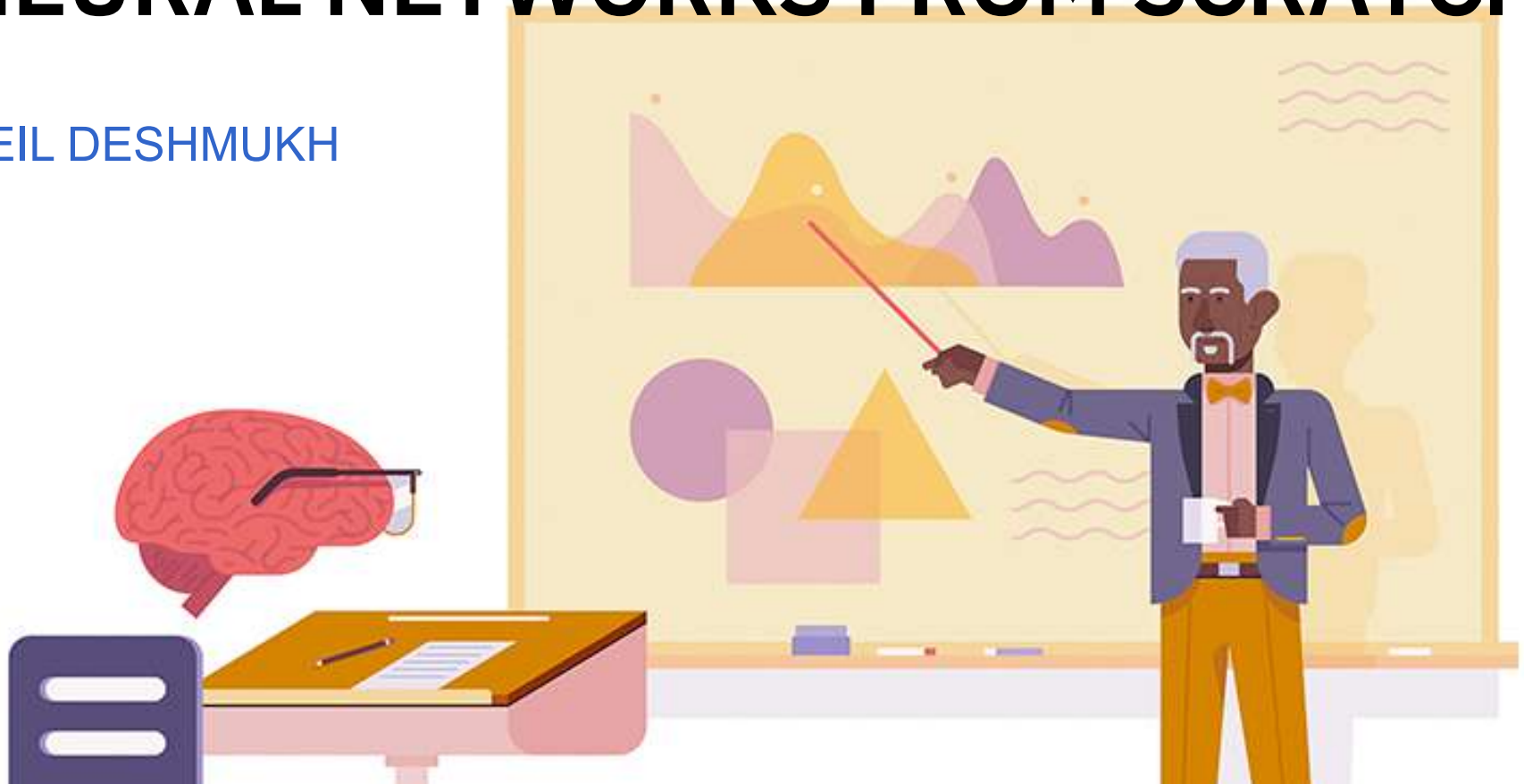
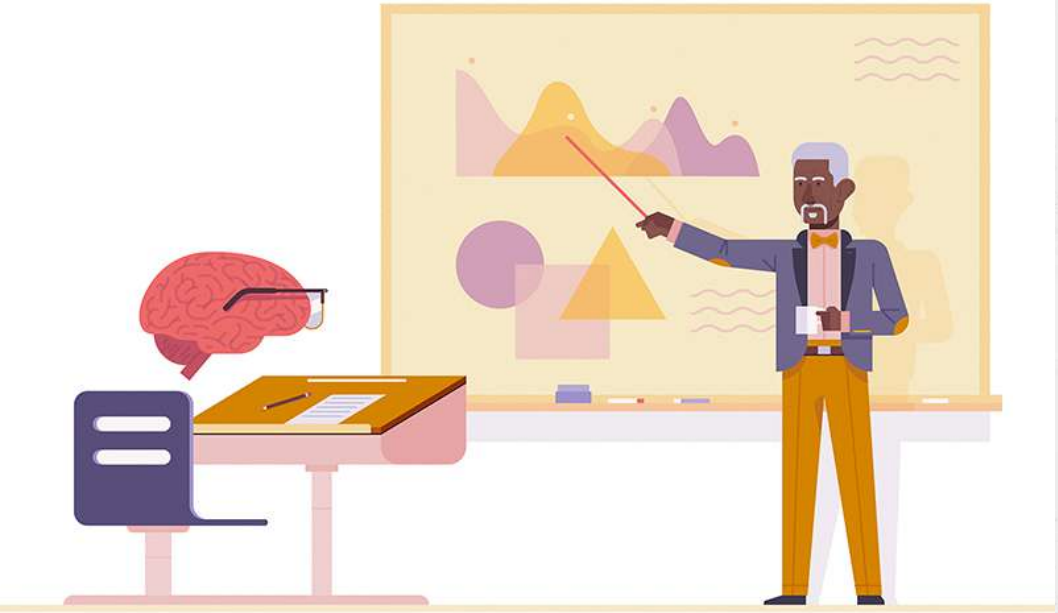
AI CRASH COURSE: DEVELOPING NEURAL NETWORKS FROM SCRATCH

