

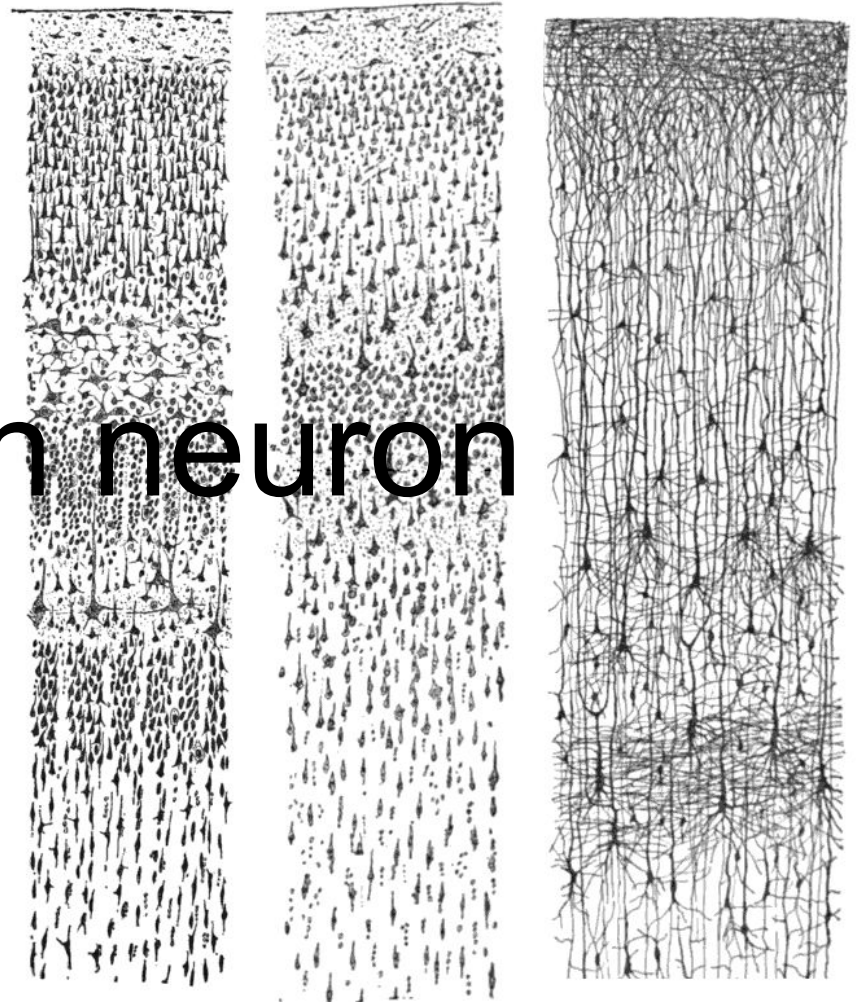
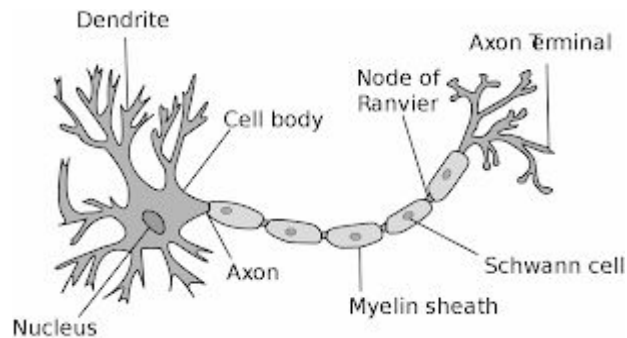
MACHINE LEARNING INTRODUCTION

