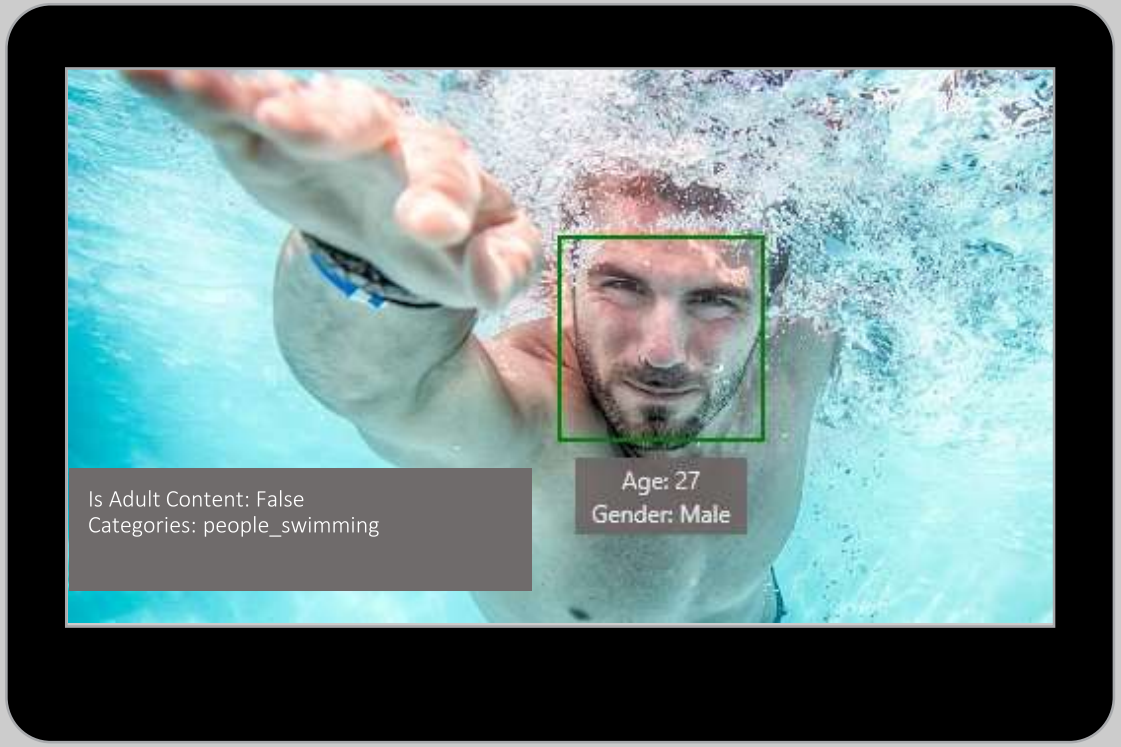
Learn and engage with Deep Learning

Cognitive services



Bot framework

Deep learning at Microsoft

- Microsoft Cognitive Services
- Skype Translator
- Cortana
- Bing
- Bing Ads
- Augmented Reality
- Microsoft Research

Uber to require selfie security check from drivers

Using Microsoft Cognitive Services, Uber hopes to make riders feel safer by verifying the ID of drivers before rides are given.

By Jake Smith for iGeneration | September 23, 2016 -- 19:59 GMT (03:59 GMT+08:00) | Topic: Innovation

Uber announced on Friday a new security feature called Real-Time ID Check that will require drivers to periodically take a selfie before starting their driving shift.

The feature, which begins rolling out to US cities on Friday, uses Microsoft Cognitive Services to reduce fraud and give riders an extra sense of security.

Uber says Microsoft's feature instantly compares the selfie to the one corresponding with the account on file. If the two

SHARING ECONOMY

RELATED STORIES

Innovation

Victoria partners with Bosch for self-

http://how-old.net/#resul How old do I look?

How-Old.net

How old do I look? #HowOldRobot

Sorry if we didn't quite get it right - we are still improving this feature.

Try Another Photo!

Microsoft

P.S. We don't keep the photo

Share 2.3M Tweet

The magic behind How-Old.net

Privacy & Cookies | Terms of Use | View Source

https://www.caption... CaptionBot - For pictures w...

Microsoft

CaptionBot

I am not really confident, but I think it's a group of young children sitting next to a child and they seem 😐😐.

How did I do?

☆ ☆ ☆ ☆ ☆

TWCN
Tech News

Home | TWC | Microsoft | Windows | Office | IE | Phone | Security | Social Media

September 6, 2016

Microsoft and Liebherr together to make Refrigerators smart

Smart refrigerators, Cortana, Microsoft and Liebherr

When this joint venture of Microsoft and Liebherr will come into reality, it will be the next level of machine learning. SmartDeviceBox is nothing a communication module which fits into Liebherr refrigerators and freezers, connecting them to the internet. The modular units can be integrated and upgraded at any time in existing SmartDevice-ready appliances to create value and comfort for customers through new digital features and solutions.

technofres
technology news today

HOME | APPLE | ANDROID | MICROSOFT | GAMING | AUTO

The underlying state-of-the-art deep learning algorithms themselves are also available within Microsoft's open source Computational Network Toolkit (CNTK) and can be used to build custom models for new use cases.