NEIL DESHMUKH

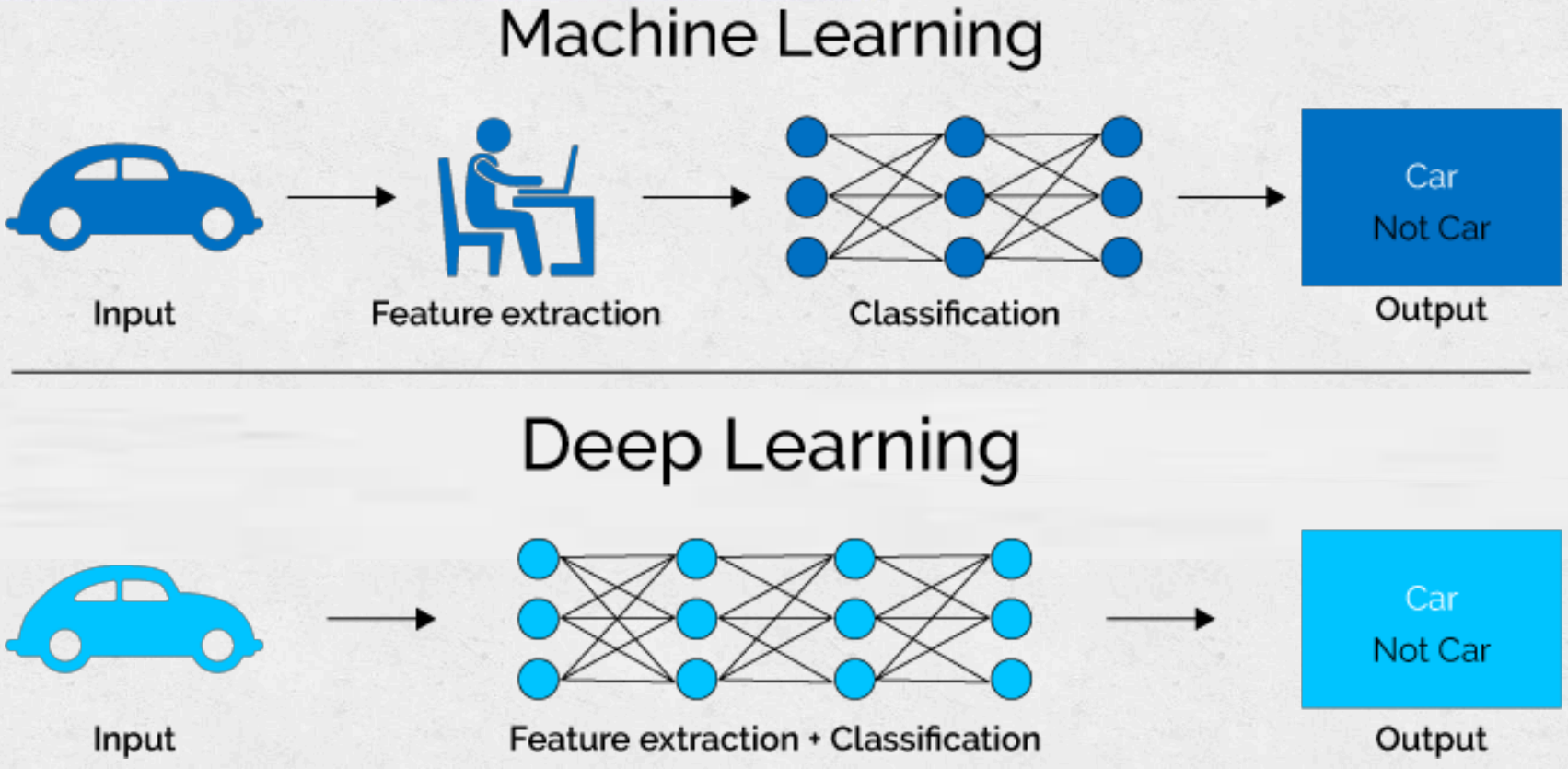


What is Artificial Intelligence?