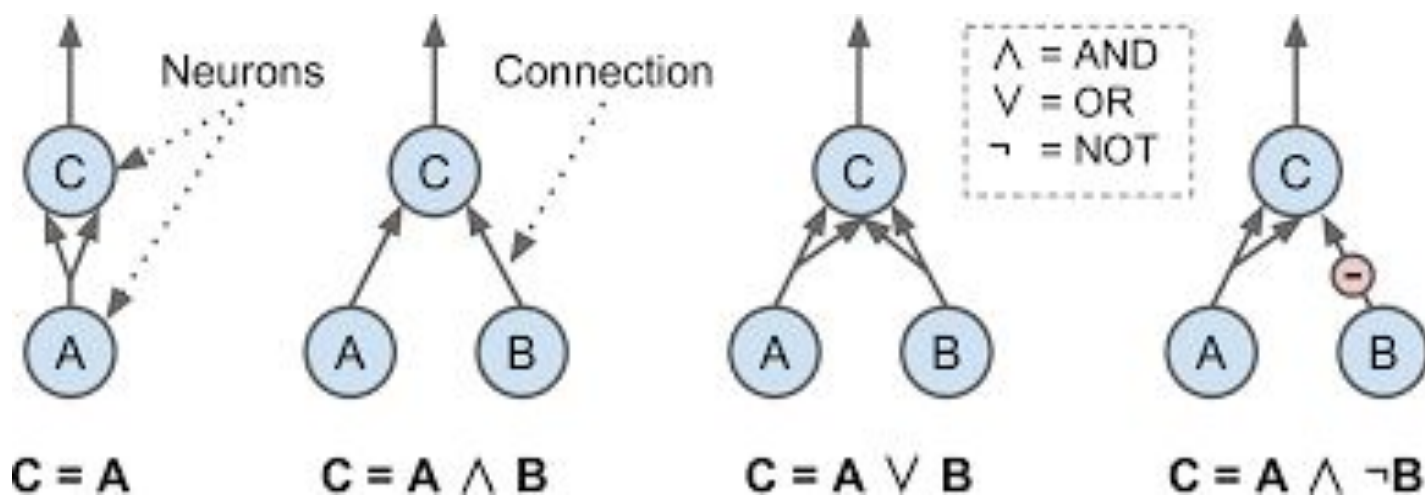


ANN

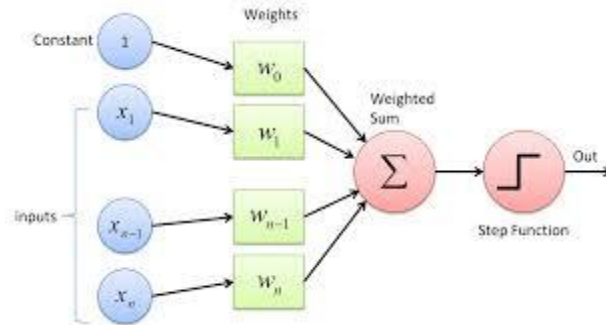
Artificial Neural Networks

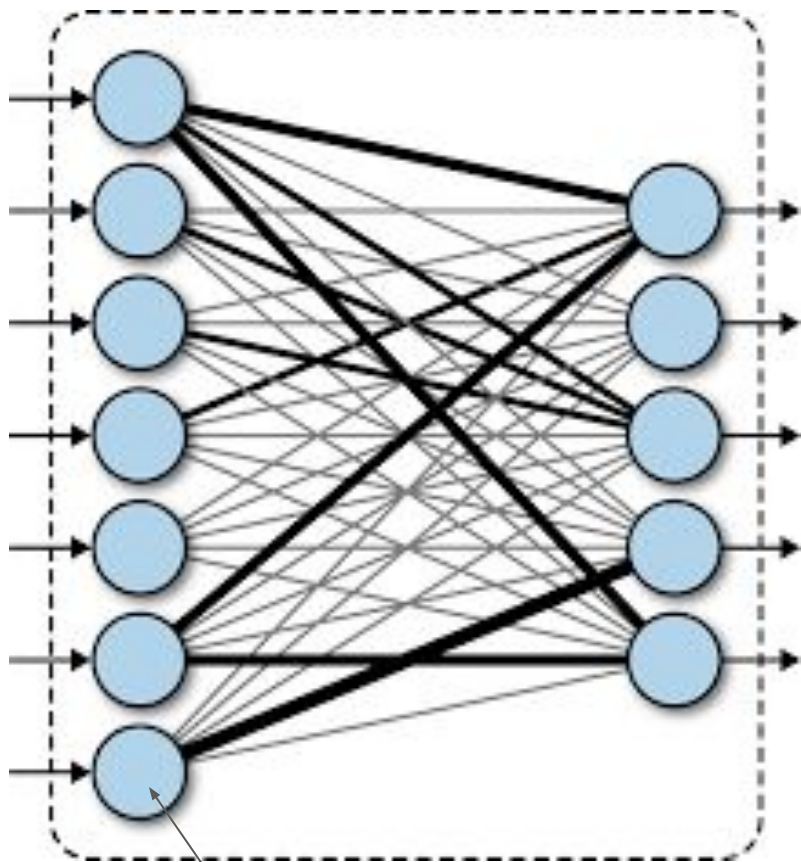
The human neuron





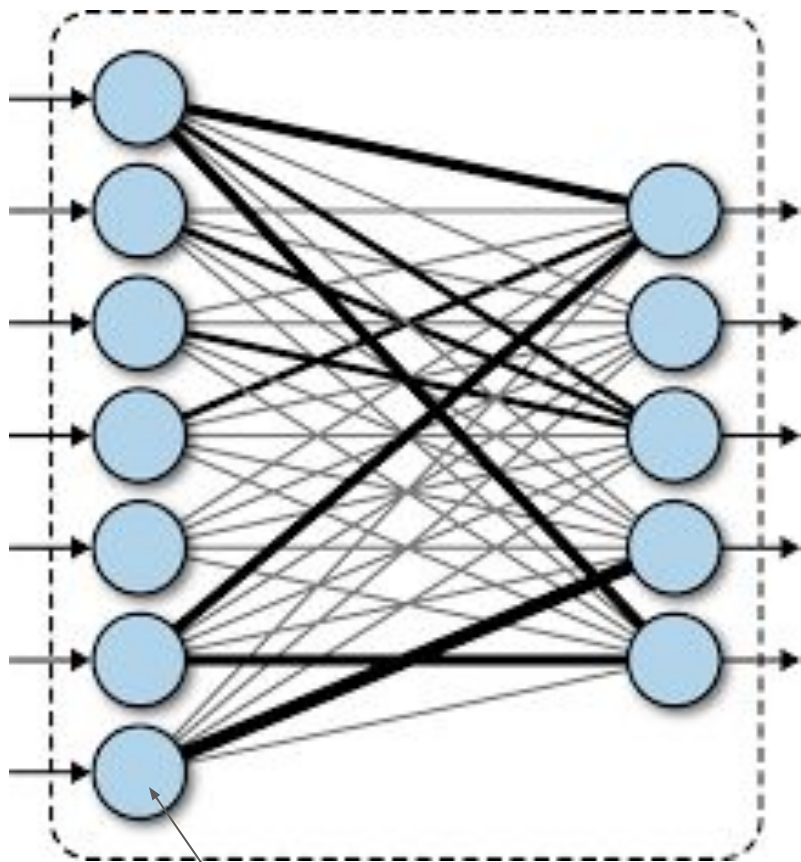
The perceptron (1957)





Bias neuron (always 1)

$$h_{w,b}(x) = \phi(Xw + b)$$



Bias neuron (always 1)

LEARNING RULE

(WAT)

$$W_{ij} = W_{ij} + \eta (y_j - \hat{y}_j) x_i$$

Example (now in colab)

https://github.com/gtchandra/JupyterNotebooks/blob/main/perceptron_test.ipynb

Why TensorFlow

TensorFlow is an end-to-end open source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries and community resources that lets researchers push the state-of-the-art in ML and developers easily build and deploy ML powered applications.

