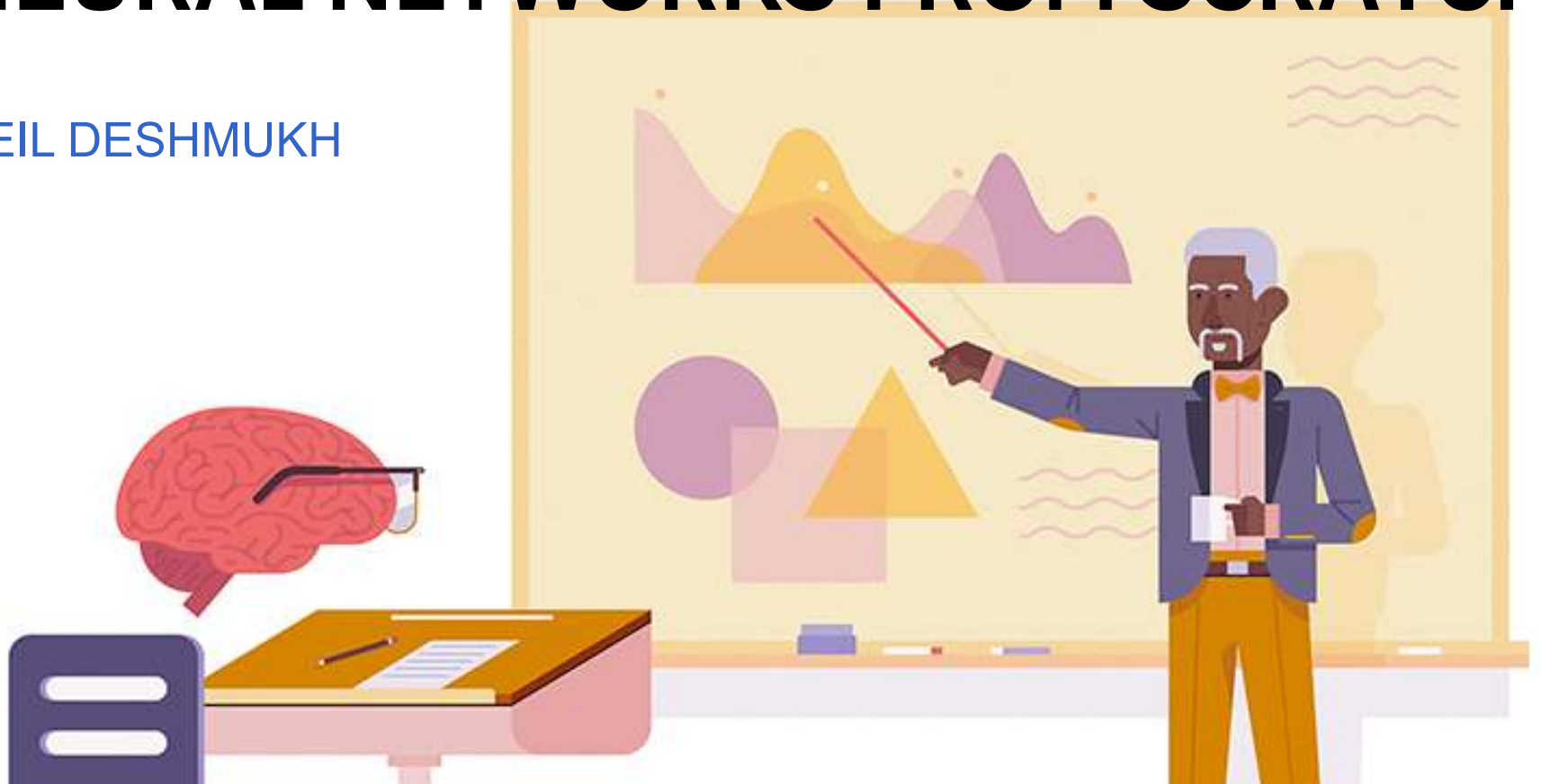
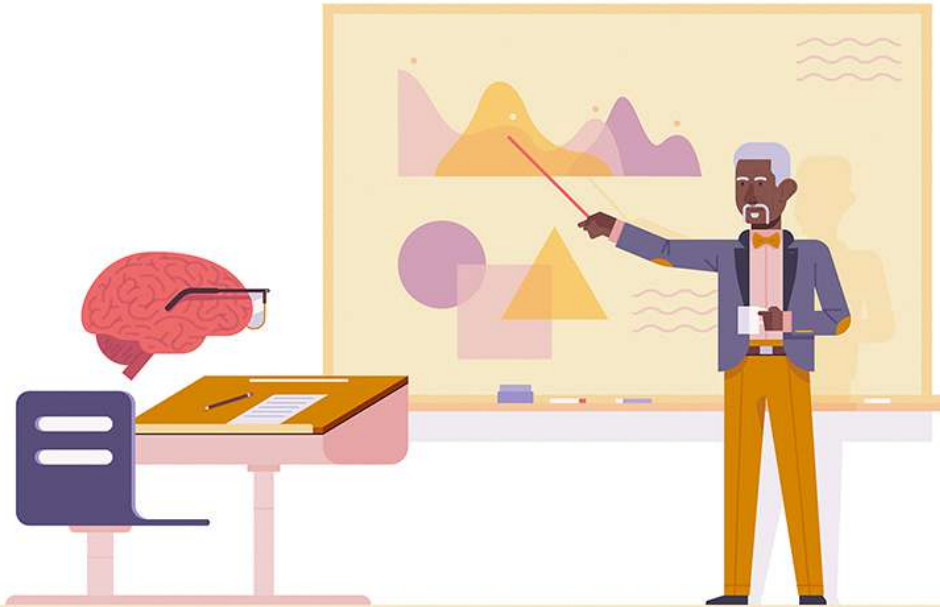


AI CRASH COURSE: DEVELOPING NEURAL NETWORKS FROM SCRATCH

NEIL DESHMUKH



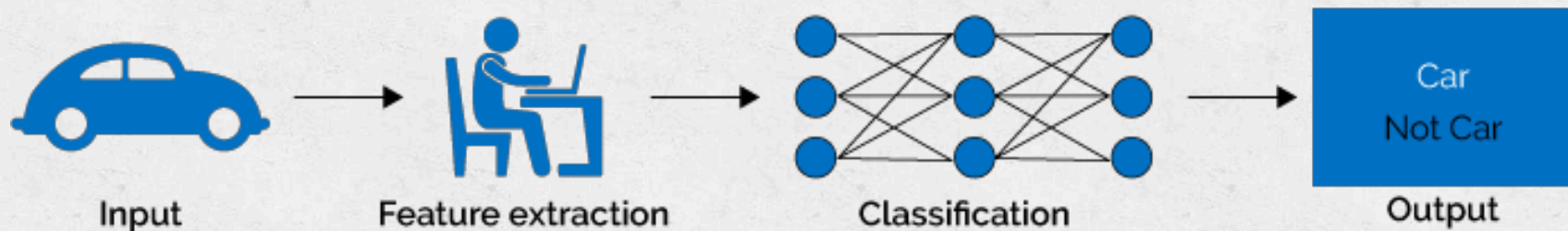
What is Artificial Intelligence?