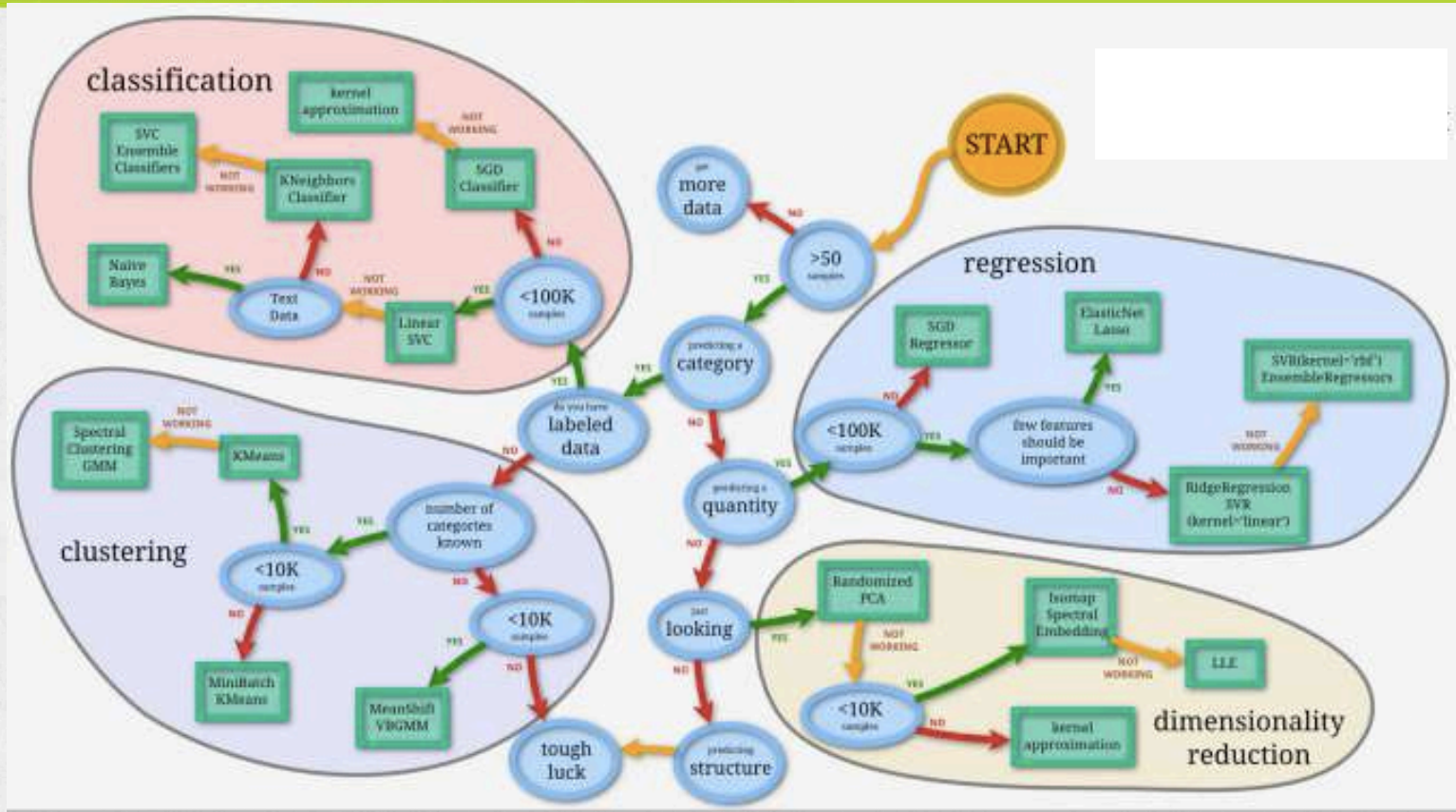


A revolutionary field of computer science that is teaching systems to improve from experience without being explicitly programed.