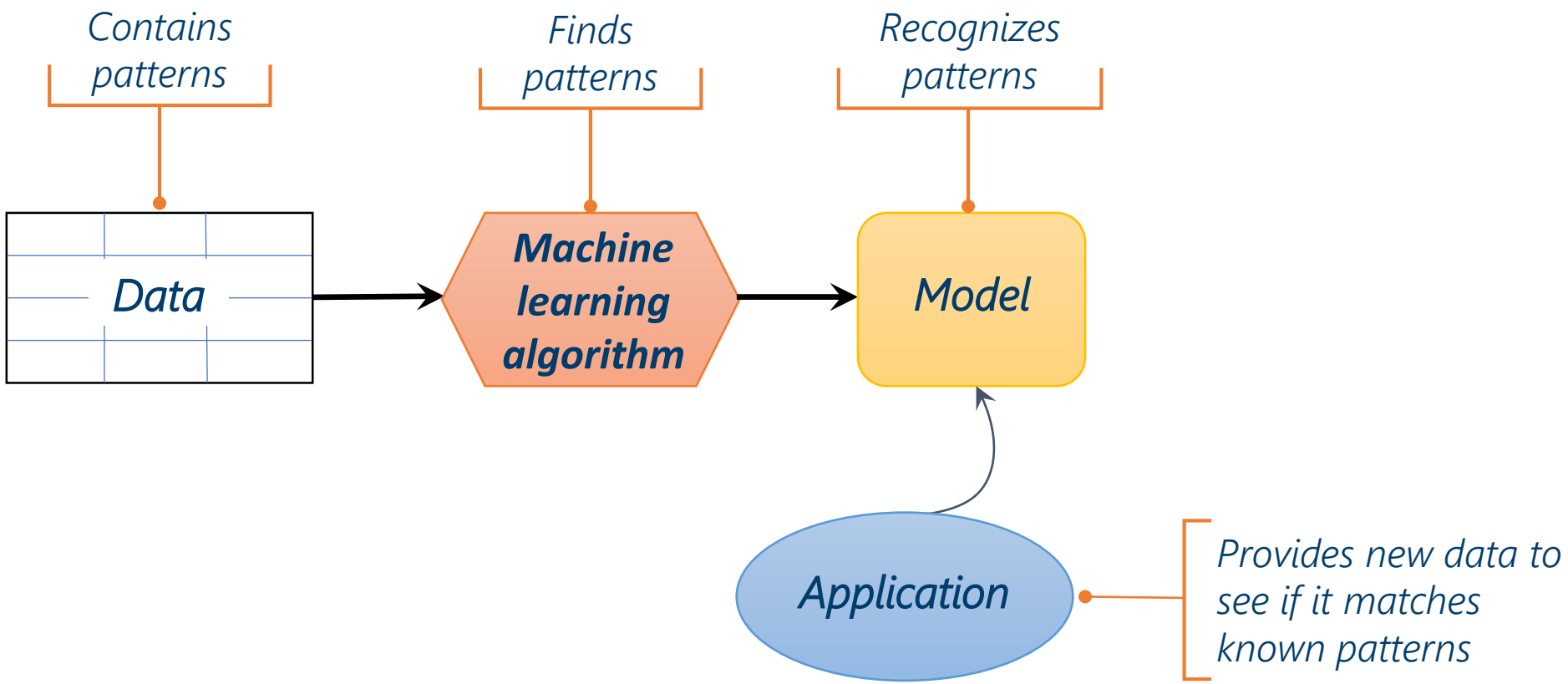
Microsoft states that it has already built a new image processing system to detect specific food items using the deep learning algorithms contained in CNTK.

Microsoft's historic speech breakthrough

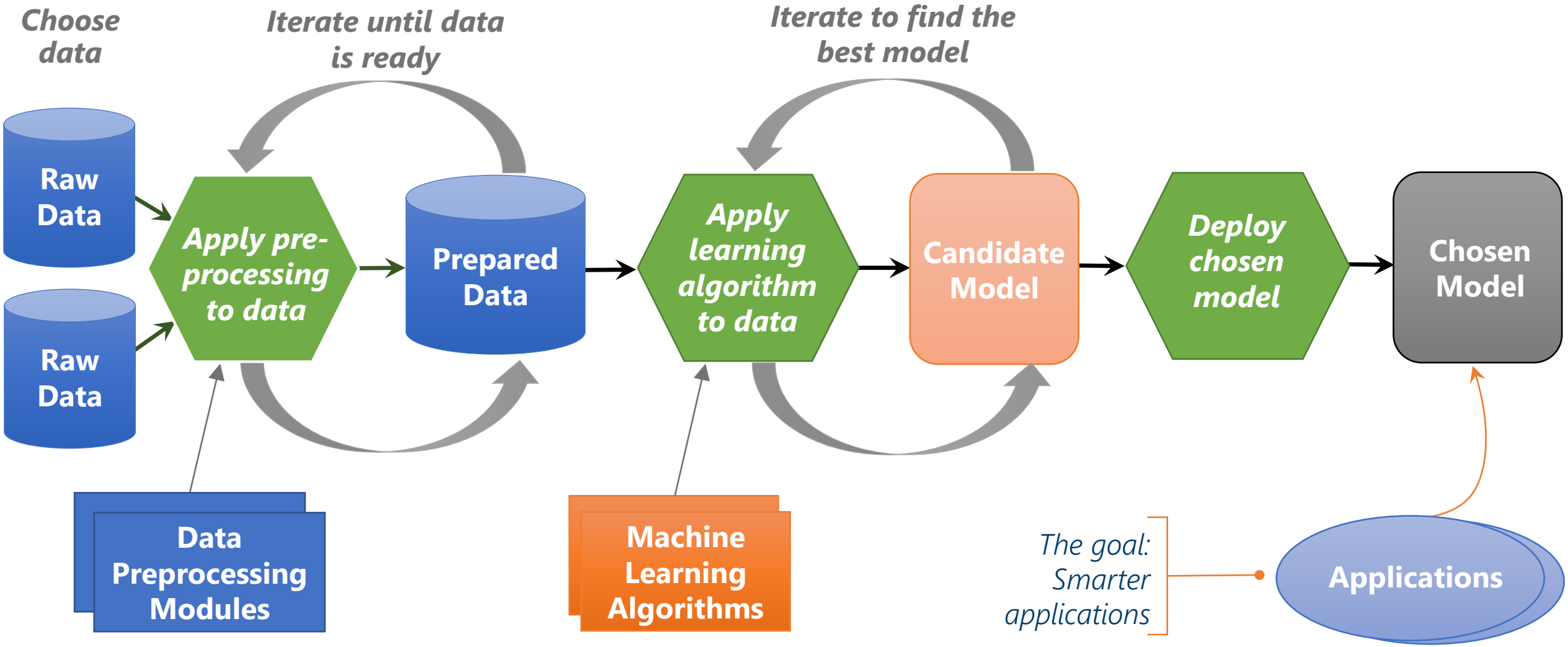
- Microsoft 2016 research system for conversational speech recognition
- 5.9% word-error rate
- enabled by CNTK's multi-server scalability

[W. Xiong, J. Droppo, X. Huang, F. Seide, M. Seltzer, A. Stolcke, D. Yu, G. Zweig: "Achieving Human Parity in Conversational Speech Recognition," https://arxiv.org/abs/1610.05256]