About →



Easy model building

Build and train ML models easily using intuitive high-level APIs like Keras with eager execution, which makes for immediate model iteration and easy debugging.



Robust ML production anywhere

Easily train and deploy models in the cloud, on-prem, in the browser, or on-device no matter what language you use.



Powerful experimentation for research

A simple and flexible architecture to take new ideas from concept to code, to state-of-the-art models, and to publication faster.

Keras

```
from tensorflow import keras
from tensorflow.keras import layers

# Instantiate a trained vision model
vision_model = keras.applications.ResNet50()

# This is our video encoding branch using the trained vision_model
video_input = keras.Input(shape=(100, None, None, 3))
encoded_frame_sequence = layers.TimeDistributed(vision_model)(video_input)
encoded_video = layers.LSTM(256)(encoded_frame_sequence)

# This is our text-processing branch for the question input
question_input = keras.Input(shape=(100,), dtype='int32')
embedded_question = layers.Embedding(10000, 256)(question_input)
encoded_question = layers.LSTM(256)(embedded_question)

# And this is our video question answering model:
merged = keras.layers.concatenate([encoded_video, encoded_question])
output = keras.layers.Dense(1000, activation='softmax')(merged)
video_qa_model = keras.Model(inputs=[video_input, question_input],
                              outputs=output)
```

Deep learning for humans.

Keras is an API designed for human beings, not machines. Keras follows best practices for reducing cognitive load: it offers consistent & simple APIs, it minimizes the number of user actions required for common use cases, and it provides clear & actionable error messages. It also has extensive documentation and developer guides.

Innovation through AI

How to develop high value business solutions based on AI

Main areas and interactions

How to develop high value business solutions based on AI

Importance of multidisciplinary approach

How to develop high value business solutions based on AI

NETWORK

The need to invent can only be fueled by a good scouting
network

AI into Action

- Computer vision
 - Segmentation
 - Tag extraction
 - Similarity search
 - QA: photography
 - QA: data entry
 - QA: finding duplicates
- NLP
 - Bigsby vocal assistant
- AR MIRROR
- Product recommendation
- Product ranking visibility rules
- Pricing definition and control
- Pattern recognition rules on real time marketing
- Fraud detection



Predicted Tags:

beach

background

car

sky

sunset

new

vector

london

sign

design

Title: **Stand Collar A-Line Dress**

Fashion Caption: A pearly button accents the stand collar that gives this so-simple, yet so-chic A-line dress its retro flair

Color: Black and Ivory

Meta: - 33" petite length (size 8P) - Hidden back-zip closure - **Stand collar** - Cap sleeves - Side-seam pockets - A-Lined - 63% polyester, 34% rayon, 3% spandex - Dry clean or hand wash, dry flat - Imported - **Dress**

Image Caption: A person in a dress





Figure 1: Illustration of images for fashion parsing and



You can also select any specific area in the image.

sort by similarity

overall

visual

color

text

filter options

all

men

women



Search



Browse...