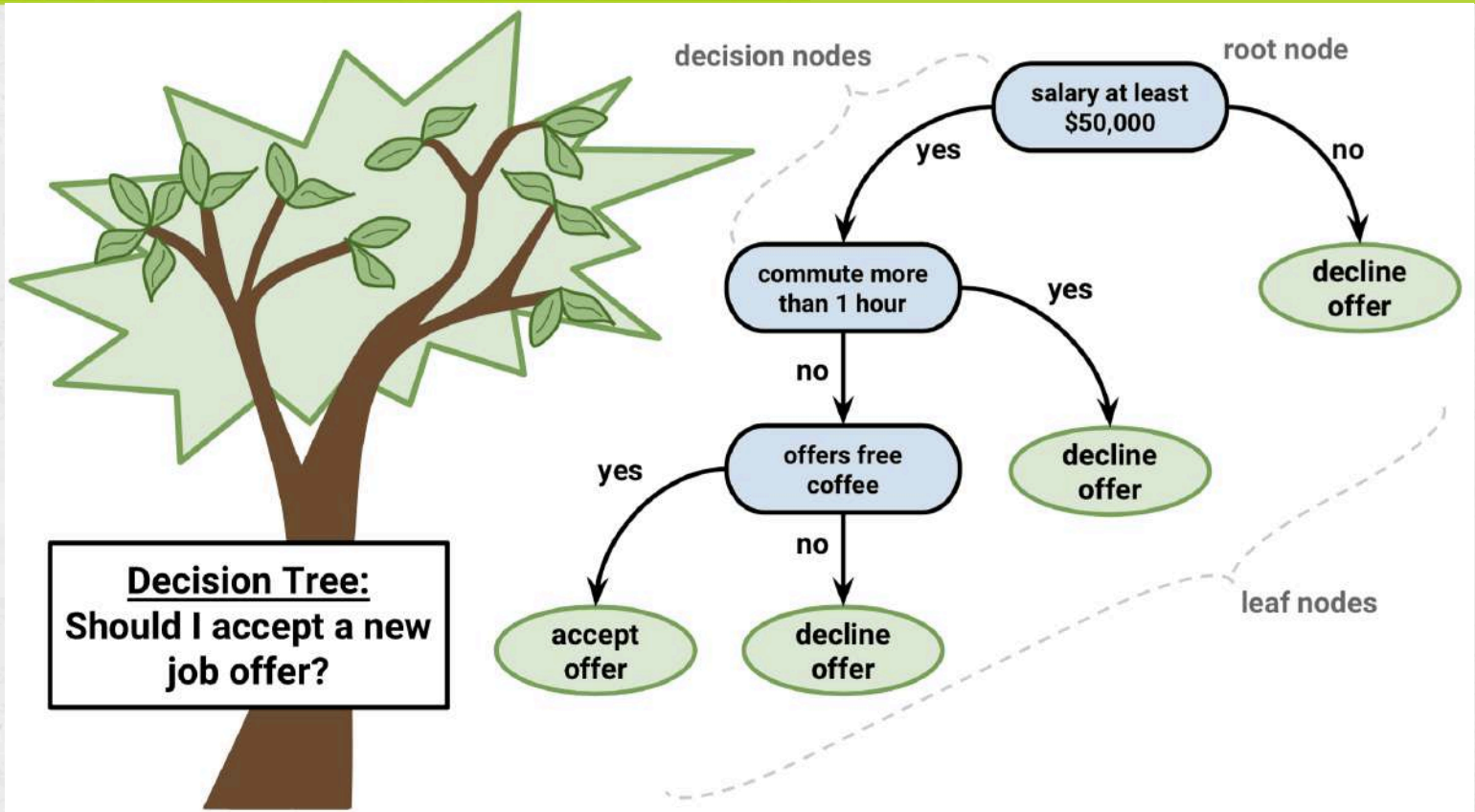
ML vs DL


Machine Learning
Input
Feature extraction
Classification
Car
Not Car
Output
Deep Learning
Input
Feature extraction + Classification
Car
Not Car
Output