Machine Learning in a Nutshell



The Machine Learning Process



Terminology

The most common approach

Training data

The prepared data used to create a model

Creating a model is called *training* a model

Supervised learning

The value you want to predict is in the training data

The data is *labeled*

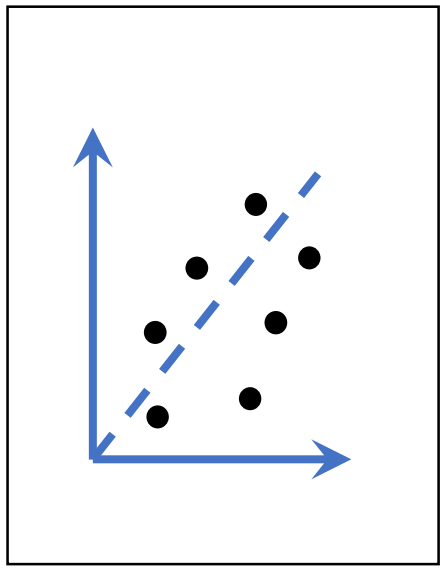
Unsupervised learning

The value you want to predict is not in the training data

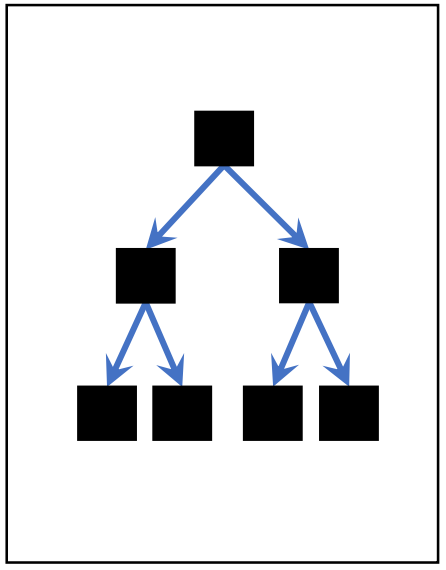
The data is *unlabeled*

Styles of Machine Learning Algorithms Examples

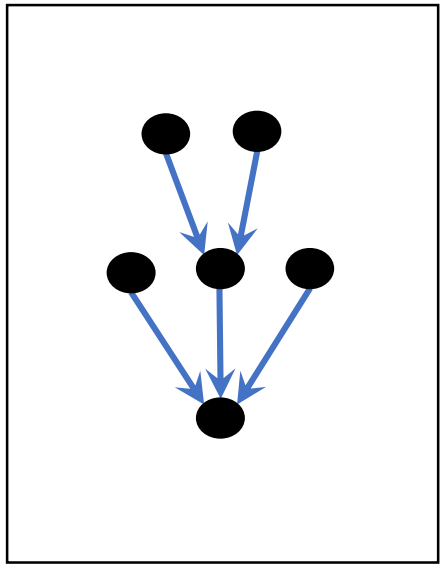
Deep learning uses this



Regression



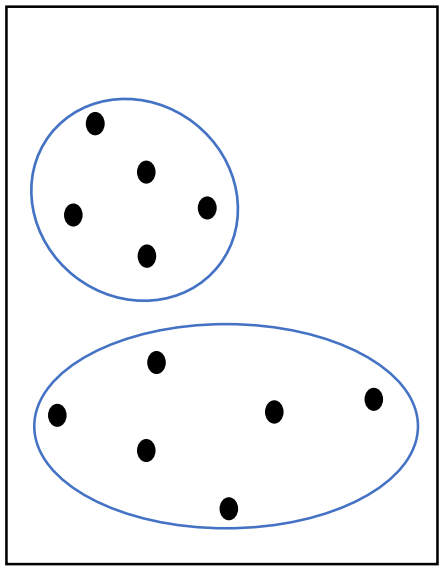
Decision tree



Neural network

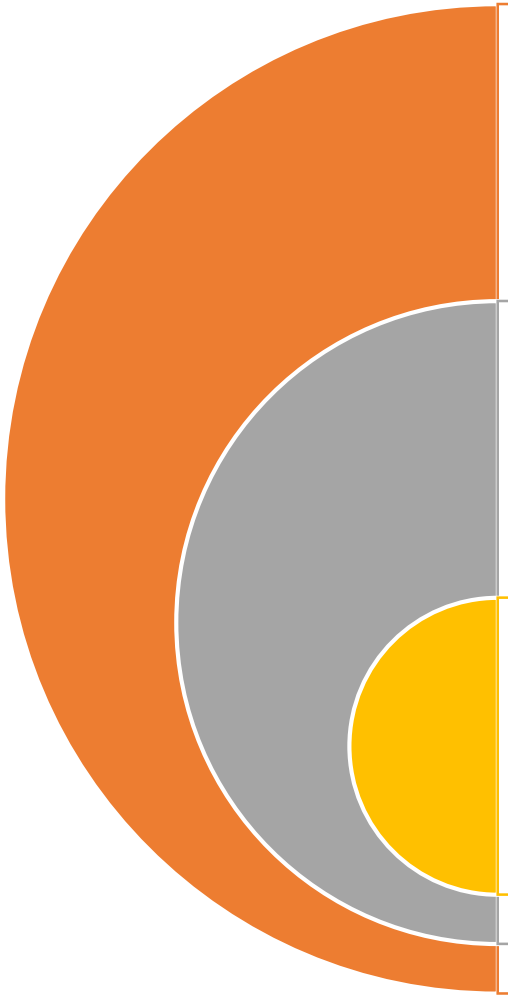
$$P(A|B) = \frac{P(A)\,P(B|A)}{P(B)}$$

Bayesian



K-means

What is deep learning



Machine learning is a way to try to make machines intelligent by allowing computers to learn from examples about the world around us or about some specific aspect of it.

Deep learning is **an approach to machine learning,** particular among all the machine learning methods in that it is inspired by some of the things we know about **the brain**. It's trying to make computers learn **multiple levels of abstraction and representation**, which is presumably what makes these systems so successful

Reinforcement learning is a type of machine learning where the learner doesn't get to know what a human would do in this **context**. The learner only gets to see if the **actions** were good or bad after a long set of actions. A lot of the recent progress in this area is in things like playing games, but reinforcement learning probably is going to be very important for things like self-driving cars.

