

# Why deep learning

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# Agenda

- ▶ What is Deep learning?
- ▶ Why deep learning ?
- ▶ Emigo
- ▶ Tools for deep learning
- ▶ Questions and Answer

# History

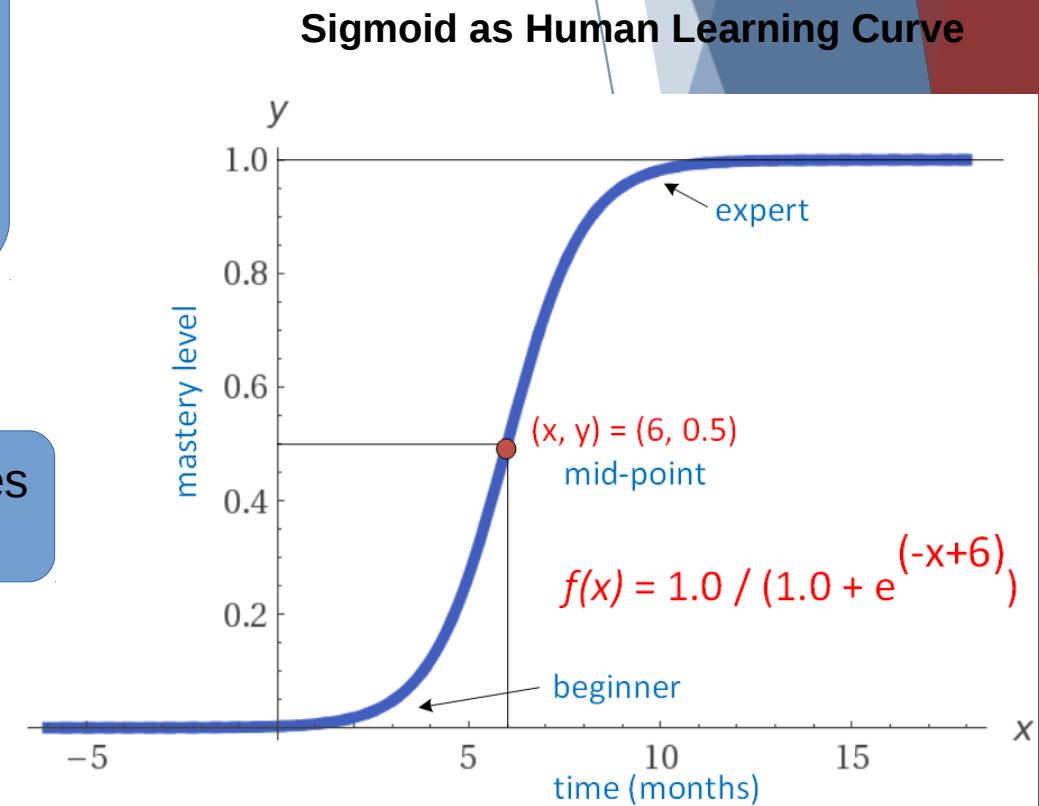
Simplified computational model of how biological neurons might work together in animal brain to perform complex computations using propositional logic. By McCulloch (1943)

Perceptron is one of the simplest ANN architectures, invented in 1957 by Frank Rosenblatt.

$$Z = W \cdot T \cdot \text{dot}(X)$$

Output  $h(x) = \text{step}(z)$

Some of today's artificial neural networks can train themselves to recognize complex patterns



# What do you see?



**Artificial Intelligence** - Human  
Intelligence Exhibited by Machines

**Machine Learning** - An  
Approach to Achieve Artificial  
Intelligence

**Deep Learning** — A  
Technique for Implementing  
Machine Learning

# What is deep learning?



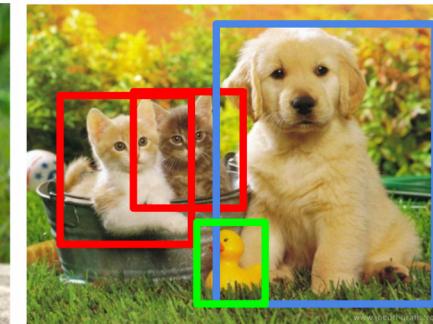
**Classification**



**Classification + Localization**



**Object Detection**



**Instance Segmentation**



CAT

CAT

CAT, DOG, DUCK

CAT, DOG, DUCK

Single object

Multiple objects

## What is Deep Learning?

Deep Learning is a new trend of machine learning that enables machines to unravel high level abstraction in large amount of data

