Intro to Tensorflow

Discovering the mystery

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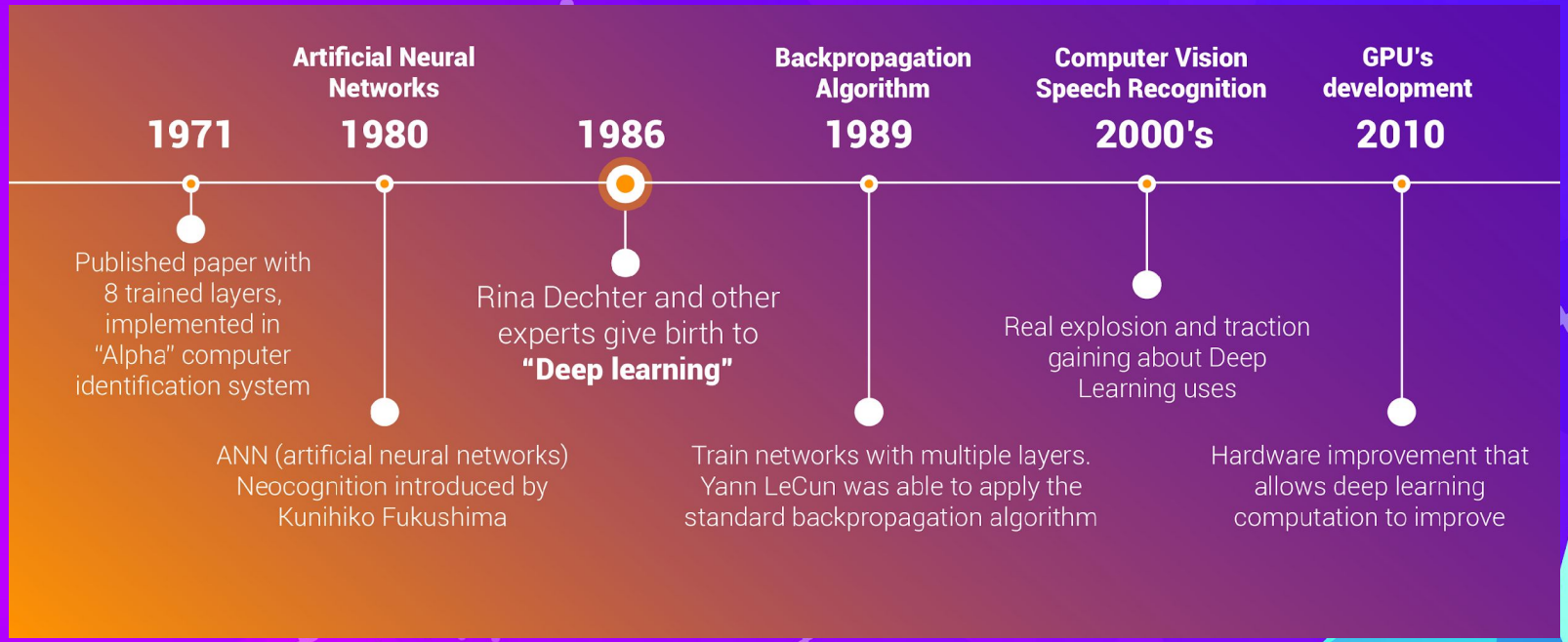
History of Deep Learning