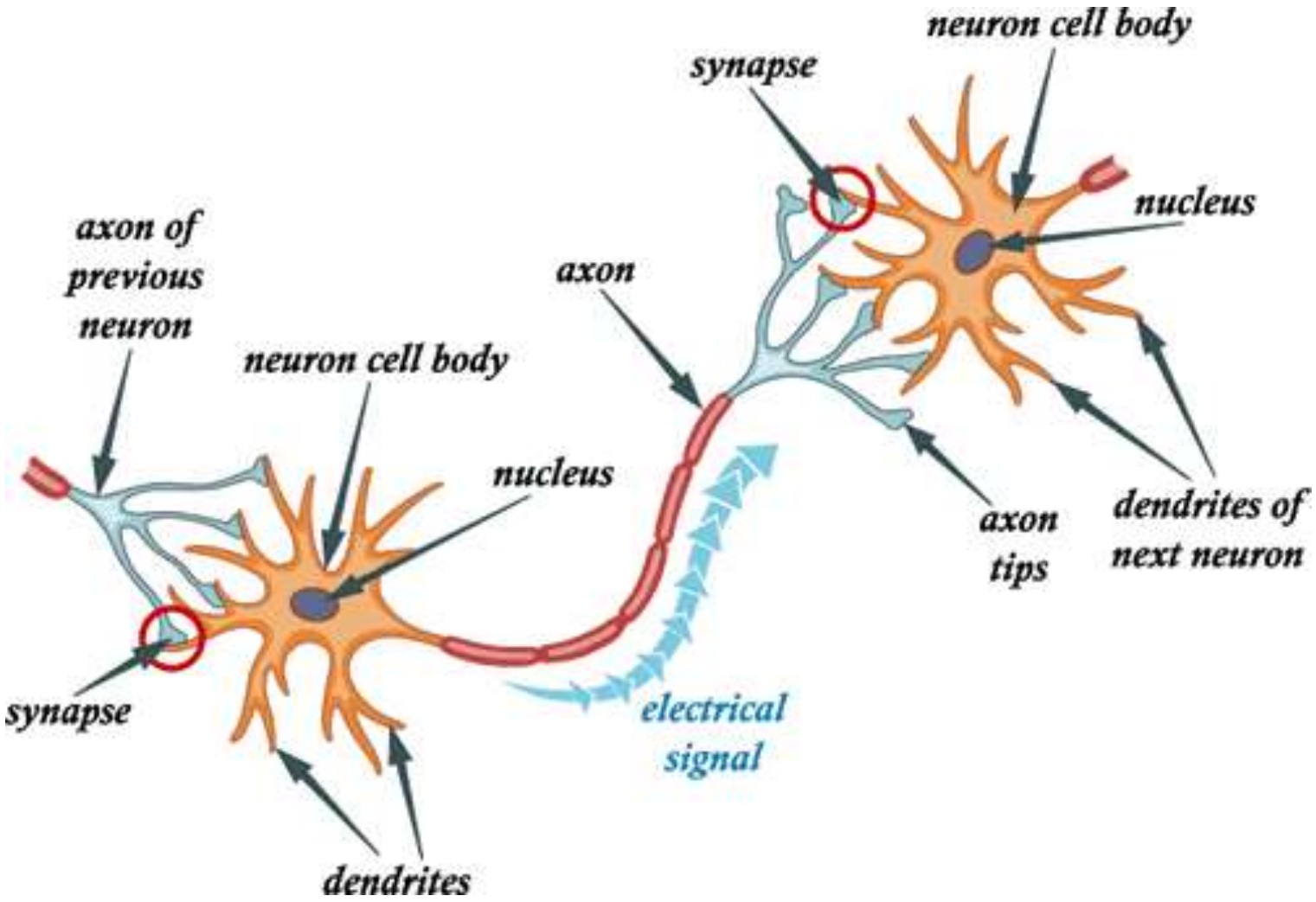
--- **Yoshua Bengio**

Deep learning fundamentals

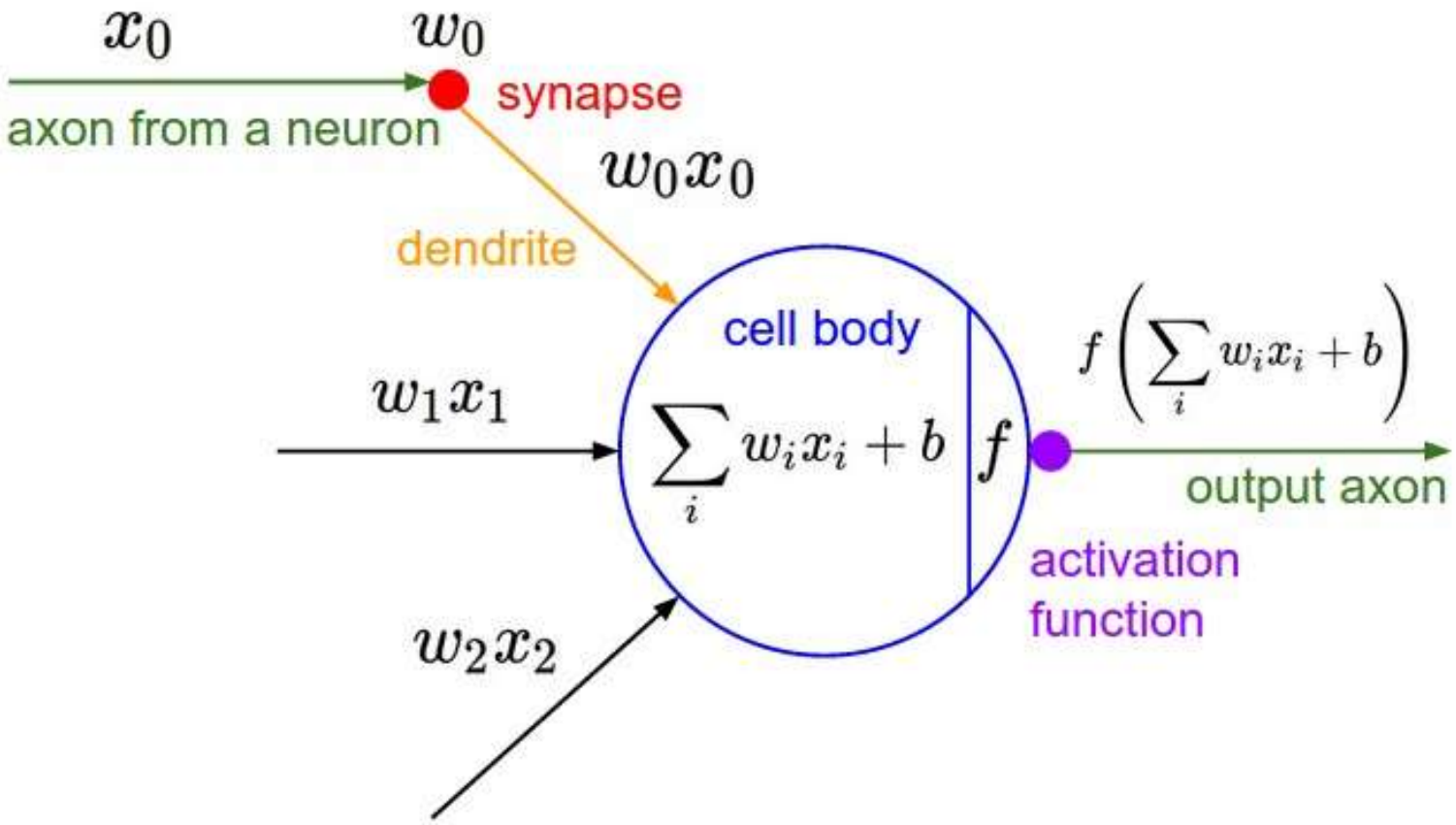
DL is trying to make computers learn **multiple levels of abstraction and representation**

- Model Generalization
  - Network Architecture
  - Activation function
  - Regularization
- Model Training
  - Loss functions
  - Parameter gradient computation with backpropagation
  - Gradient descent algorithms