Image  
recognition



Natural Language  
Processing

Speech  
recognition

Drug Discovery  
& Toxicology

Customer Centric  
Management

3



# Why deep learning

simple

Use methods like SVM

Moderate

Deepnets outperform

Complex

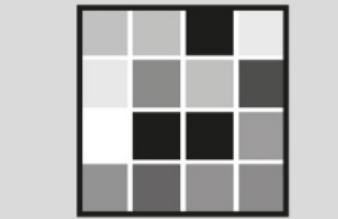
Deepnets- only practical choice



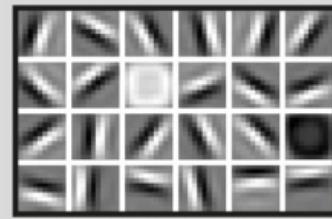
Neep nets breaks the complex pattern down into series of simplex patterns

## FACIAL RECOGNITION

Deep-learning neural networks use layers of increasingly complex rules to categorize complicated shapes such as faces.



Layer 1: The computer identifies pixels of light and dark.



Layer 2: The computer learns to identify edges and simple shapes.

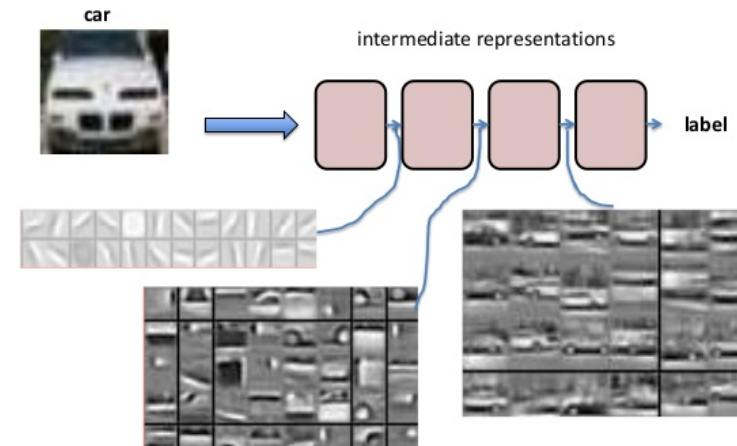


Layer 3: The computer learns to identify more complex shapes and objects.