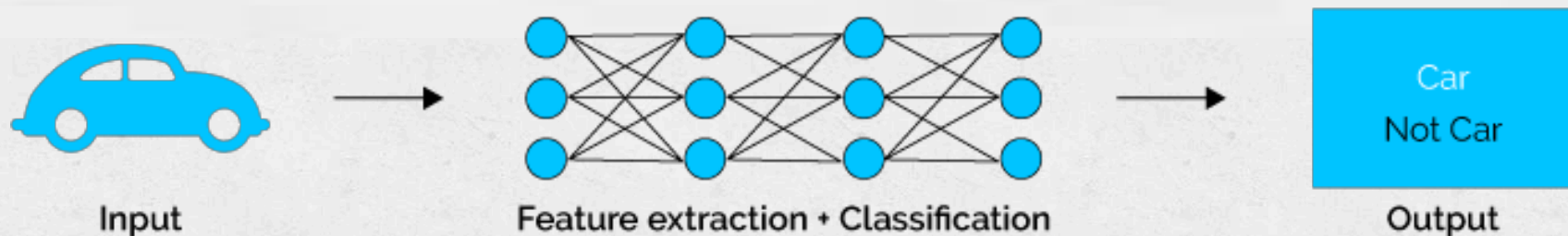
A revolutionary field of computer science that is teaching systems to improve from experience without being explicitly programmed.