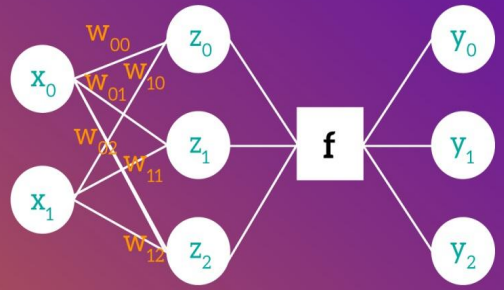


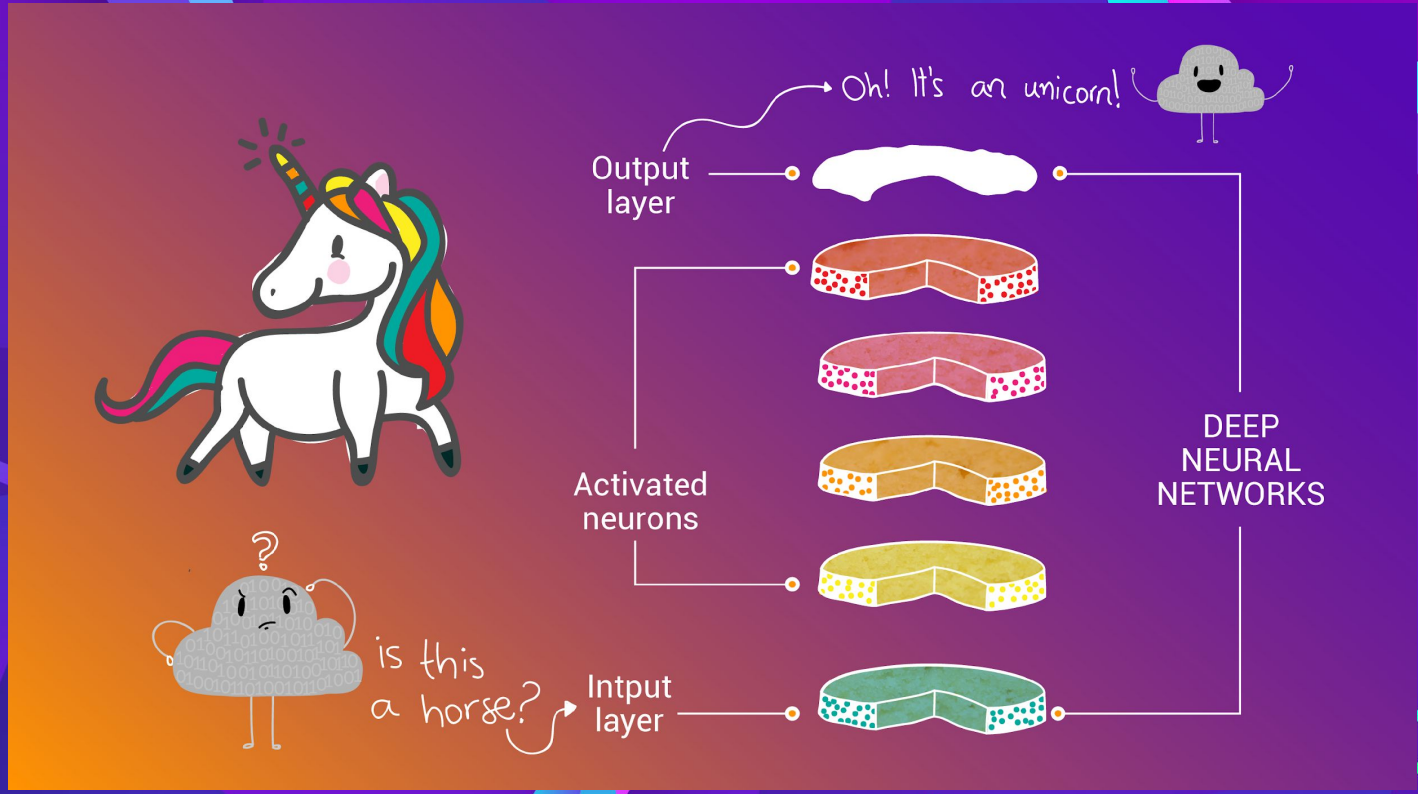
What is a neural network?