Real Neural Network



Artificial Neural Network



Logistic regression

Features

0.12
-3.4
1.11
-0.94
-1.2

Weights

1.21
-2.2
-0.32
-1.29
1.4

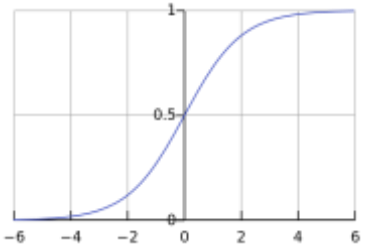
Multiply features by weights

1.21 x 0.12
-2.2 x -3.4
-0.32 x 1.11
-1.29 x -0.94
1.4 x -1.2

Sum them up, add a bias term

$\sum + b$

Pass result through the logistic function

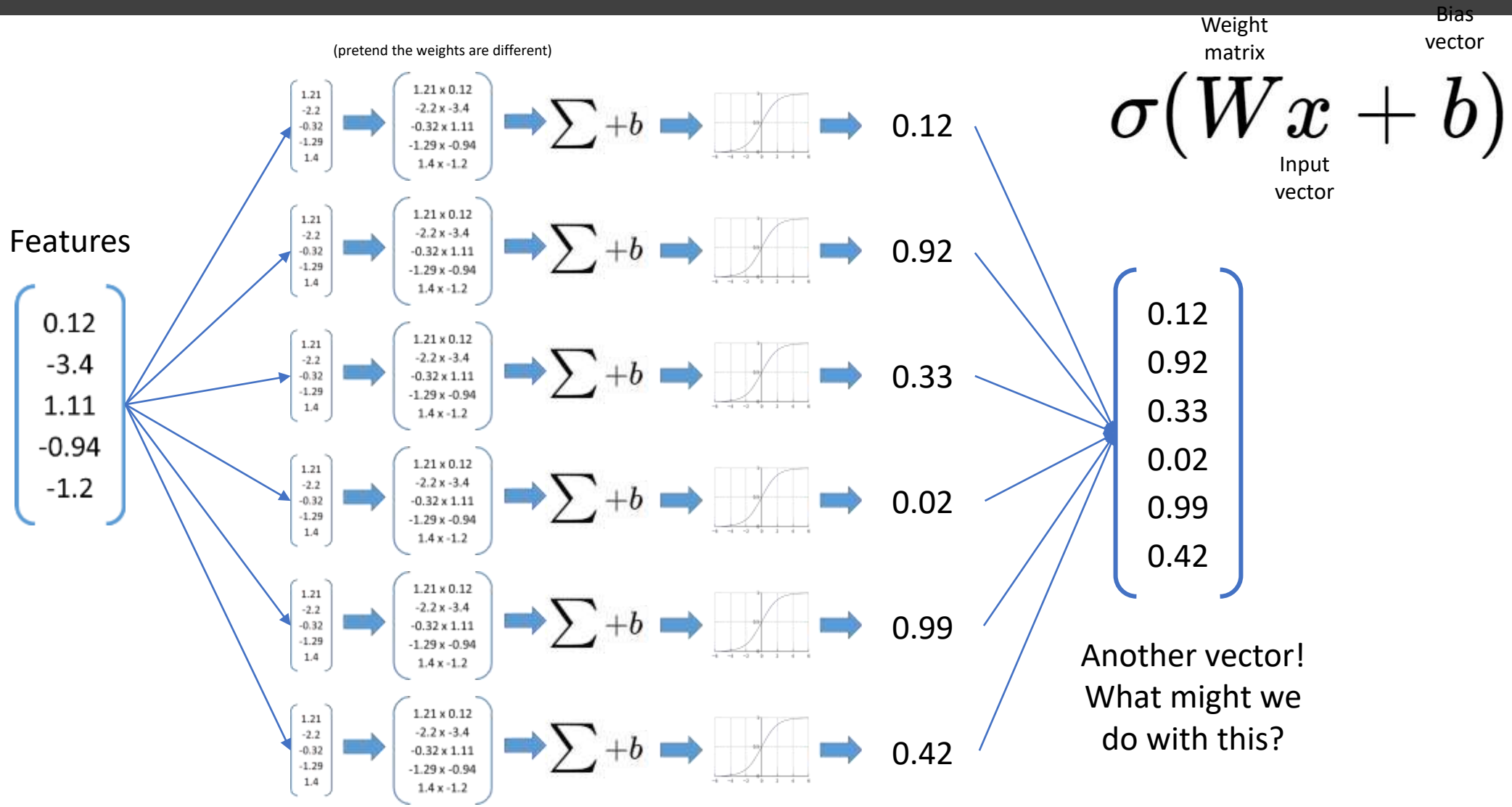


0.94