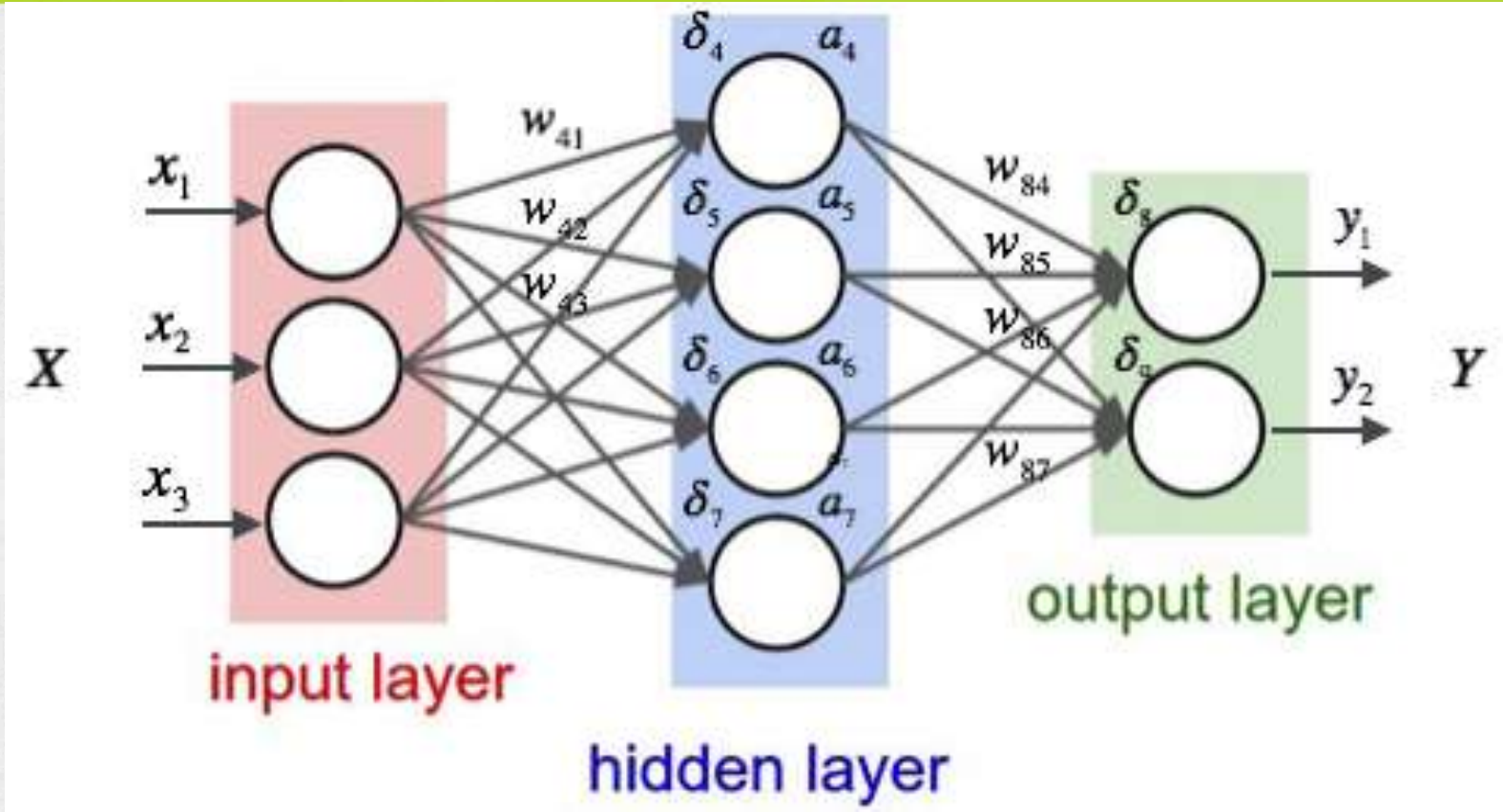
ML Cheatsheet



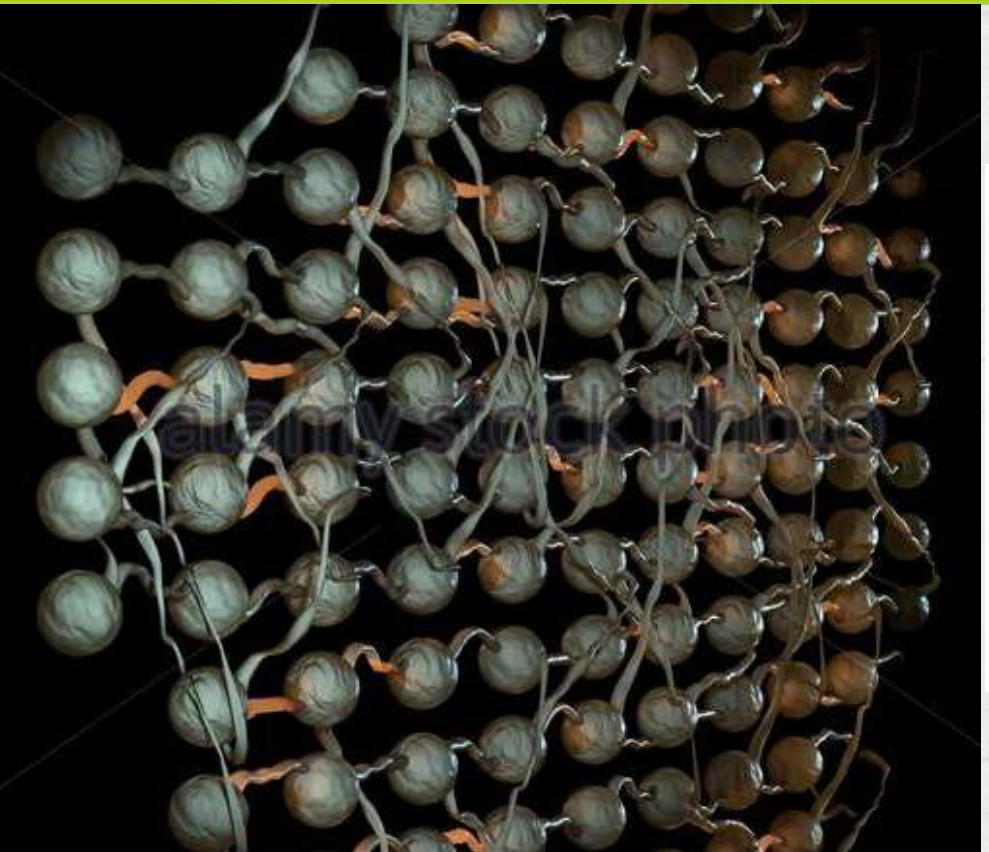
ML Example: Decision Trees

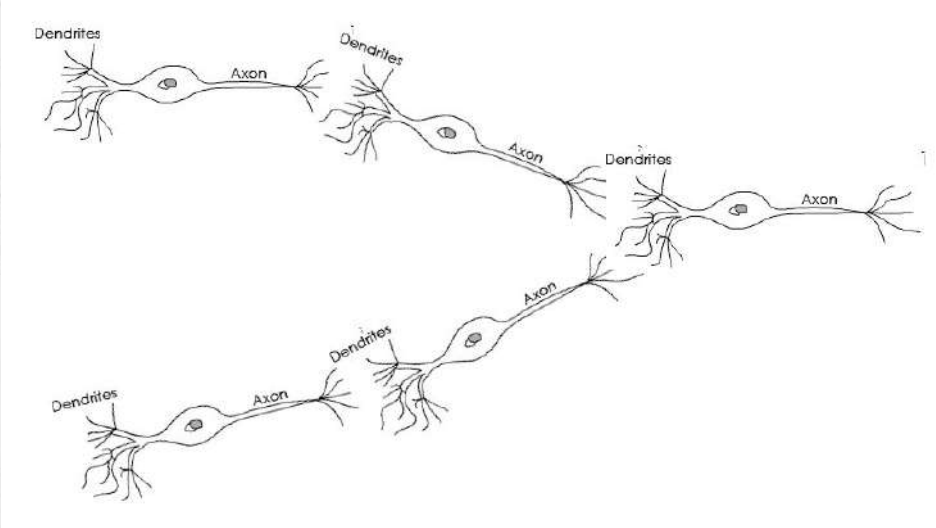


