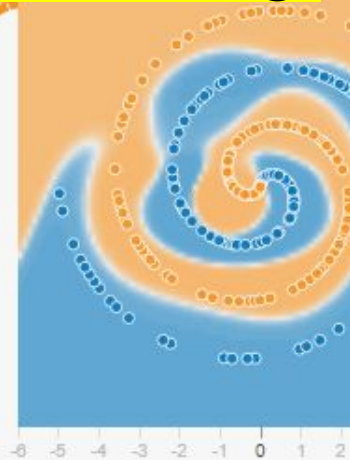
OUTPUT

Test loss 0.013

Training loss 0.013



<http://playground.tensorflow.org/>



Colors shows data, neuron and weight values.

-1

☐ Show test data

☐ Dis



**Planes dont flap their wings to fly,
but birds dont take off from trees
either...**

**A car can run faster than a cheetah
but it can never climb a tree..**





Hi!

Feel free to connect :)

fb.com/just.keep.hustlin

linkedin.com/in/justhustlin





How to install

Supports Mac OS, Linux, and Windows.

Visit **<https://www.tensorflow.org/install/>**





Required knowledge

Sprinkle with **Python**. Add a cup of **Arrays**. And a pinch of **Machine Learning**



Tensors

The central unit of data in TensorFlow. A **tensor** consists of a set of primitive values shaped into an array of any number of dimensions.

```
3 # a rank 0 tensor; this is a scalar with shape []  
[1., 2., 3.] # a rank 1 tensor; this is a vector with shape [3]  
[[1., 2., 3.], [4., 5., 6.]] # a rank 2 tensor; a matrix with shape [2, 3]
```





Computational Graph

TensorFlow Core programs has two discrete sections:

1. Building the computational graph.
2. Running the computational graph.



Low-level API

[Researchers]

High-level API

[Developers]

Basic Coding



Importing TensorFlow

- The canonical import statement for TensorFlow programs is as follows:

```
import tensorflow as tf
```





Constant

- A type of tensor. **Constants** takes no inputs, and outputs a value it stores internally.

```
node1 = tf.constant(3.0, tf.float32)
```





Placeholder

- A graph can be parameterized to accept external inputs, known as **placeholders**. A **placeholder** is a promise to provide a value later.

```
a = tf.placeholder(tf.float32)
```





Variable

- **Variables** allow us to add trainable parameters to a graph. They are constructed with a type and initial value.

```
W = tf.Variable([.3], tf.float32)
```





Updating a Variable

- **Variables** allow us to add trainable parameters to a graph. They are constructed with a type and initial value.

```
tf.assign(var, [1])
```





Arithmetic Operators

- TensorFlow provides several operations that you can use to add basic arithmetic operators to your graph.

```
tf.add(var1, var2)
```

```
tf.subtract(var1, var2)
```





Session Object

- To actually evaluate the nodes, we must run the computational graph within a session. A session encapsulates the control and state of the TensorFlow runtime.

```
sess = tf.Session()
```





Initialising all Variables

- To initialize all the variables in a TensorFlow program, you must explicitly call a special operation as follow:

```
init = tf.global_variables_initializer()  
sess.run(init)
```