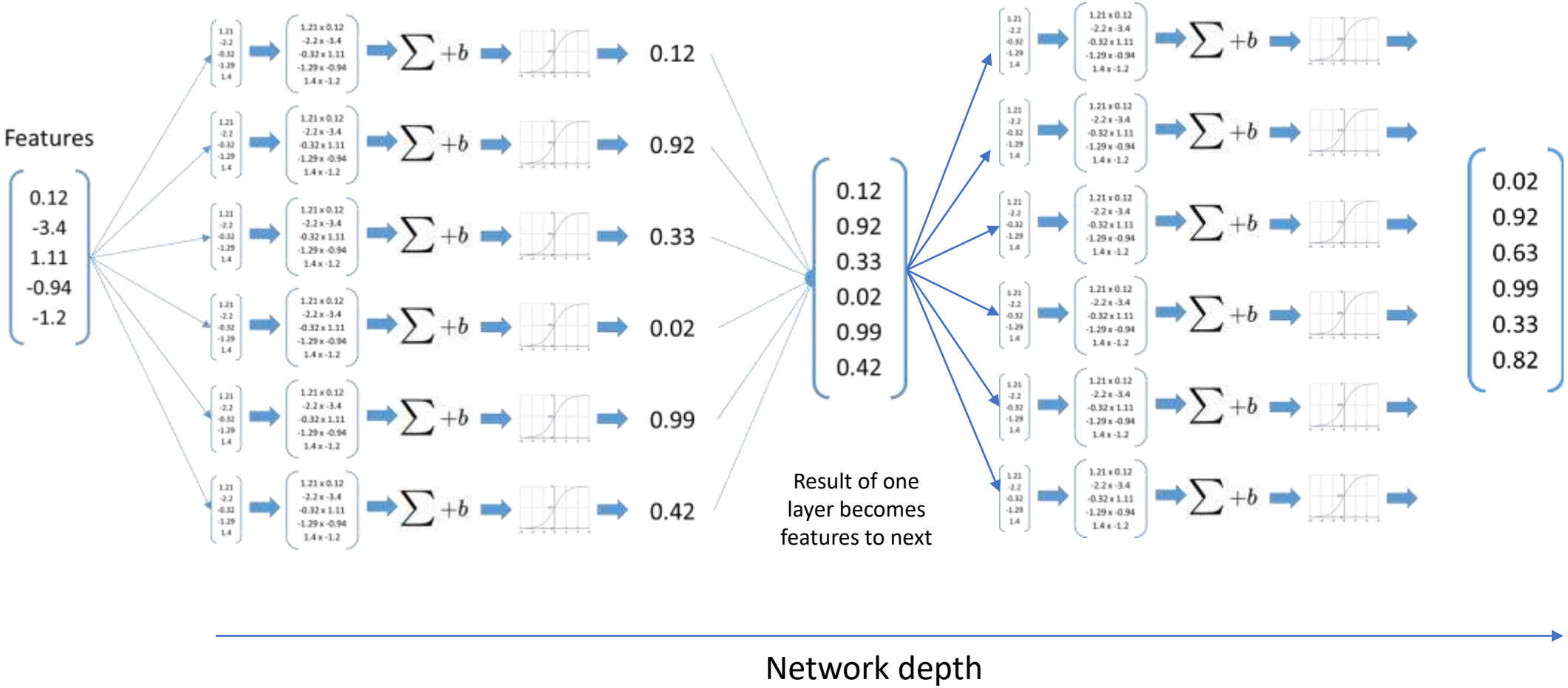
dot product

$$\sigma(weights \cdot features + b)$$

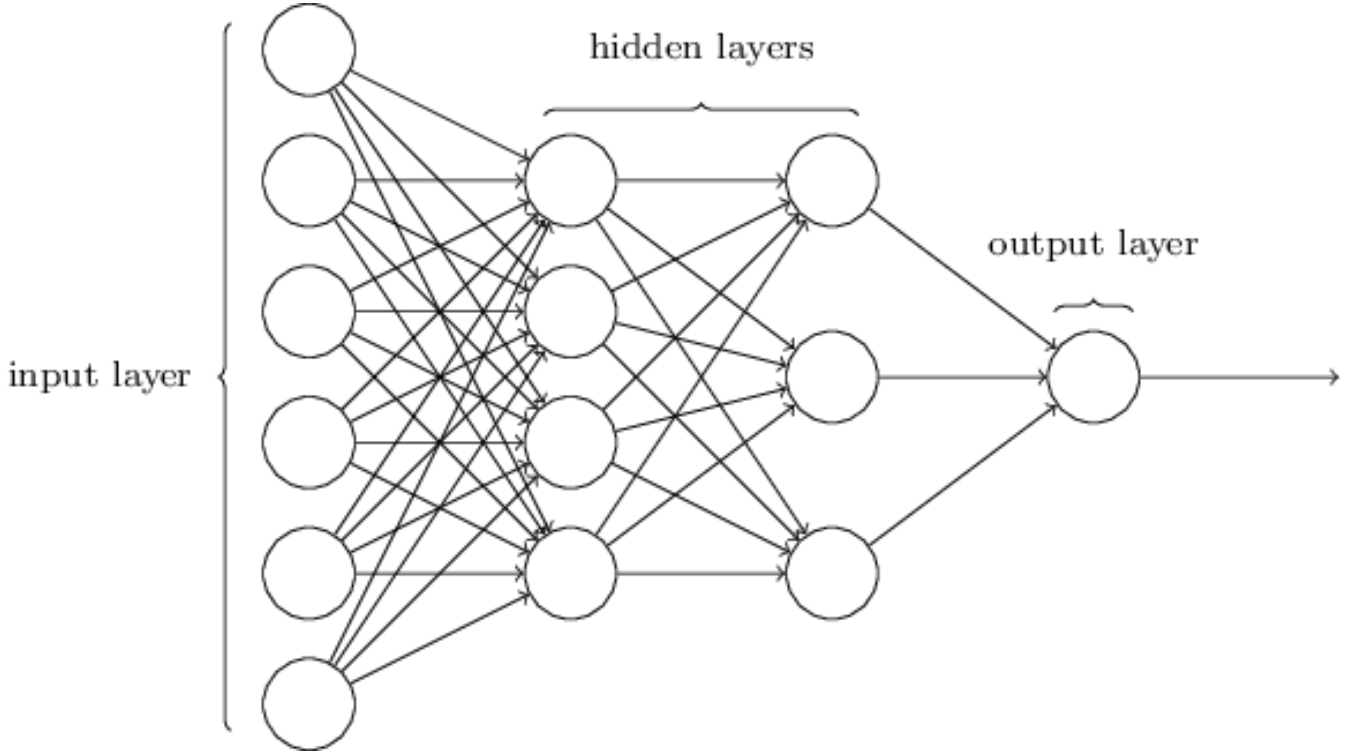
A single-layer neural network
(also known as doing multiple logistic regressions at the same time)



Multi-Layer Perceptrons



These diagrams are getting hard to read
Let’s make each individual input and logistic regression into a circle



How do we figure out the weights?