Neural Network

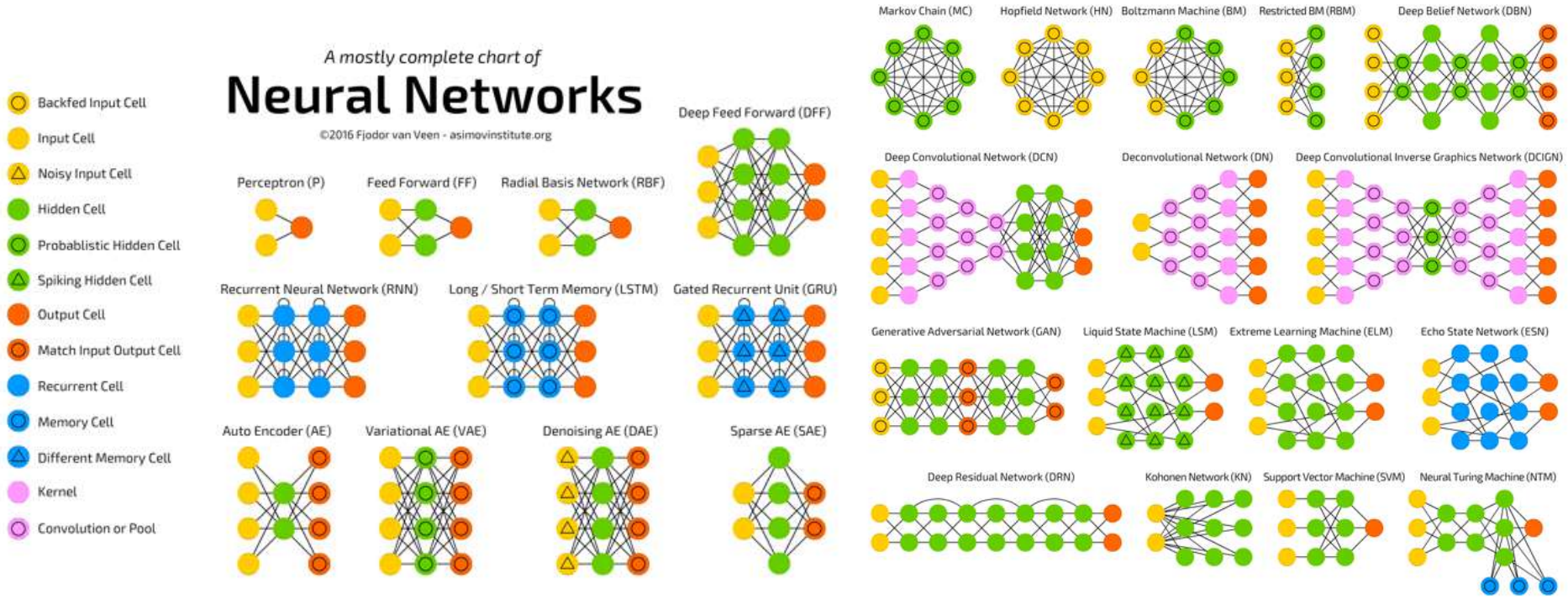


Based on Biology

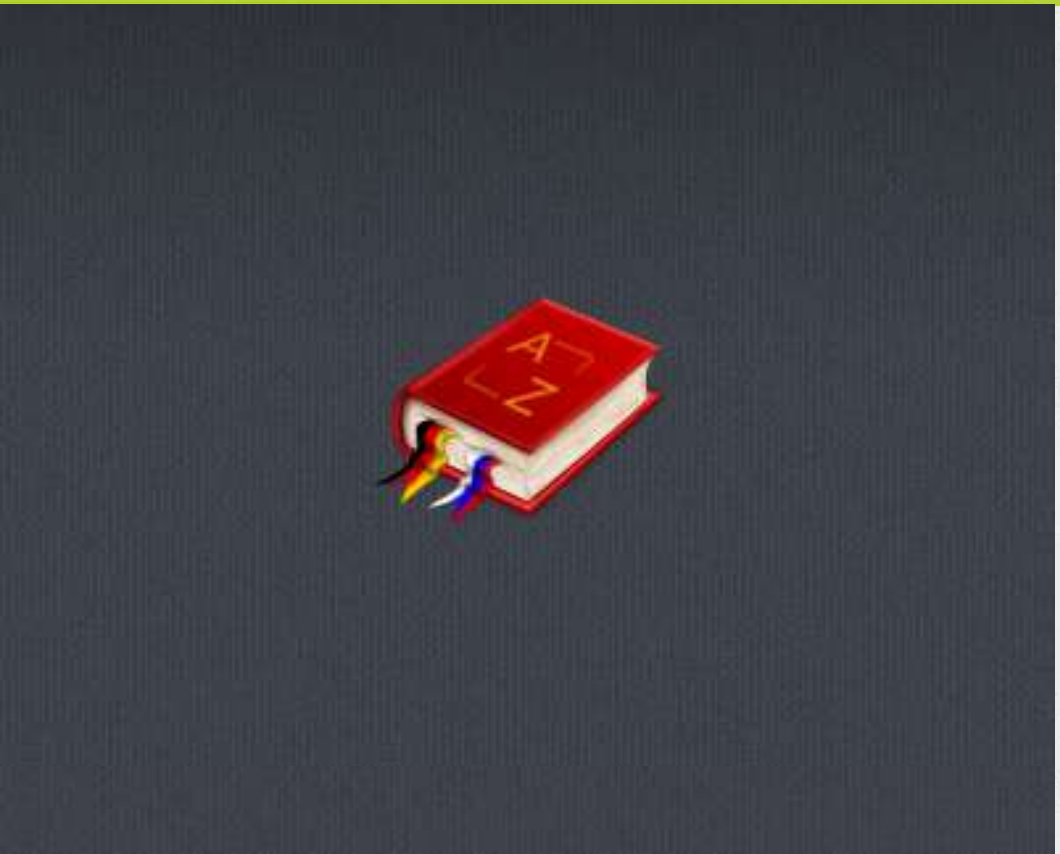




Neural Network Cheat Sheet



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