Neural networks

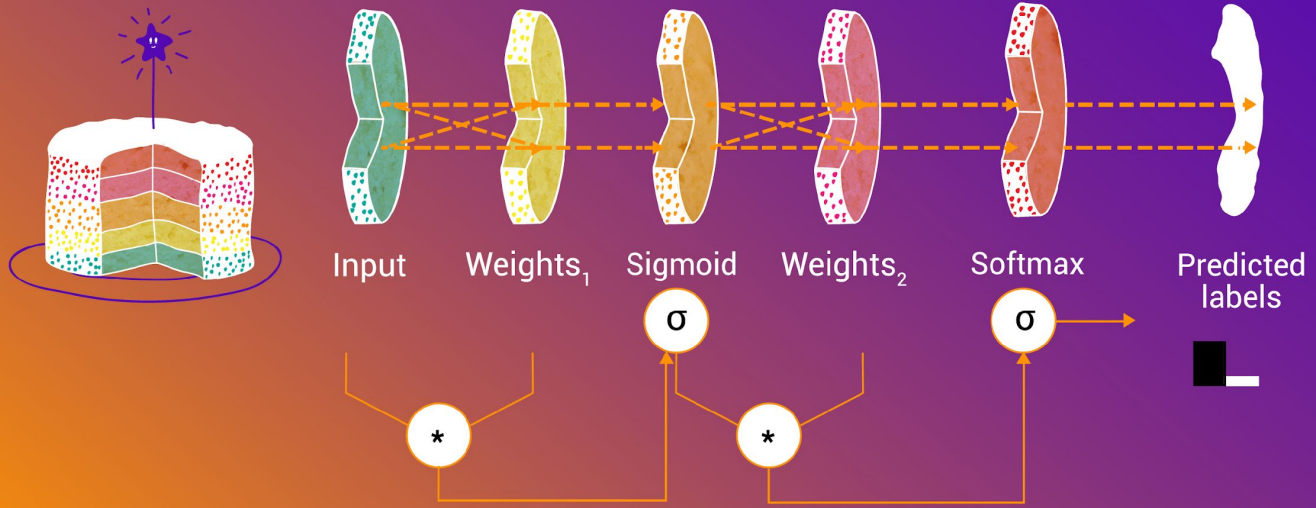
$z = w * x$

$y = f(z)$

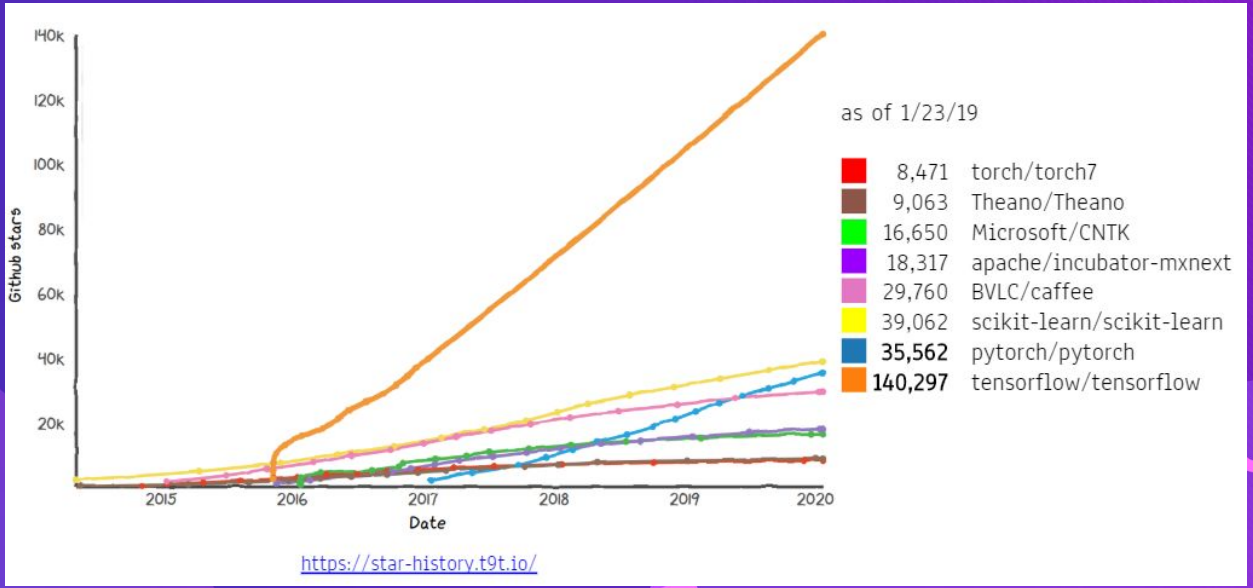



Oh! It's an unicorn!
Output layer
Activated neurons
Intput layer
DEEP NEURAL NETWORKS
is this a horse?