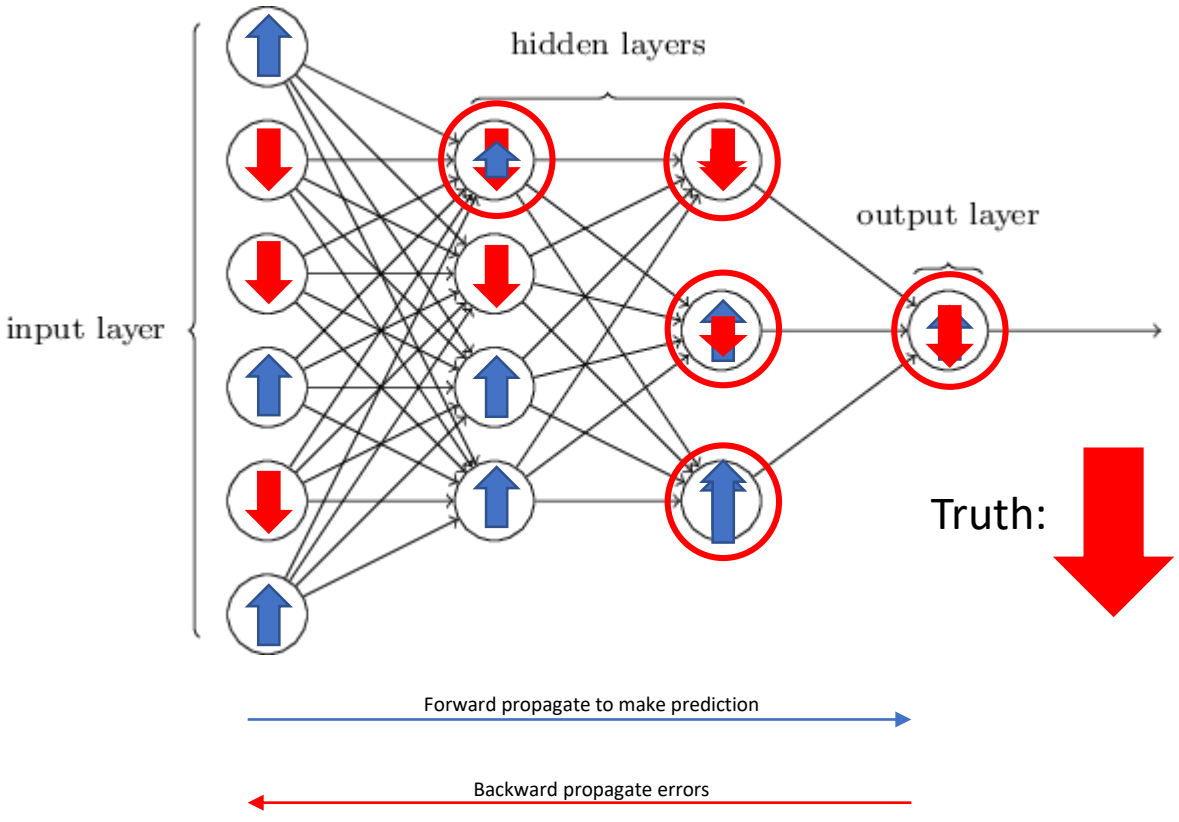
Start with random weights

Try out the model

Determine the error

Figure out how responsible each weight is for the error

Punish each weight in proportion to its crime



Microsoft Cognitive Toolkit

CNTK expresses (nearly) **arbitrary neural networks** by composing simple building blocks into complex **computational networks**, supporting relevant network types and applications

Microsoft Cognitive Toolkit

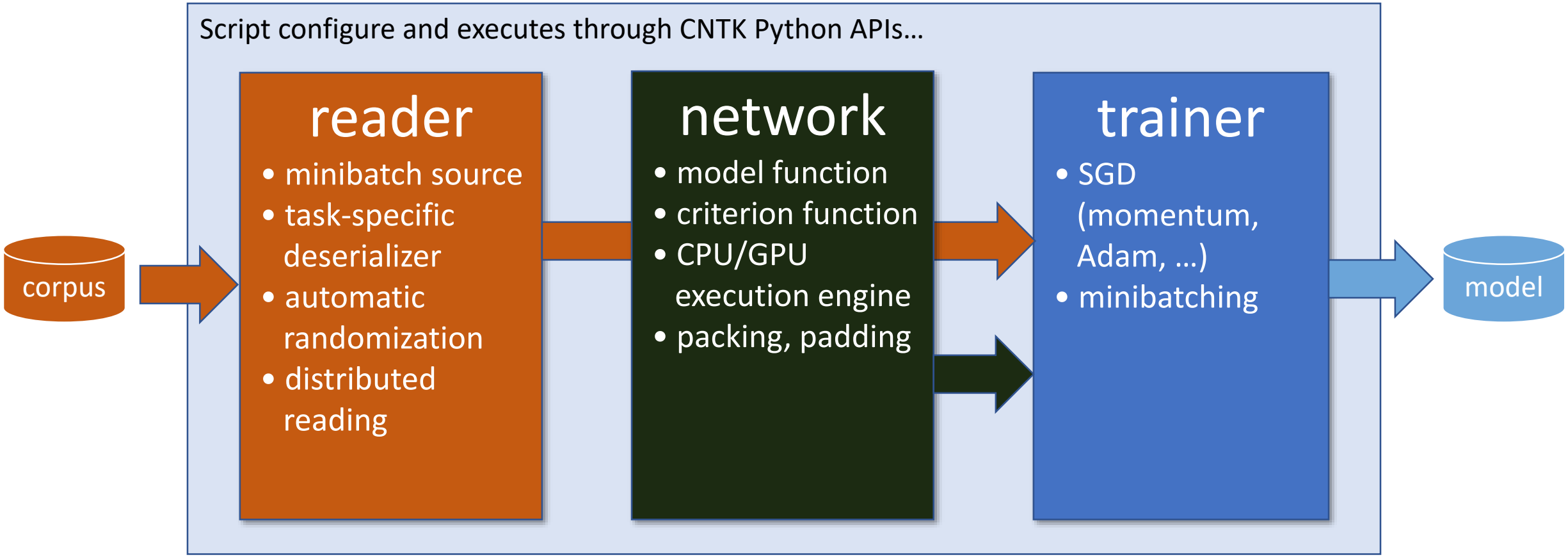
- Microsoft's open-source deep-learning toolkit
  - https://github.com/Microsoft/CNTK 

  - Created by Microsoft Speech researchers (Dong Yu et al.) in 2012, "Computational Network Toolkit"
  - On GitHub since Jan 2016 under MIT license
  - Renamed from CNTK to "Cognitive Toolkit"
  - Community contributions e.g. from MIT, Stanford and NVidia

Microsoft Cognitive Toolkit

- Python and C++ API
  - Mostly implemented in C++
  - Low level + high level Python API
- Extensibility
  - User functions and learners in pure Python
- Readers
  - Distributed, highly efficient built-in data readers
- Details: https://docs.microsoft.com/en-us/cognitive-toolkit/reasons-to-switch-from-tensorflow-to-cntk