Let's build a
simple model

Models

<https://github.com/tensorflow/models>



Inception

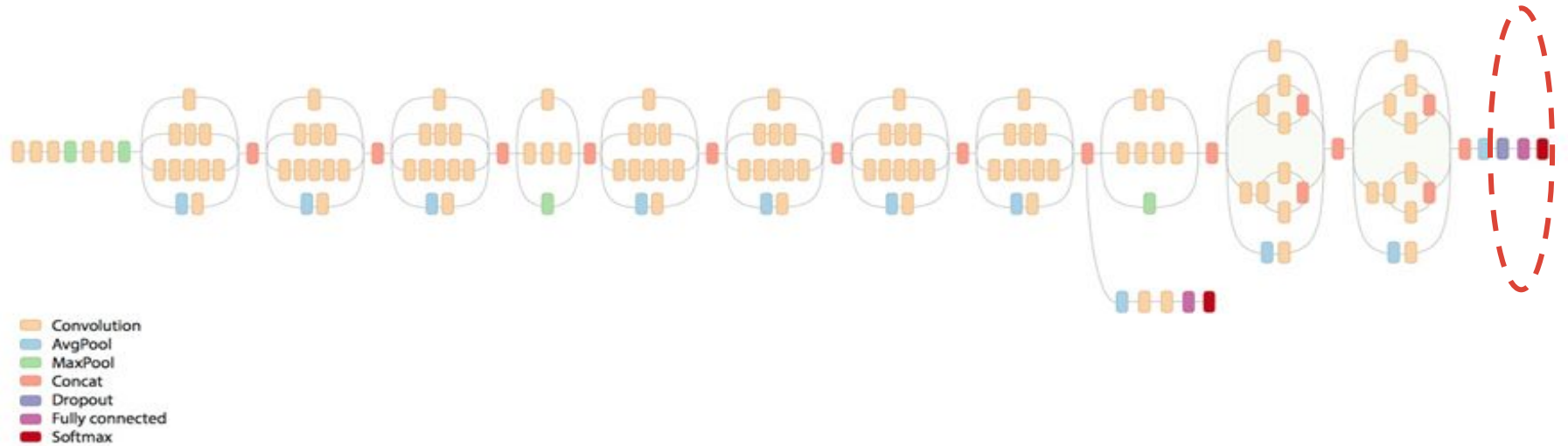
SyntaxNet

TextSum

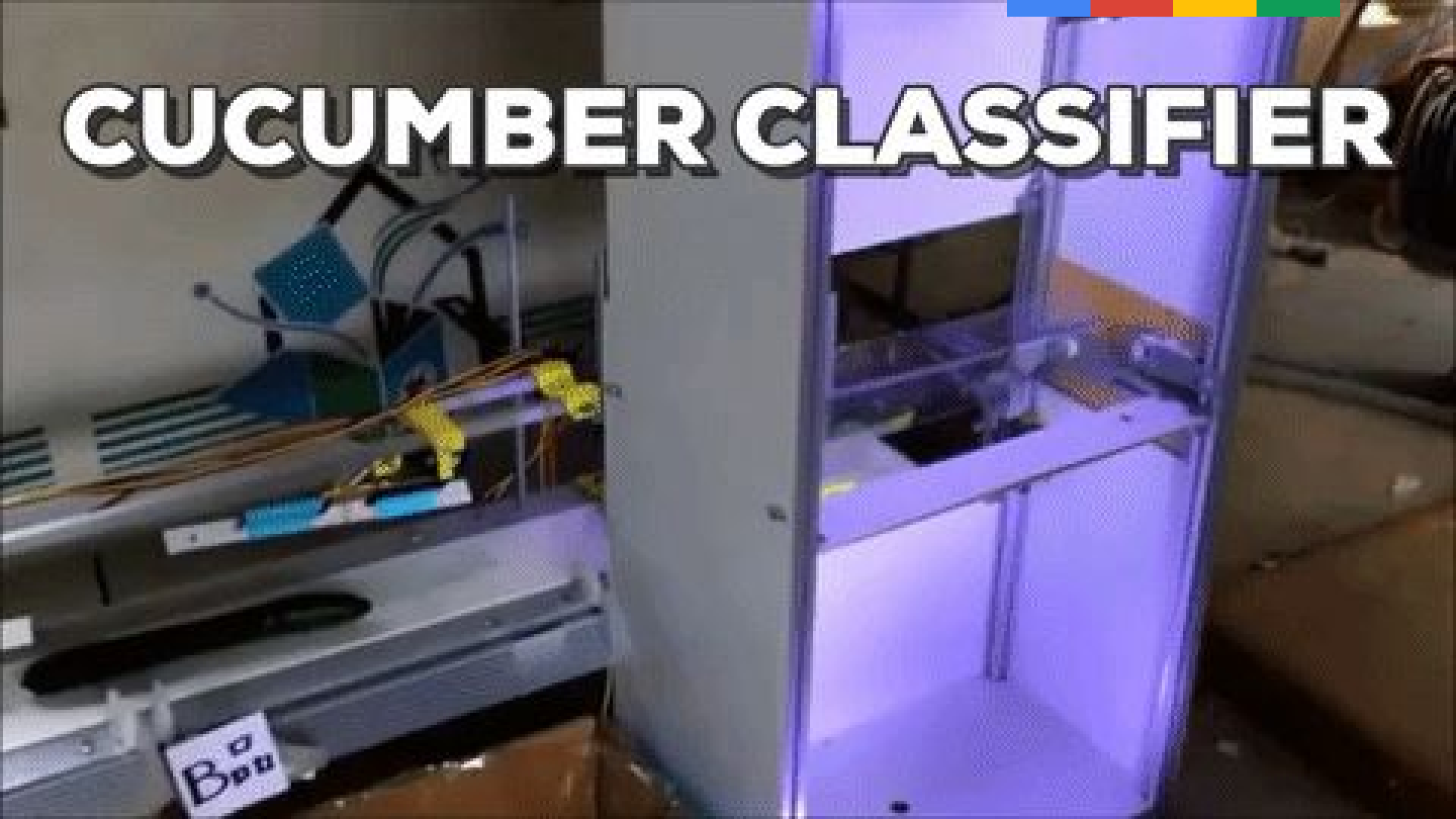
Codelabs

<https://codelabs.developers.google.com/codelabs/tensorflow-for-poets/>

Inception Model



CUCUMBER CLASSIFIER



Join the TensorFlow Philippine Community

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

Join our Machine Learning Meetups (MLM)

facebook.com/groups/ph.mlm

Learn more about TensorFlow

<https://www.tensorflow.org>

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