ML vs DL

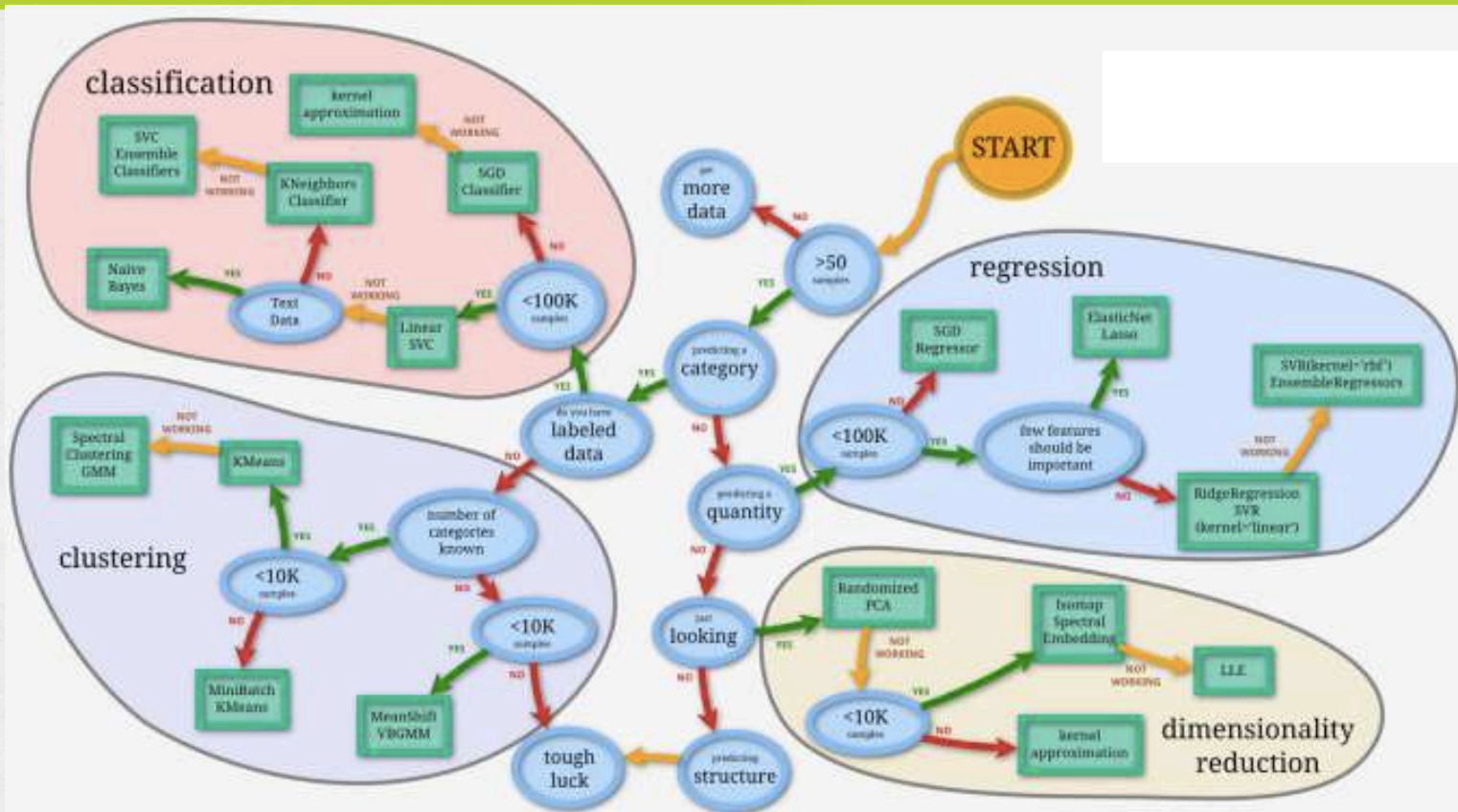
Machine Learning



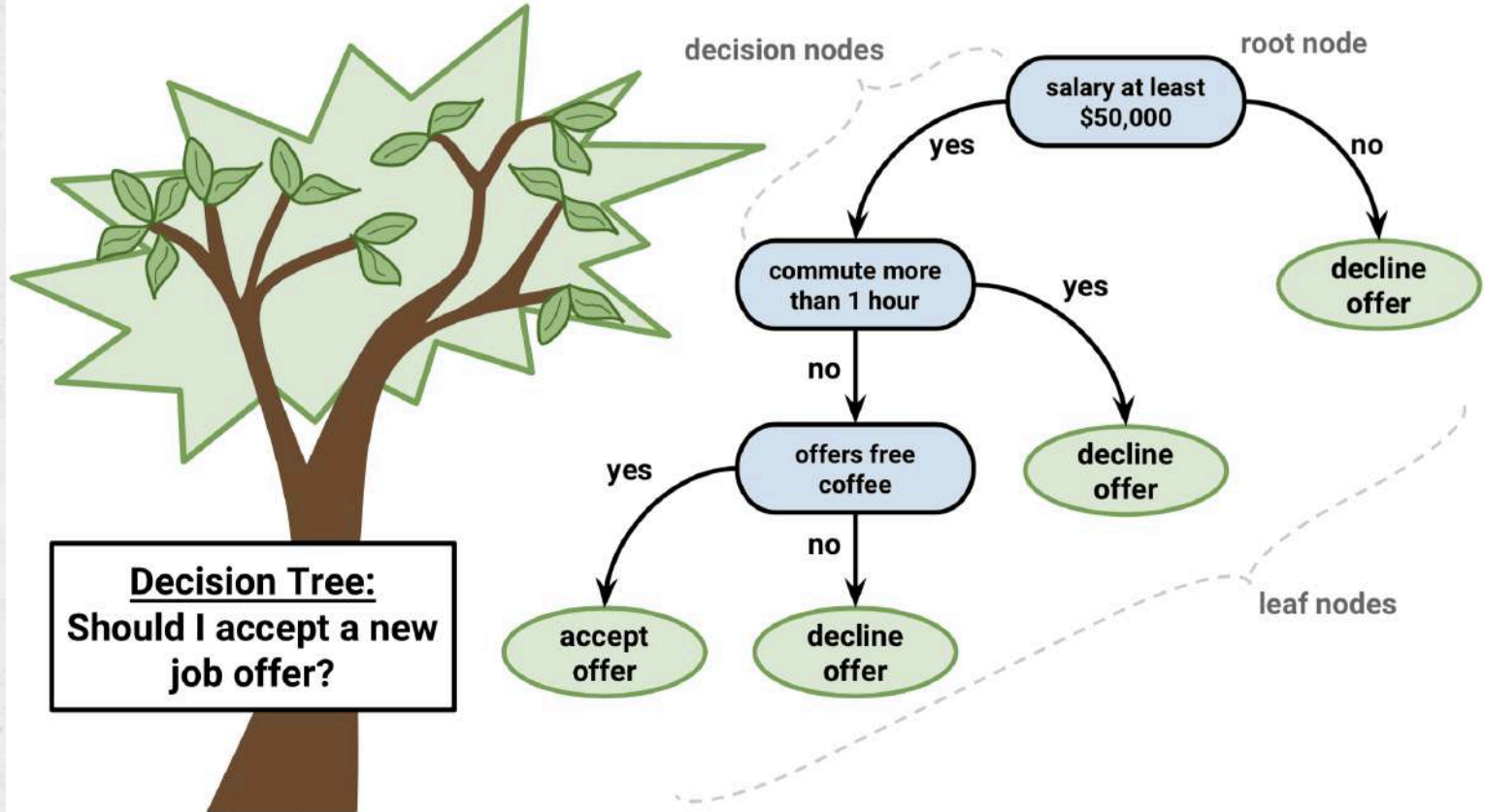
Deep Learning



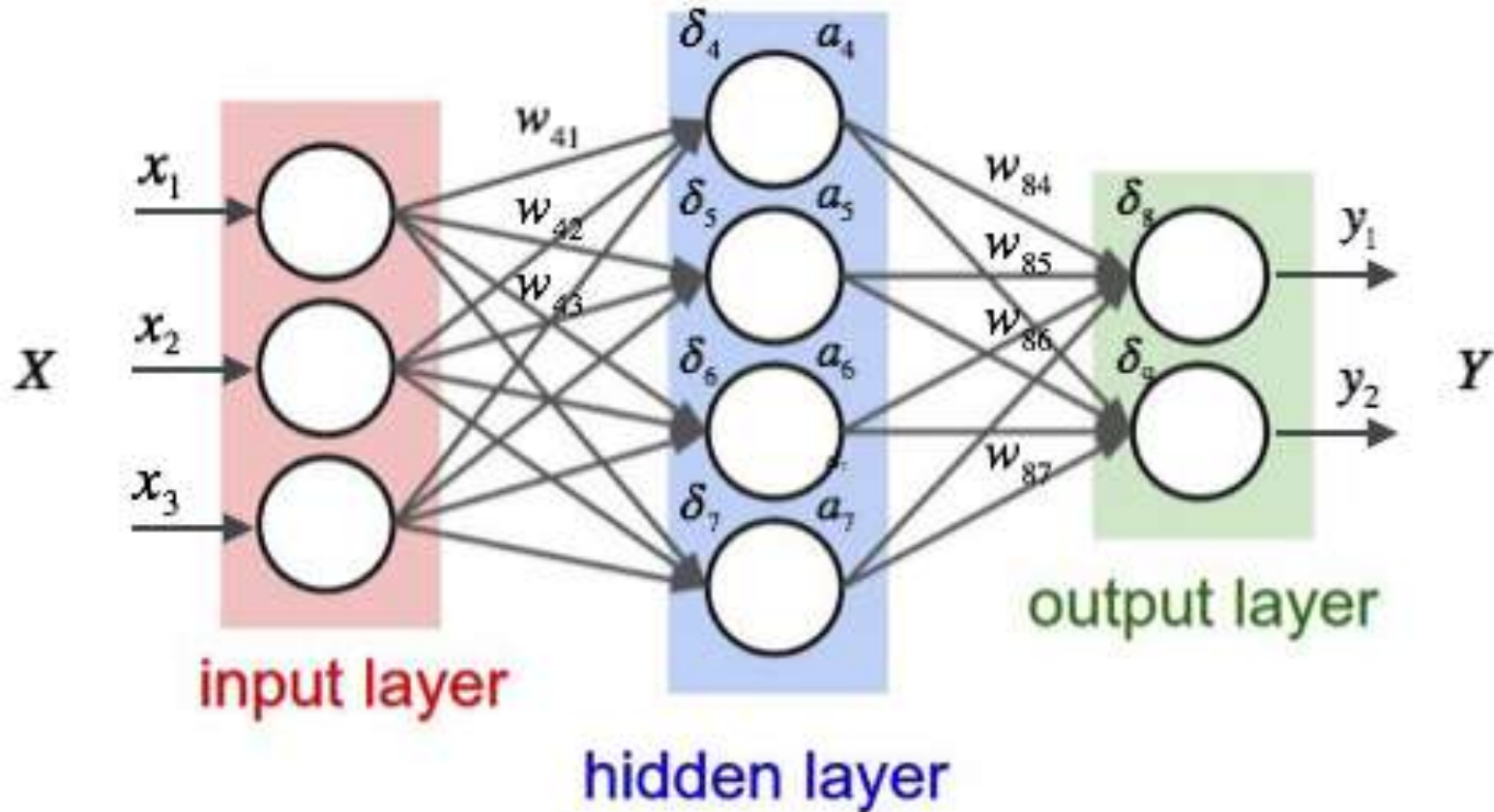
ML Cheatsheet



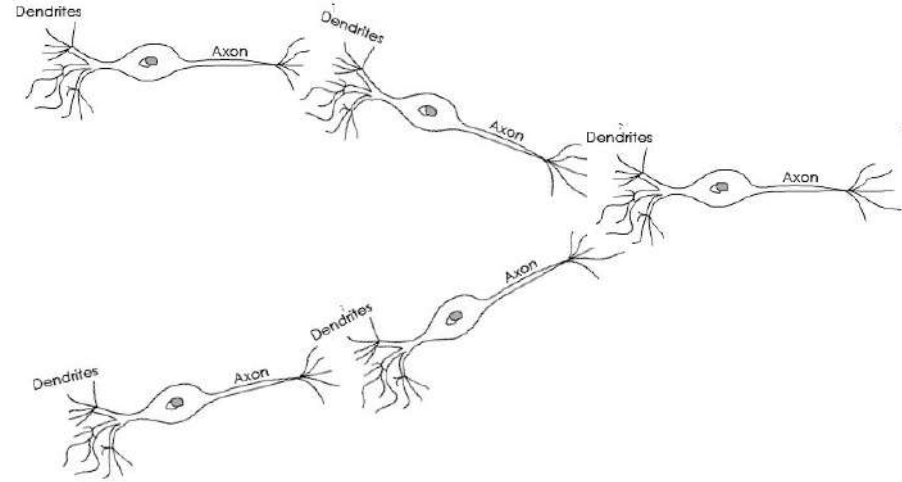