Jersey dress

turquoise | GBP 8


female - adult - dress



visual similarity - 0.60

color - 0.31 textual - 0.52

similarity - 0.31

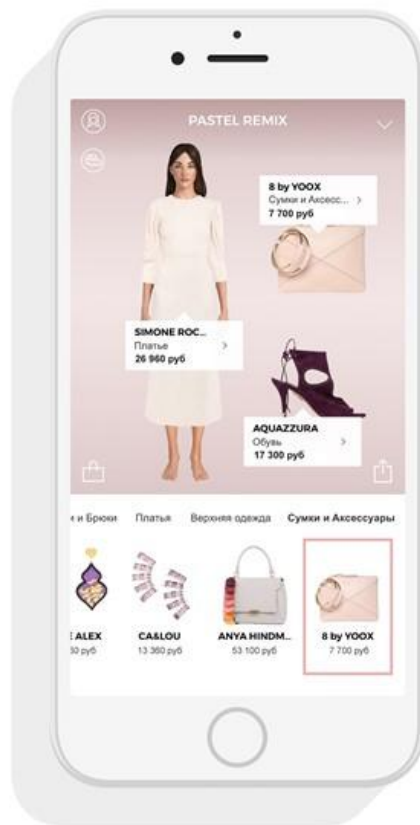


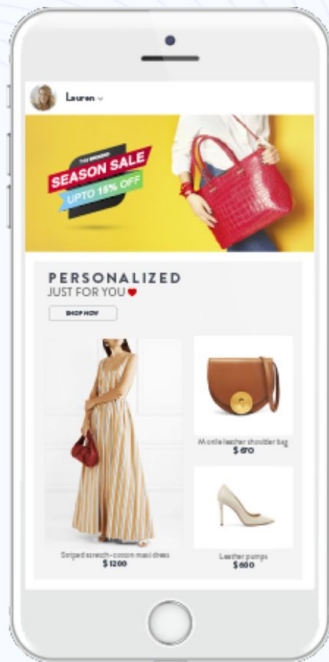
IBM Developer

Generate fashion images using Generative Adversarial Networks

An #IBMDeveloper pattern



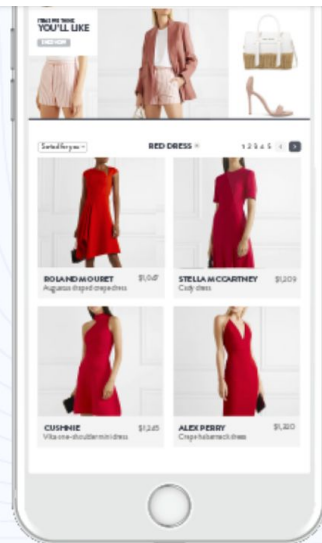




Homepage

Top picks for the shopper
Personalized trending
Inspired by browsing history

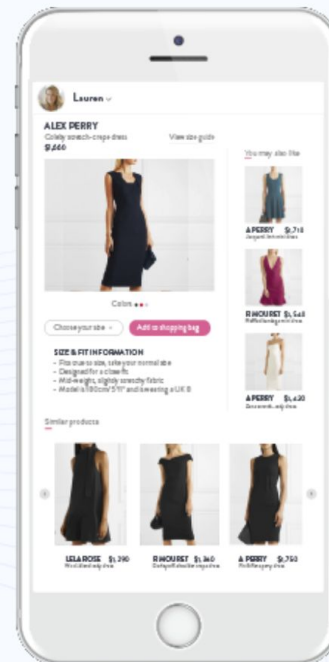
4.5x improvement
in product discovery



Category Page

Personalized sorting

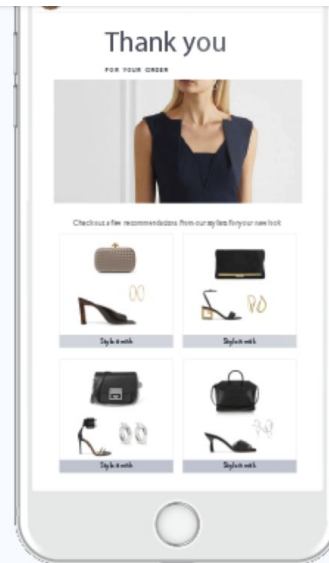
3x higher
conversions



Product Page

Visually similar
recommendations
Personalized outfitting, styling

4x increase in
page views



After Checkout

Personalized outfitting, styling

3x products viewed
per session

Machine Learning in Fraud Detection



Dynamic Pricing



Pricing Strategies
that maximize total
revenue for the
Product

Behavioural Economics



Behavioural Insights
that influence
customer purchase
decisions

AI Driven Insights



Data Driven Insights
that influence
customer purchase
decisions

Personalised Dynamic Offers



Dynamic Pricing
+
Behavioural Insights
+
AI Driven Insights



Articles on AI Lab internal organization (afternoon lecture)

[Article1](#)

[Article2](#)

[Article3](#)