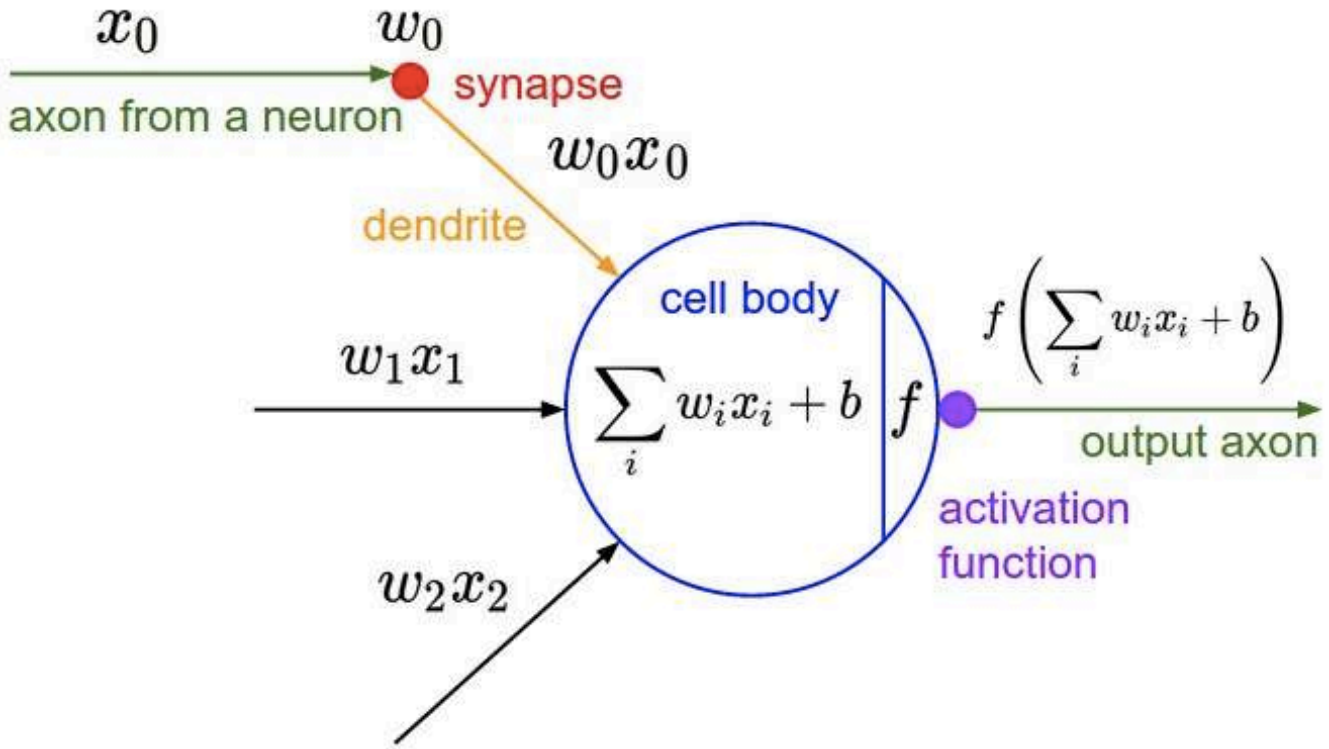
Convolutional Neural Network

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

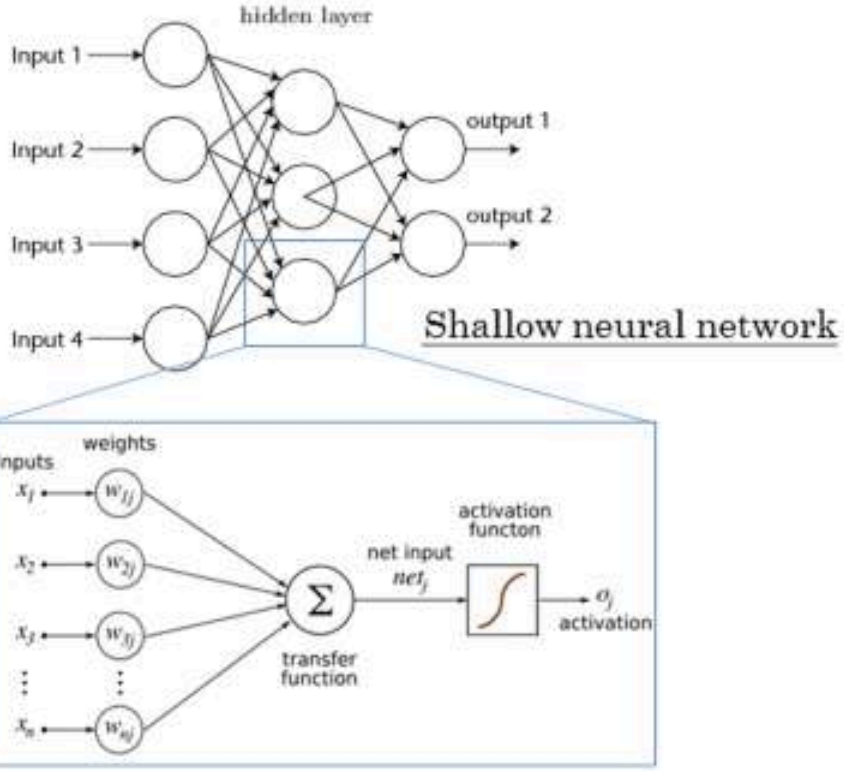