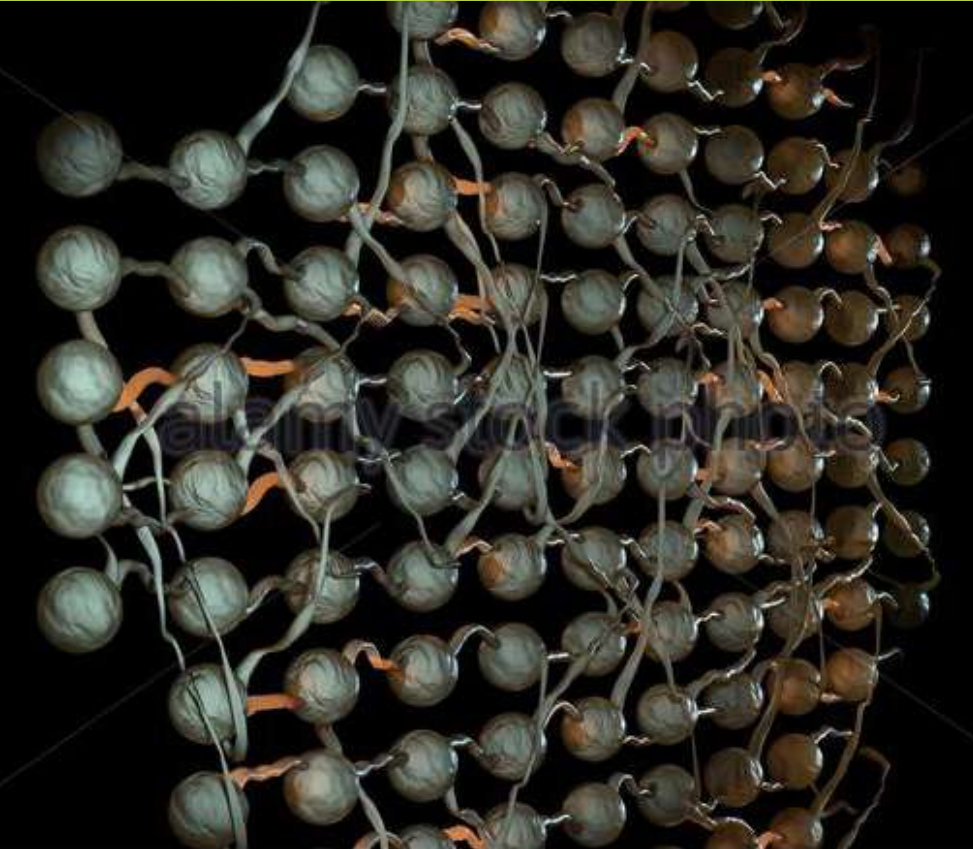
ML Example: Decision Trees



Neural Network



Based on Biology

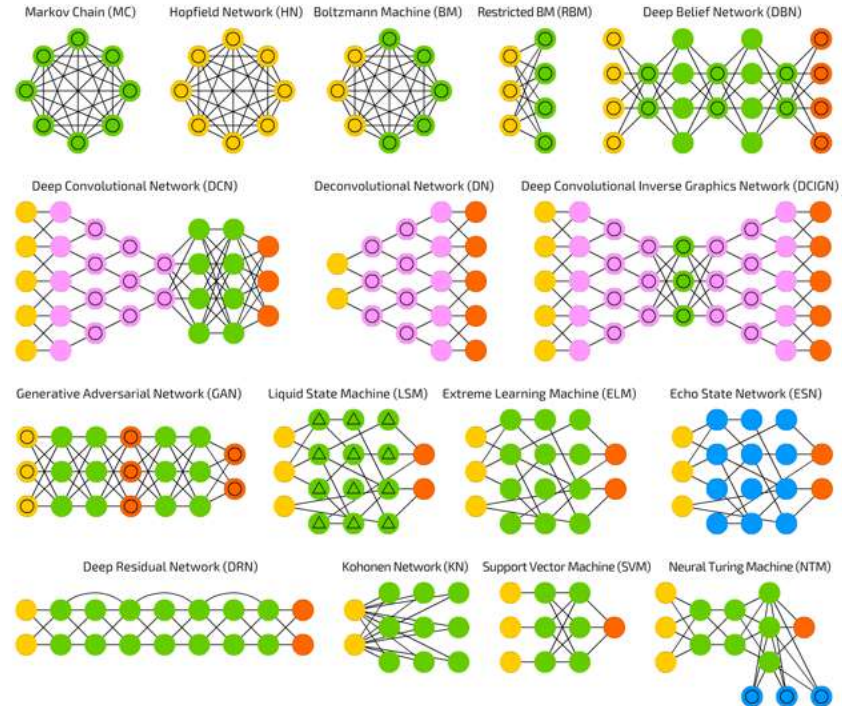
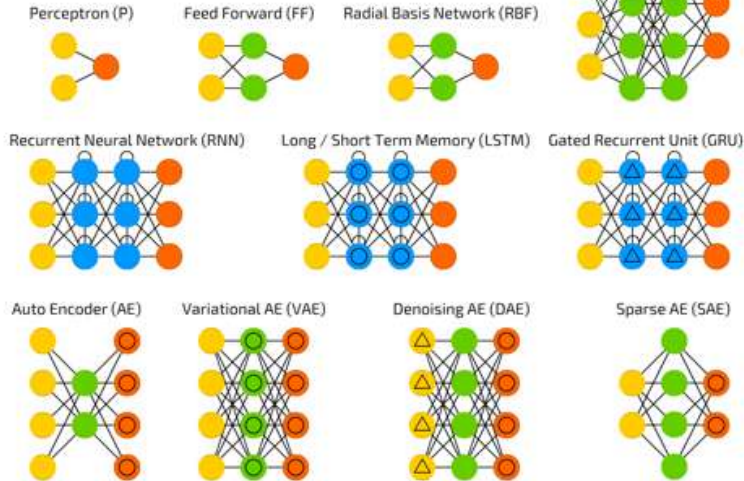