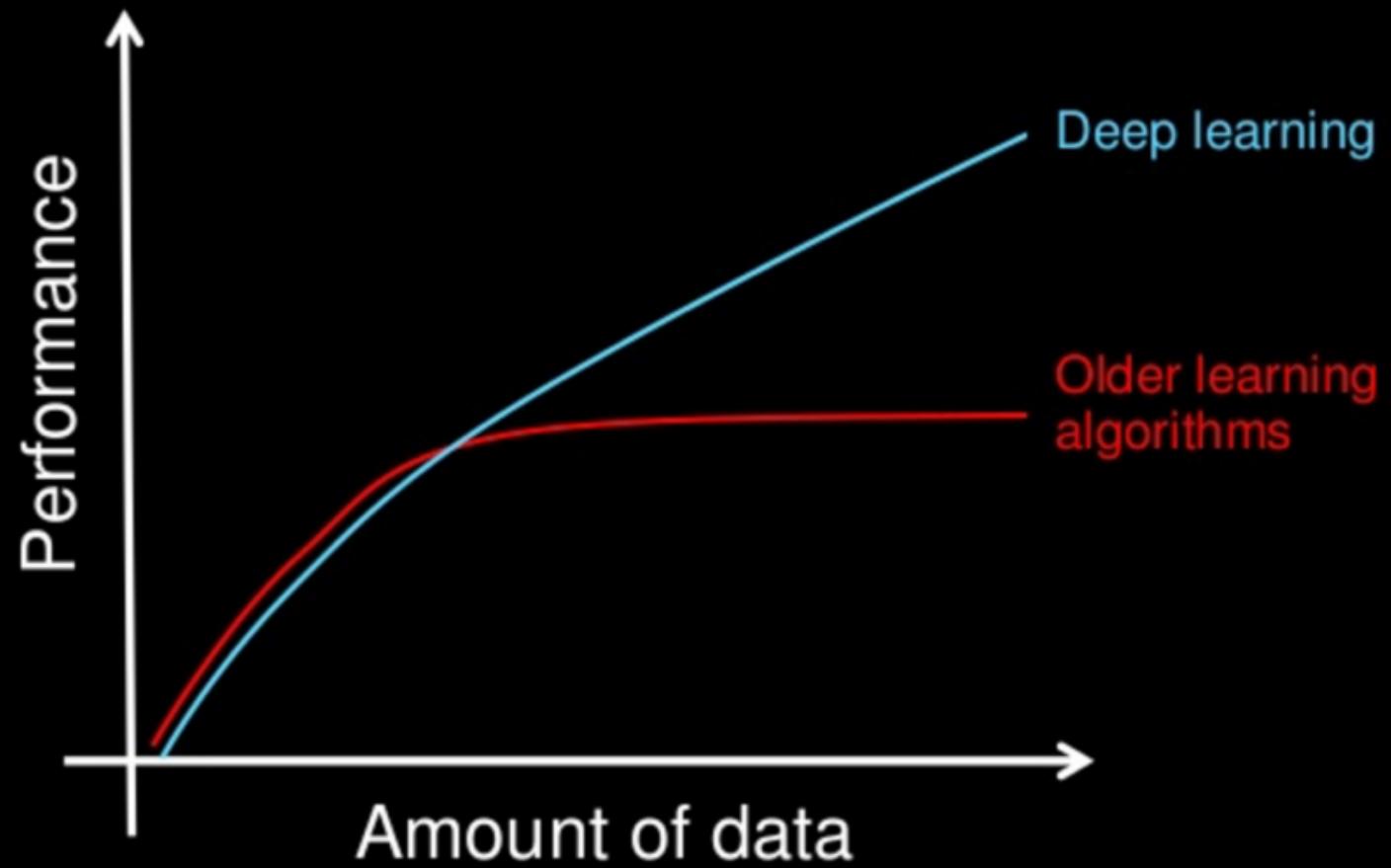


Layer 4: The computer learns which shapes and objects can be used to define a human face.

## Deep Nets Intuition



# Why deep learning



How do data science techniques scale with amount of data?

# Why deep learning right now?

A huge quantity of data available to train neural network and, ANNs frequently outperform other ML techniques on very large and complex problems.

The tremendous increase in computing power since the 1990s now make it possible to train large artificial neural network in reasonable amount of time.

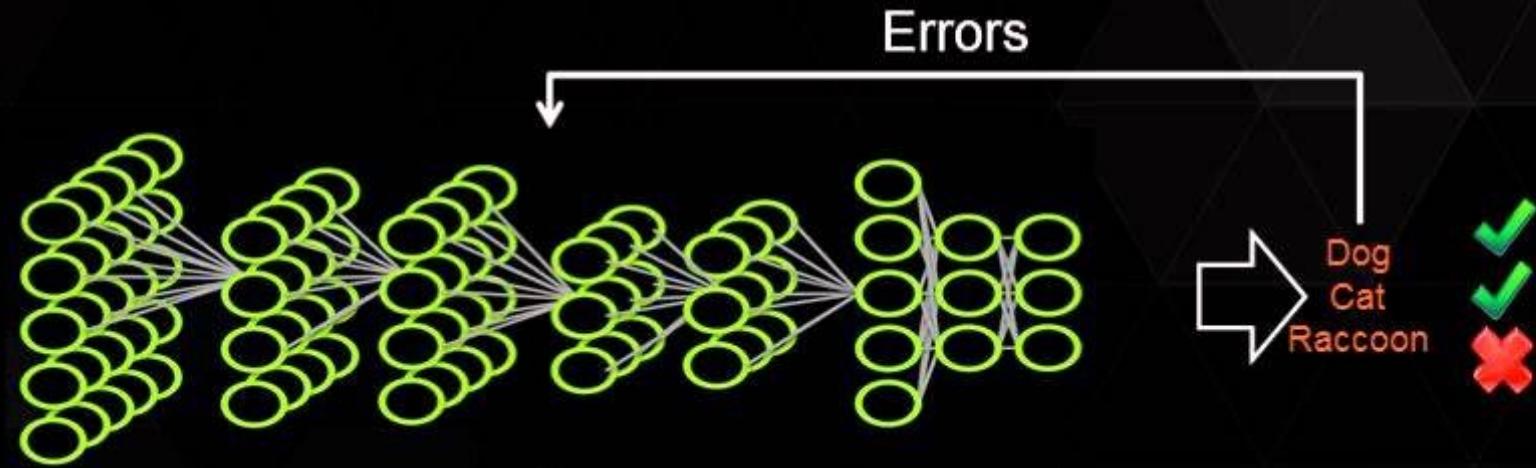
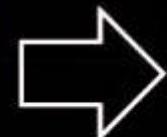
We are thankful to the gaming industries