Anatomy of a CNTK training job



Terms to remember: Neural Networks/Deep Networks

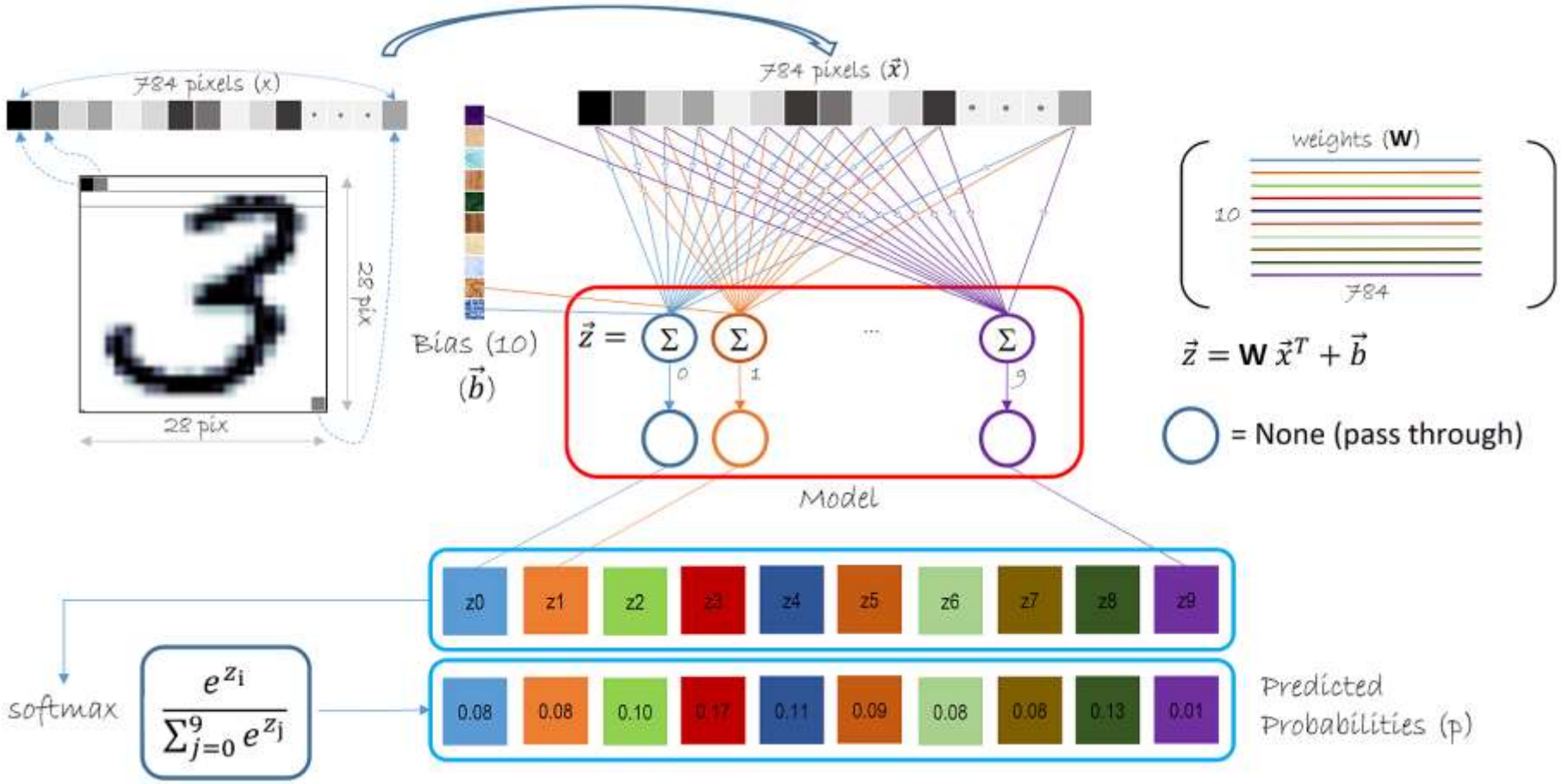
- Backpropagation
  - Forward Pass
  - Loss Function
  - Backward pass
  - Weight Adjustment
- Hidden layer – Neither an input nor and output layer
- Activation Function & Activation Value
- Activation Matrix (CNN)
- Stochastic Gradient Descent
- Convolutional Layers
  - Auto Feature Detection
- Weights
- Bias
- Regularization

CNTK – Jupyter Notebook

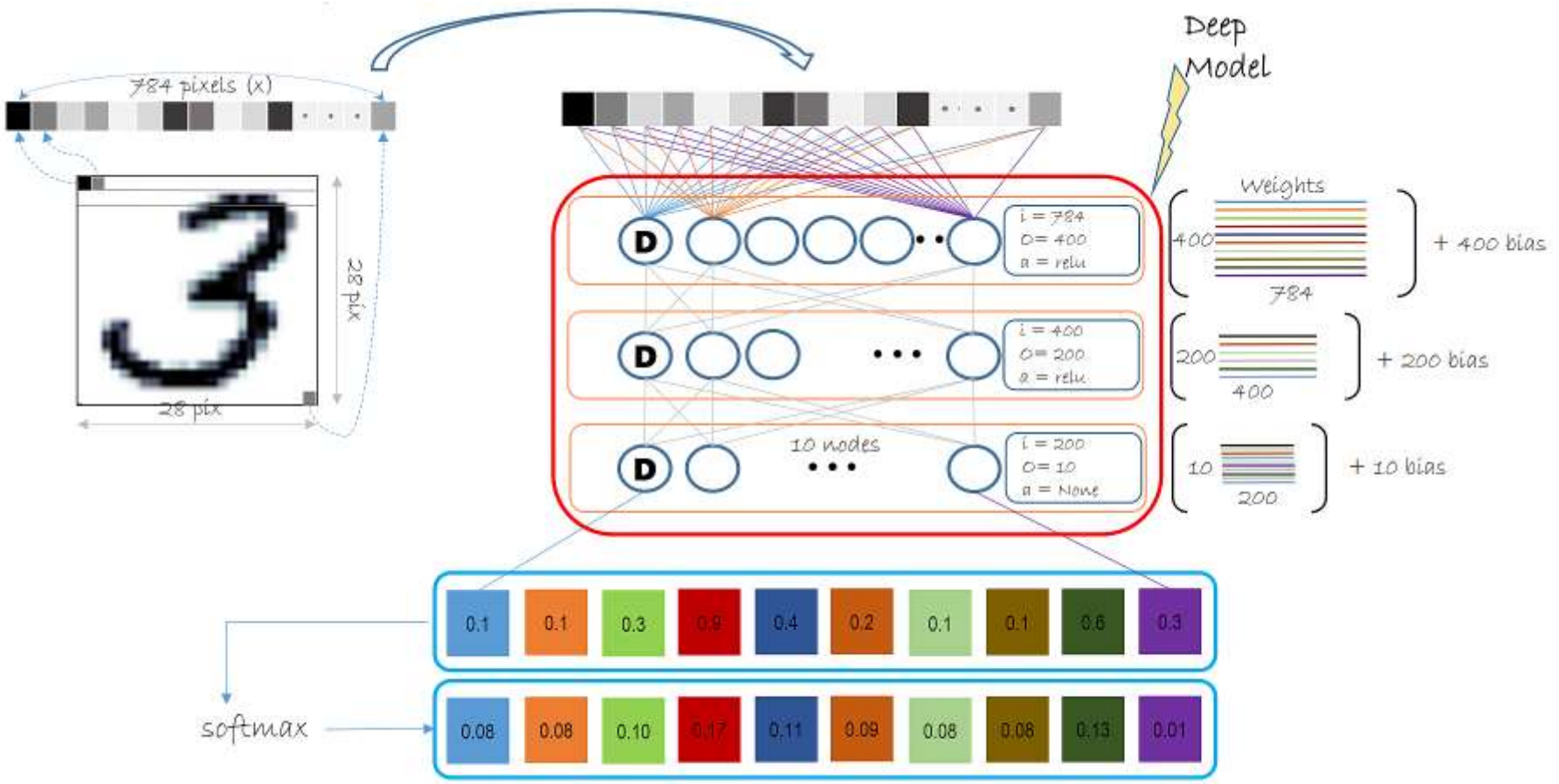
MNIST Data – Recognize Digits

1. Logistic Regression
2. Multi Layer Perceptron
3. Convolution Neural Networks

Machine Learning – Logistic Regression



Deep Learning – Multi Level Perceptron



Deep Learning – CNN

Input = (3, width, height)