Neural Network Cheat Sheet

- Backfed Input Cell
- Input Cell
- Noisy Input Cell
- Hidden Cell
- Probabilistic Hidden Cell
- Spiking Hidden Cell
- Output Cell
- Match Input Output Cell
- Recurrent Cell
- Memory Cell
- Different Memory Cell
- Kernel
- Convolution or Pool

A mostly complete chart of Neural Networks

©2016 Fjodor van Veen - asimovinstitute.org



ML Terms



Model:

- The actual algorithm that will be doing the classification

Classes:

- The different types of objects that the algorithm can classify (car, train, etc.)

Layers:

- Structures in the model that conduct matrix operations on the inputted data

Nodes:

- The 'neurons' in the graph, they have a specific weight and bias that allow them to collectively classify

Graphs (GraphDefs/TFLite):

- A compressed version of a model that is optimized for mobile

Convolutional Neural Network

- CNN architectures make the explicit assumption that the inputs are images, named for its convolution layers

TensorFlow + Keras

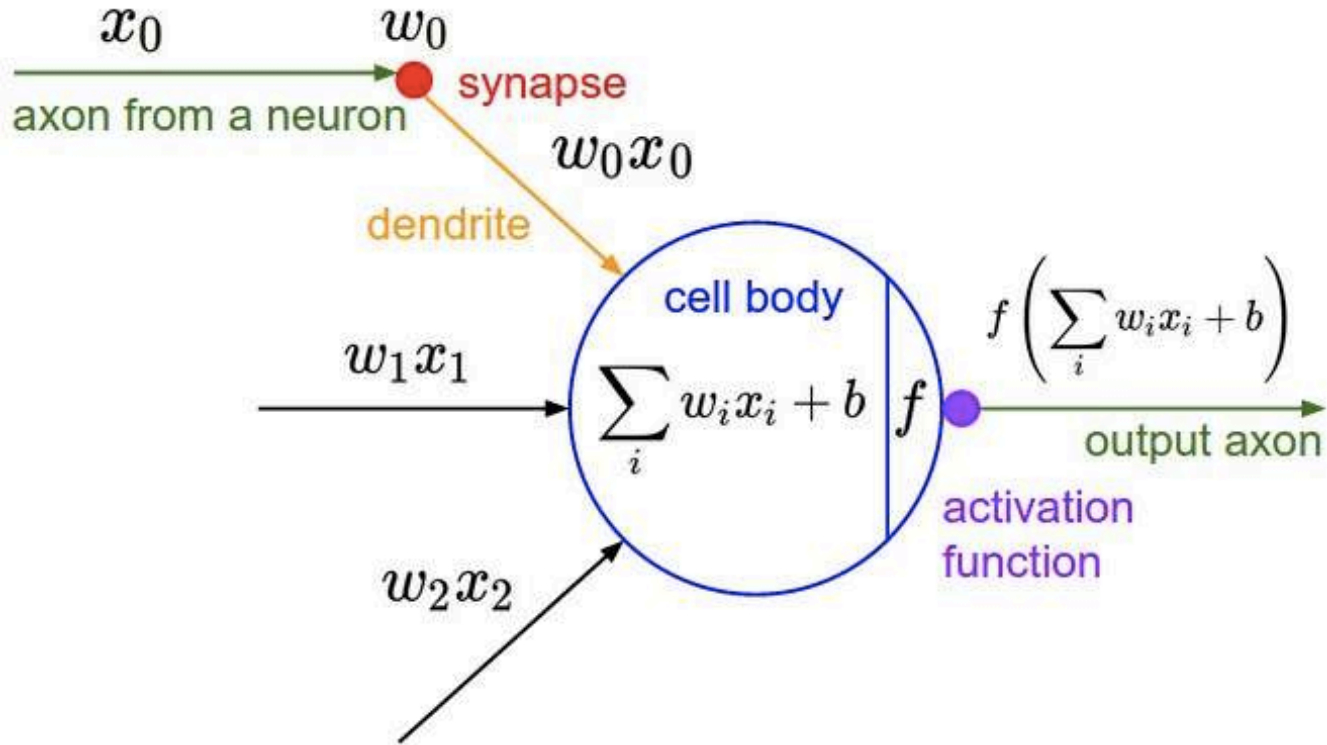


Kaggle Competition!

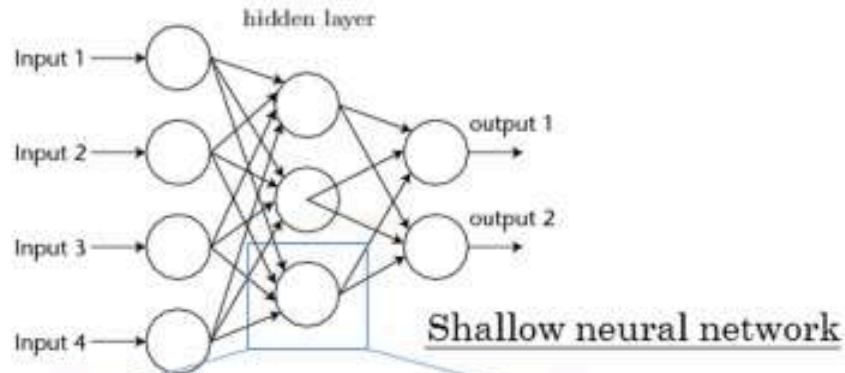
The image shows the Kaggle logo, which consists of the word "kaggle" in a light blue, lowercase, sans-serif font. A small "TM" trademark symbol is located at the top right of the letter "e". The logo is centered on a dark gray rectangular background.