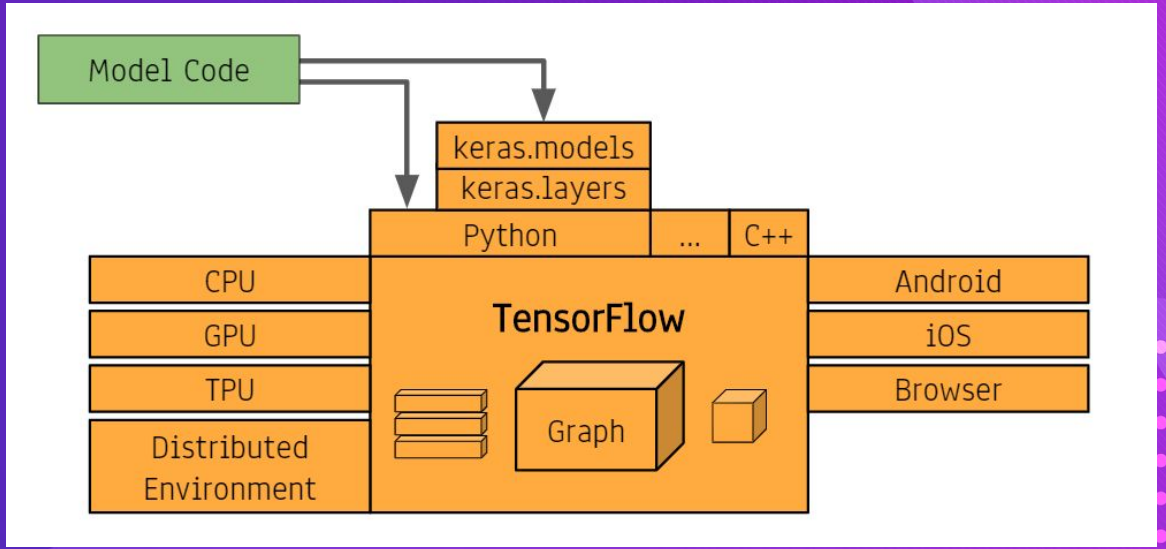
How does a neural network learns?



Stars on Github

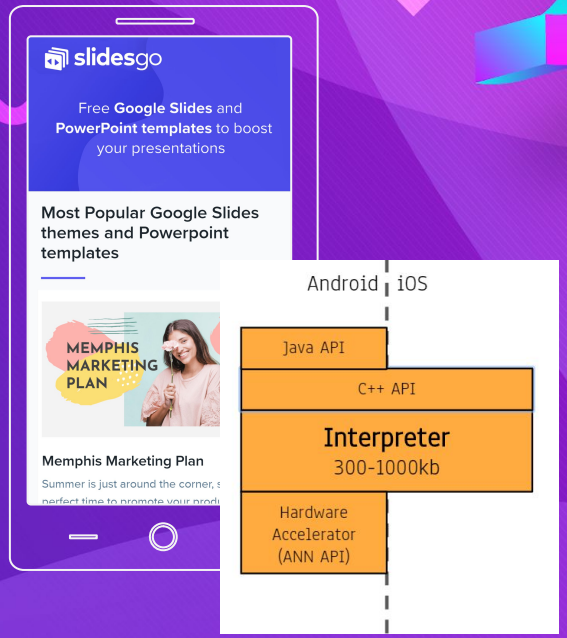


Dealing With Complexity



TensorFlow Lite

- Lightweight
- Low latency
- Operators (float/quantized) tuned for mobile performance
- Convert existing models to .tflite format