The training algorithms have been improved . To be fair they are only slightly different from the ones used in 1990s.

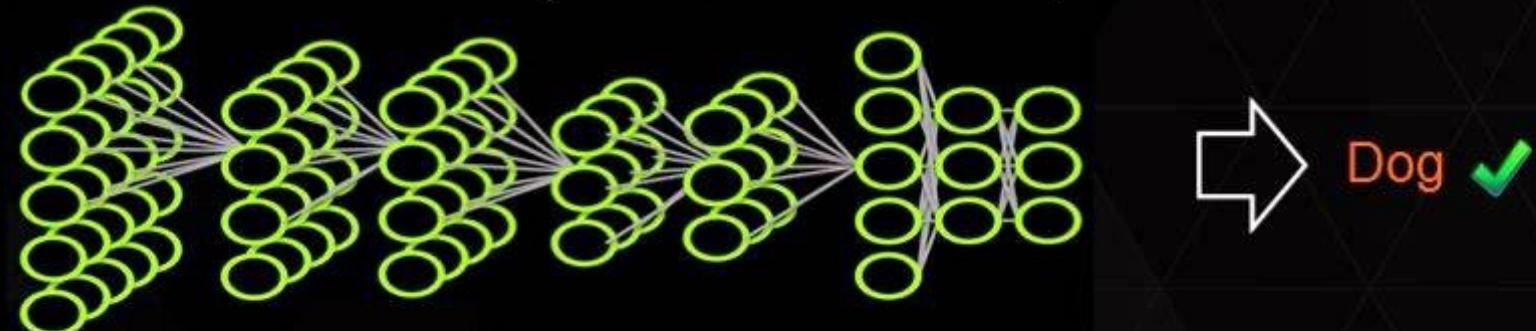
GPU and CPU

# DEEP LEARNING APPROACH

Train:

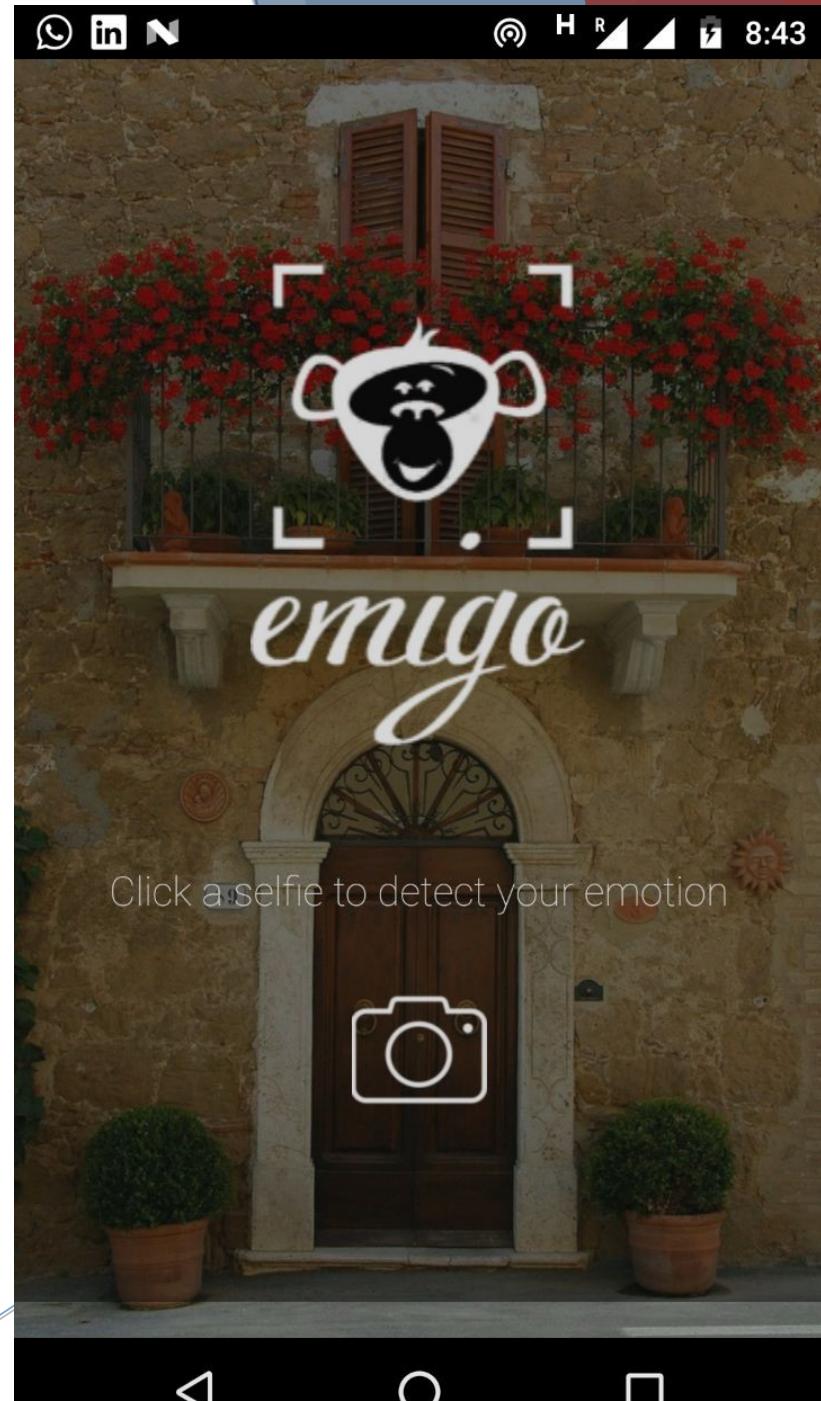
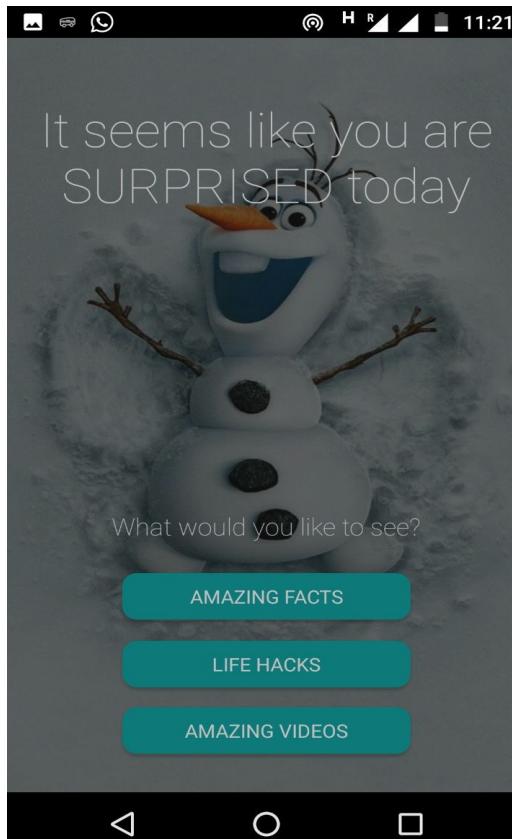
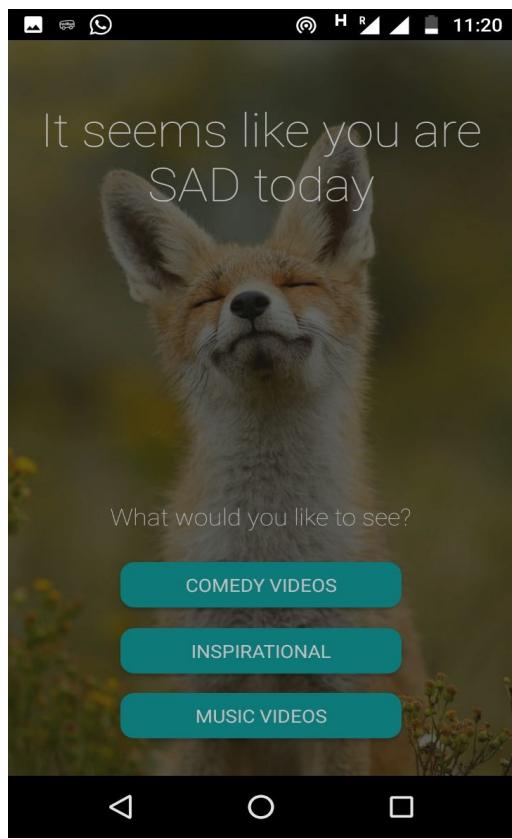
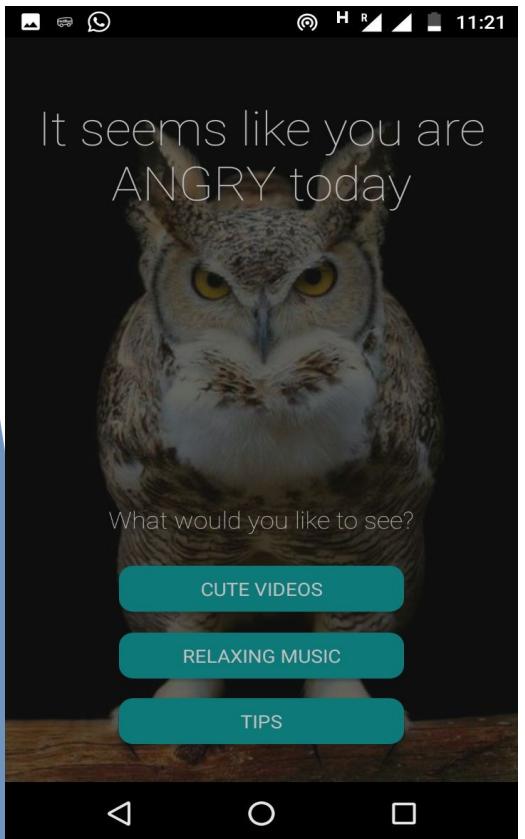


Deploy:

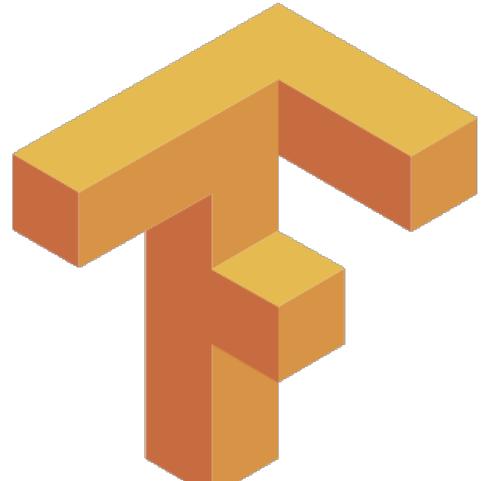




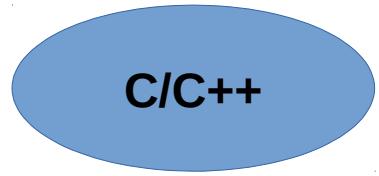
# Emigo



# Deep learning frameworks and tools



theano



# Caffe



# julia



THANKS