kaggleTM

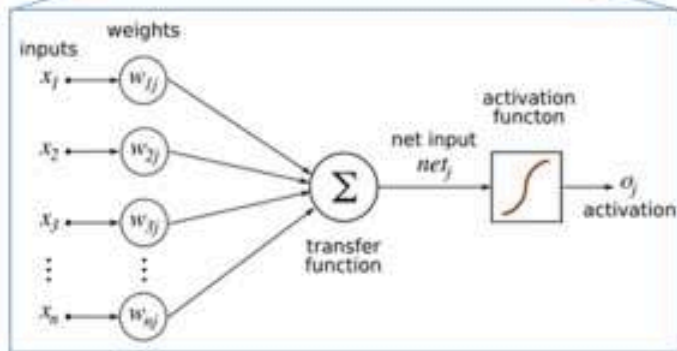
Basic Math of NN



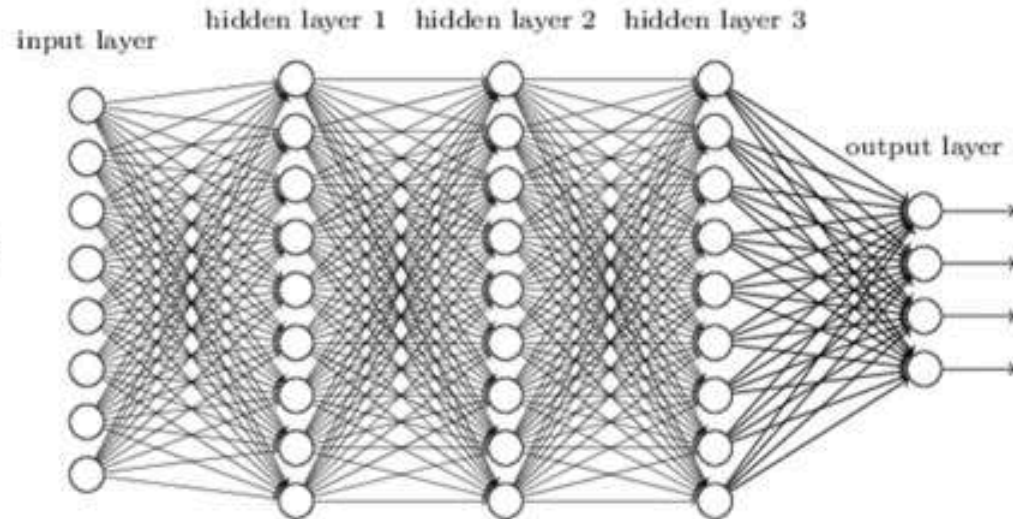
Basic Math of NN



Shallow neural network



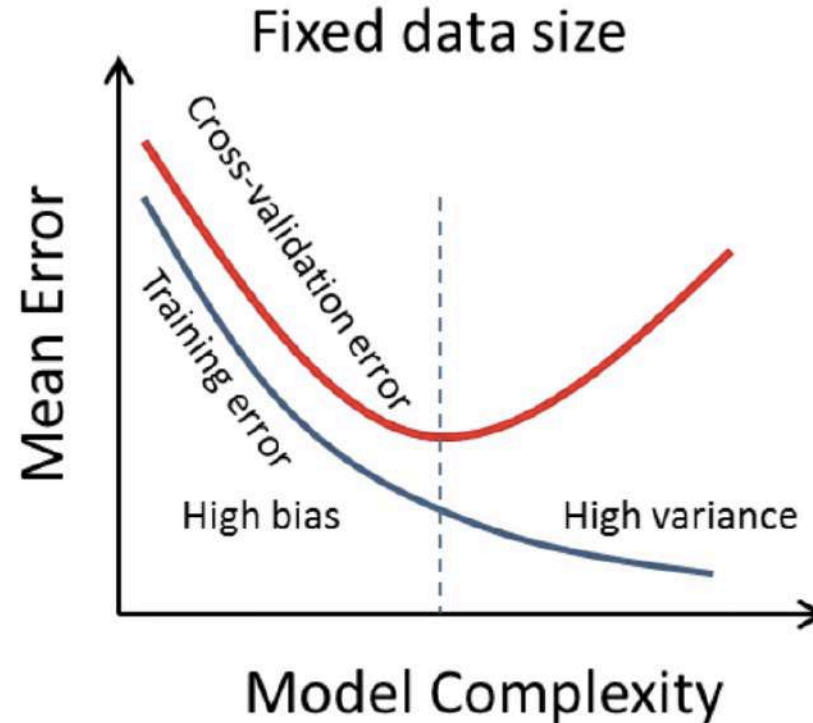
Deep neural network



Train/Validation Split



Solve NN Problems

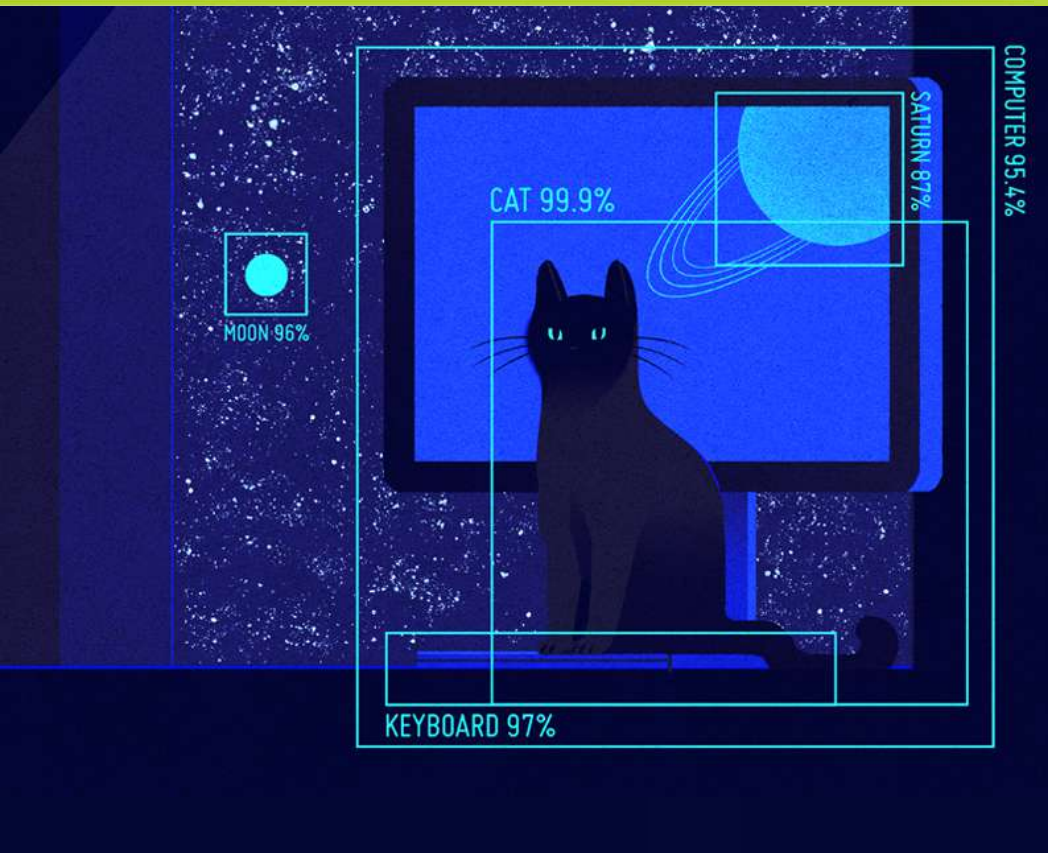


Limitations of DL



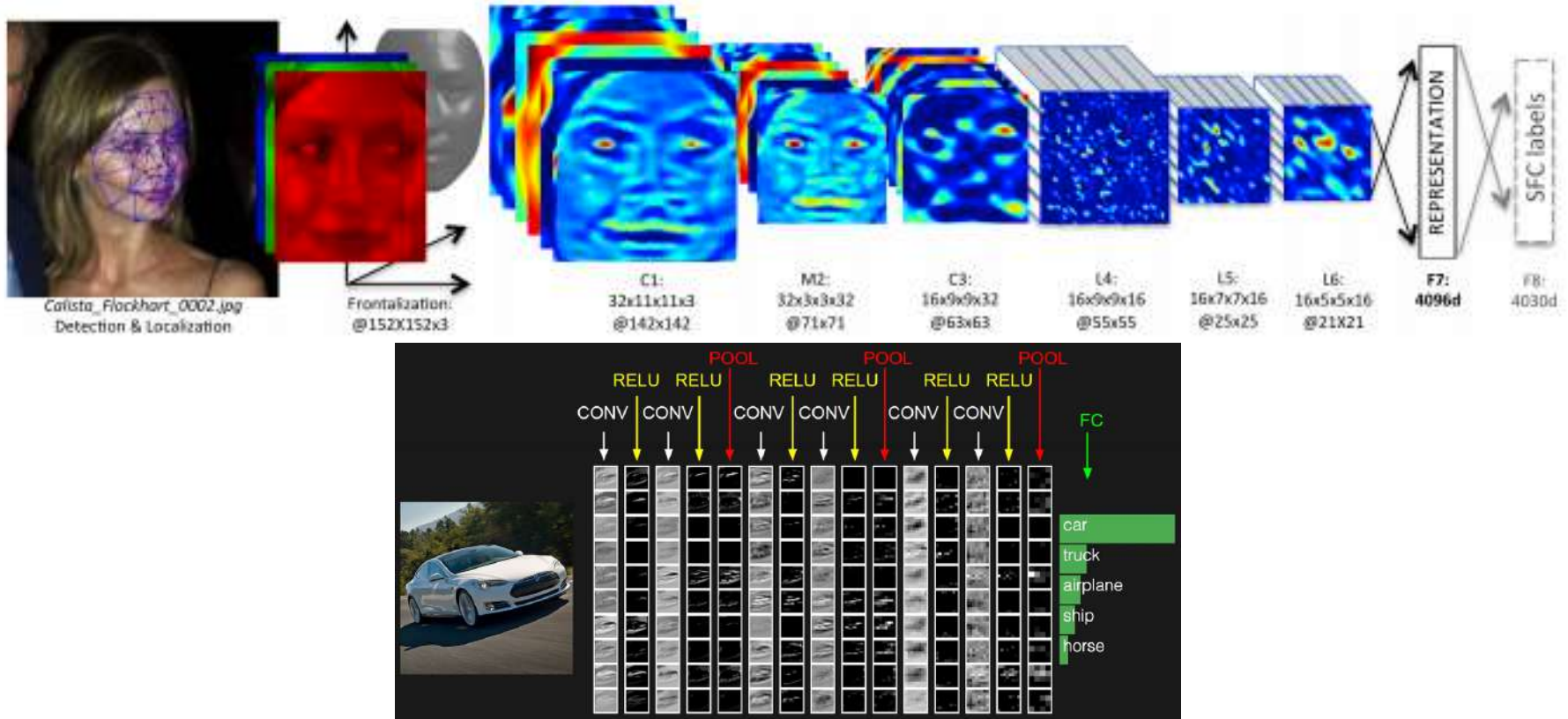
- It's mostly a 'black box'