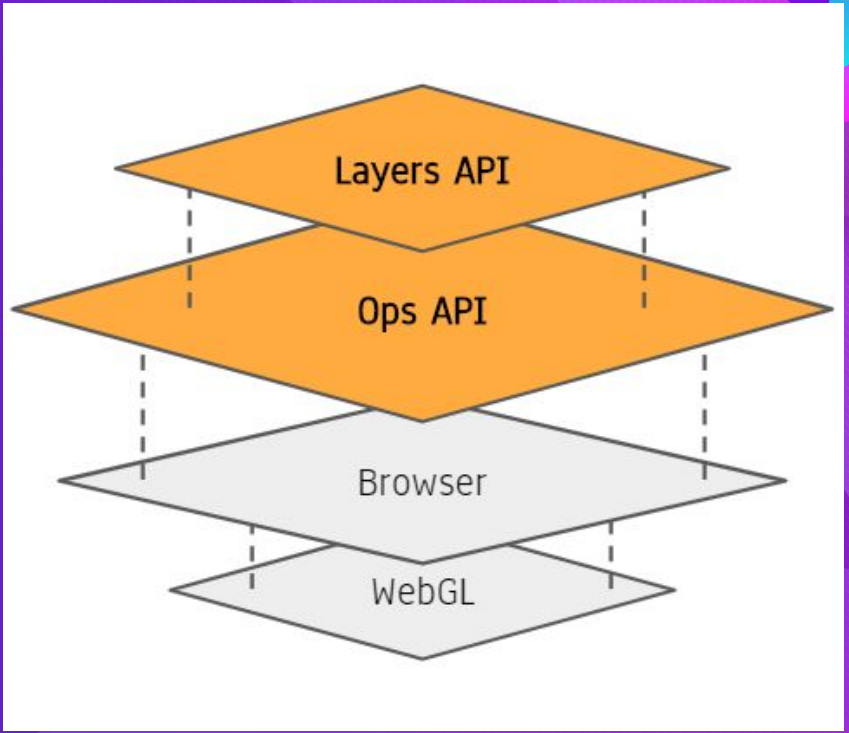


TensorFlow.js

Train / run in browser

Import SavedModel/Keras models

WebGL backend 100x speedup



By now you should know what the following terms are:

- **Feature**: The input(s) to our model
- **Examples:** An input/output pair used for training
- **Labels**: The output of the model
- **Layer**: A collection of nodes connected together within a neural network.
- **Model**: The representation of your neural network
- **Dense and Fully Connected (FC):** Each node in one layer is connected to each node in the previous layer.

By now you should know what the following terms are:

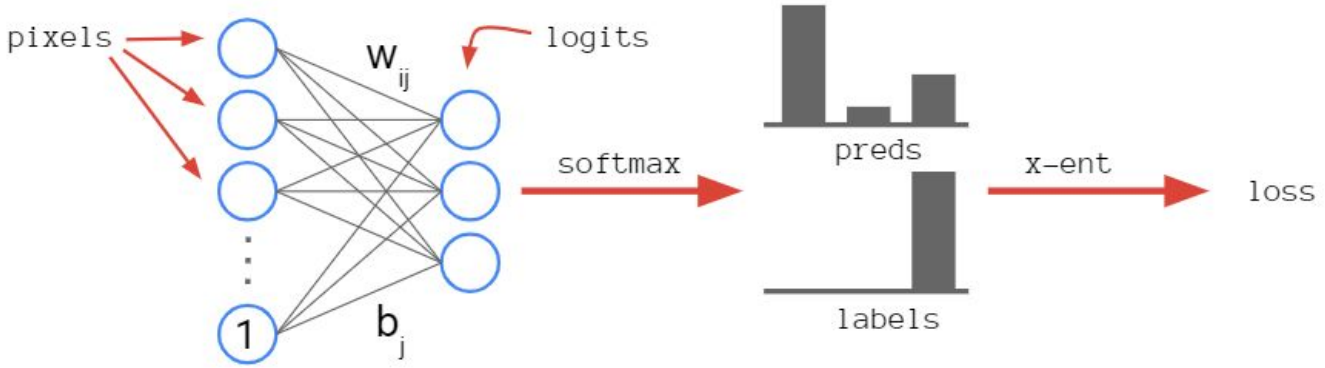
✅**Weights and biases**: The internal variables of model

✅**Loss**: The discrepancy between the desired output and the actual output

✅**MSE:** Mean squared error, a type of loss function that counts a small number of large discrepancies as worse than a large number of small ones.

✅**Gradient Descent:** An algorithm that changes the internal variables a bit at a time to gradually reduce the loss function.

Linear Model : y = Wx + b




```
with tf.GradientTape() as tape:
  x_flattened = tf.reshape(x, (x.shape[0], -1))
  logits = tf.matmul(x_flattened, W) + b
  loss = tf.nn.softmax_cross_entropy_with_logits(y, logits)
W_grad, b_grad = tape.gradient(loss, (W, b))
W.assign_add(-0.01 * W_grad)
b.assign_add(-0.01 * b_grad)
```

💛Regression: A model that outputs a single value. For example, an estimate of a house's value.

💛Classification: A model that outputs a probability distribution across several categories.

- Machine Learning Crash Course - ML from scratch theory + practice
https://developers.google.com/machine-learning/crash-course/

- Seedbank - learn ML with simple and advanced example Colabs
https://research.google.com/seedbank

- Distill.pub - awesome visual explanations
https://distill.pub/

- Deep Learning With Python
https://github.com/fchollet/deep-learning-with-python-notebooks/

- MIT Deep Learning Course
https://deeplearning.mit.edu/

- Fast.ai online courses - uses PyTorch !
https://www.fast.ai/

- EPFL's Deep Learning Course - uses PyTorch !
http://fleuret.org/dlc

THANKS!

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