 - Difficult to understand hidden processes
- Can't explain reasoning

Difficulties with Image Classification

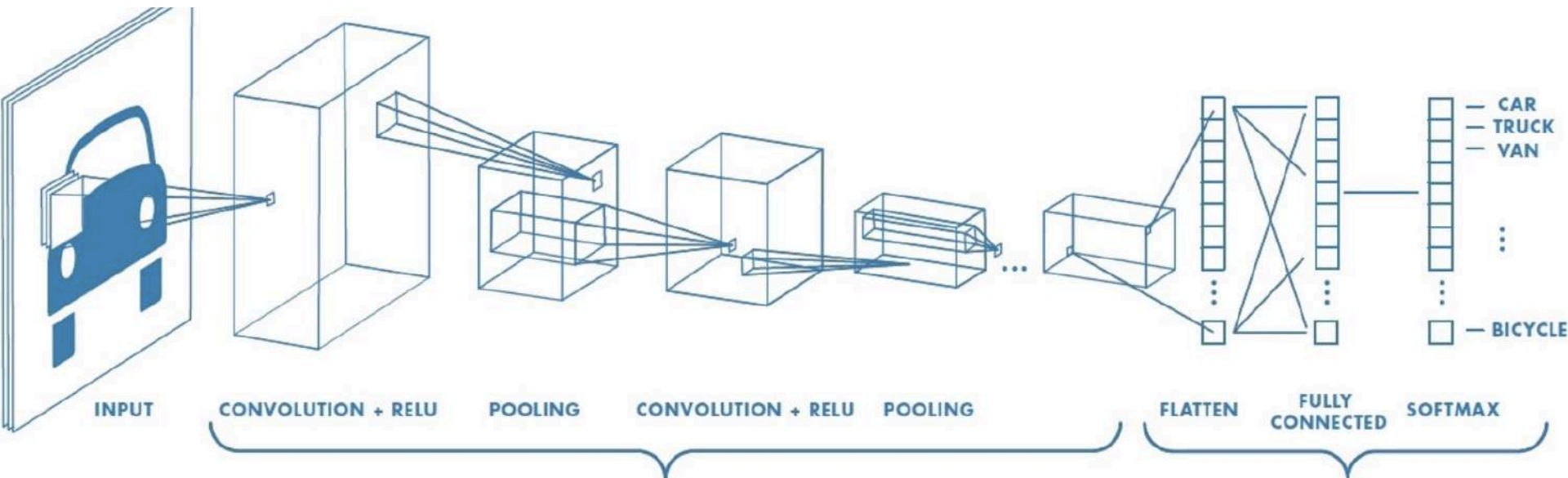


- In the Past:
 - Hand Coded Features
 - Variability in Images
 - Difficulty in Novel Image Classification
 - Edge Detection, Color Histogram, etc.
- With ML:
 - Automatic, easy image classification for variable images

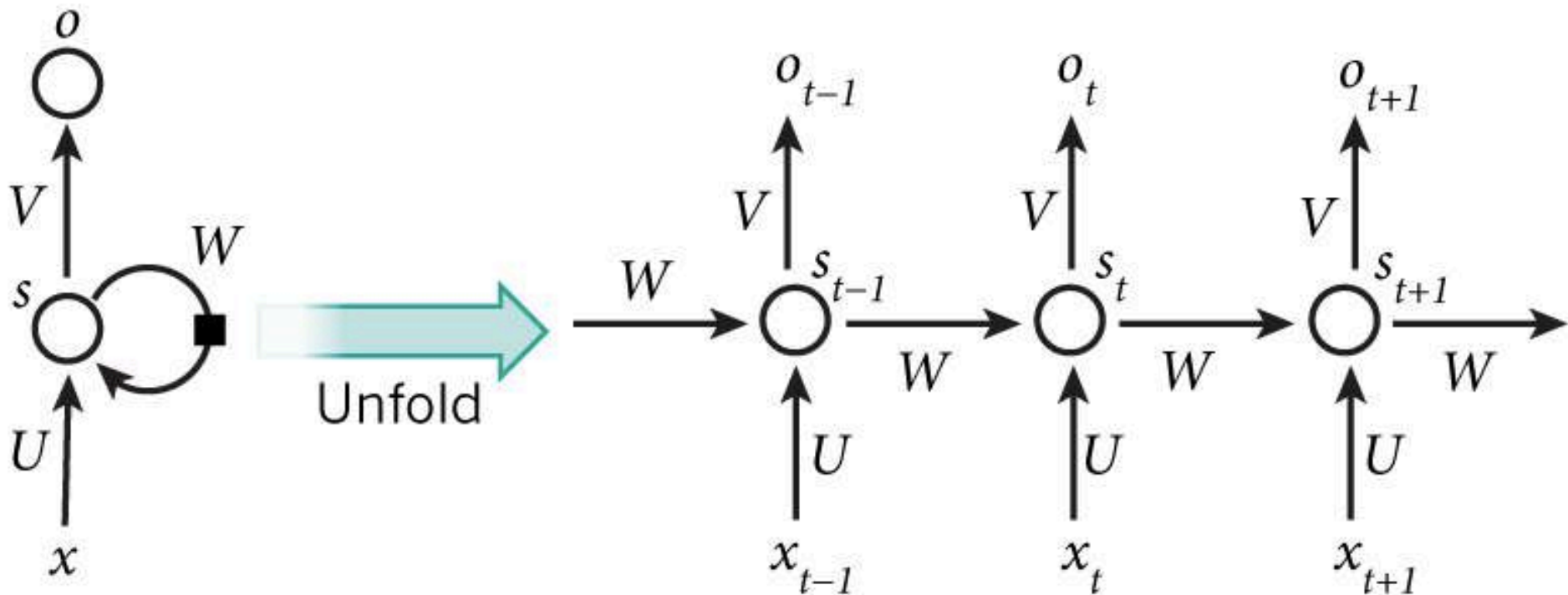
Convolutional Neural Network (CNN)



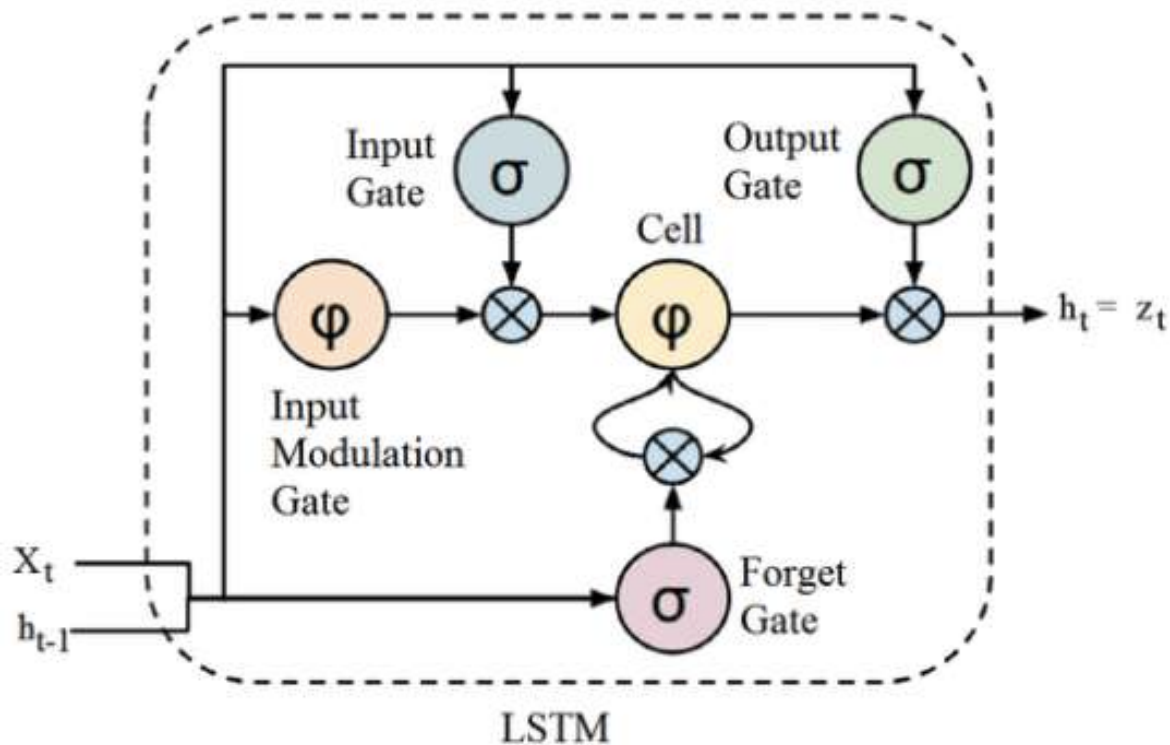
Convolutional Neural Network



Recurrent Neural Network



Long Short-Term Memory Cell



Potential of AI



Optimizing



Optimize for Low Computation Devices

- Tweaks the parameters of the model to make it have less parameters and processing steps
- Memory maps the model to reduce strain on RAM

Resources for ML Beginners



Resources:

- Andrew Ng ML Course – Coursera
- Siraj Raval – Youtube Channel
- DeepLearning.ai - Coursera
- Just keep on working with AI networks, and you've eventually become better at working with them!

Thank you!

For more info: neildeshmukh.com

Email: neil@plantum.ai