TensorFlow + Keras

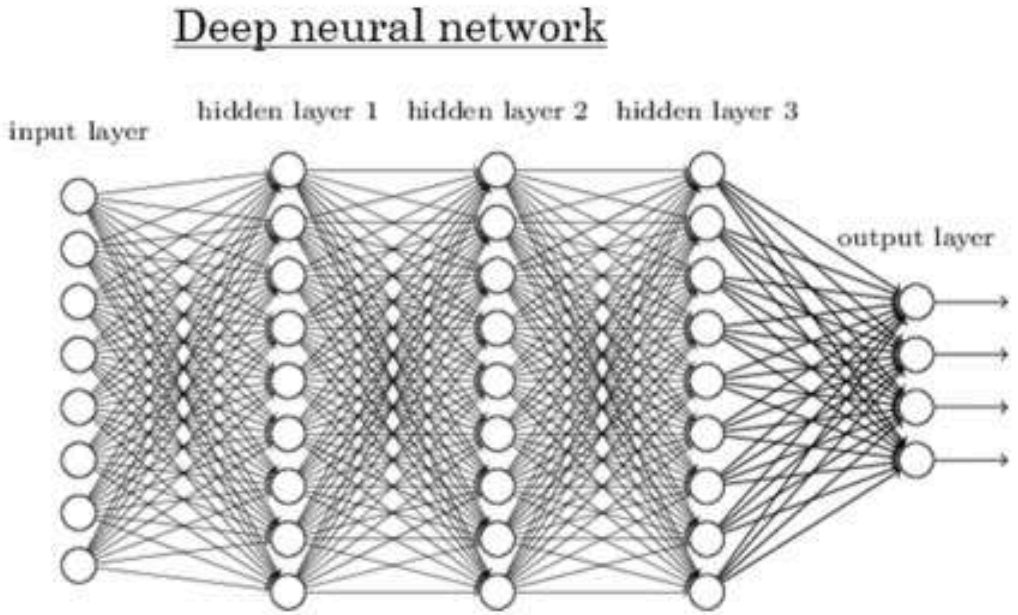
Kaggle Competition!

Basic Math of NN

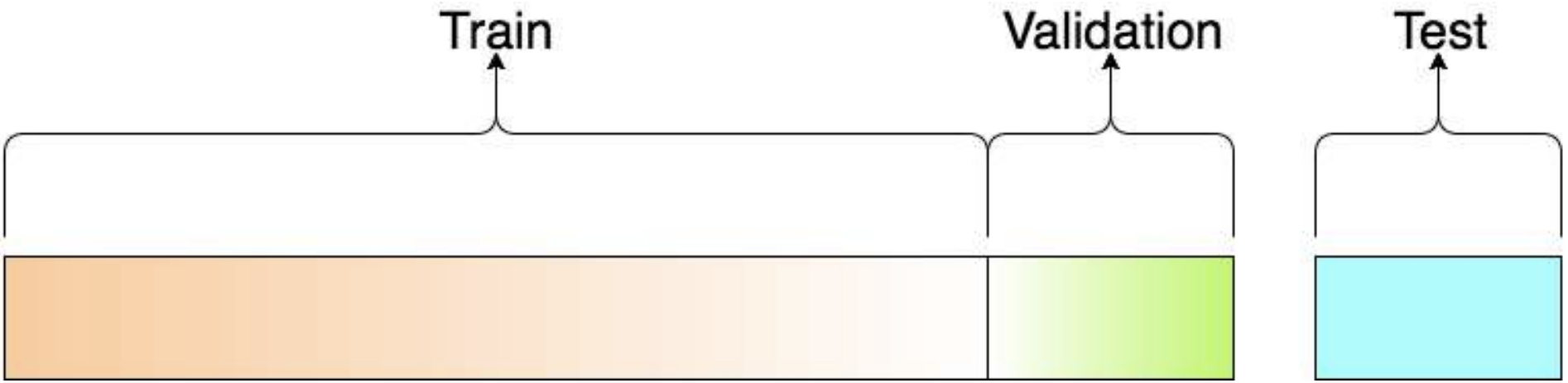


Basic Math of NN

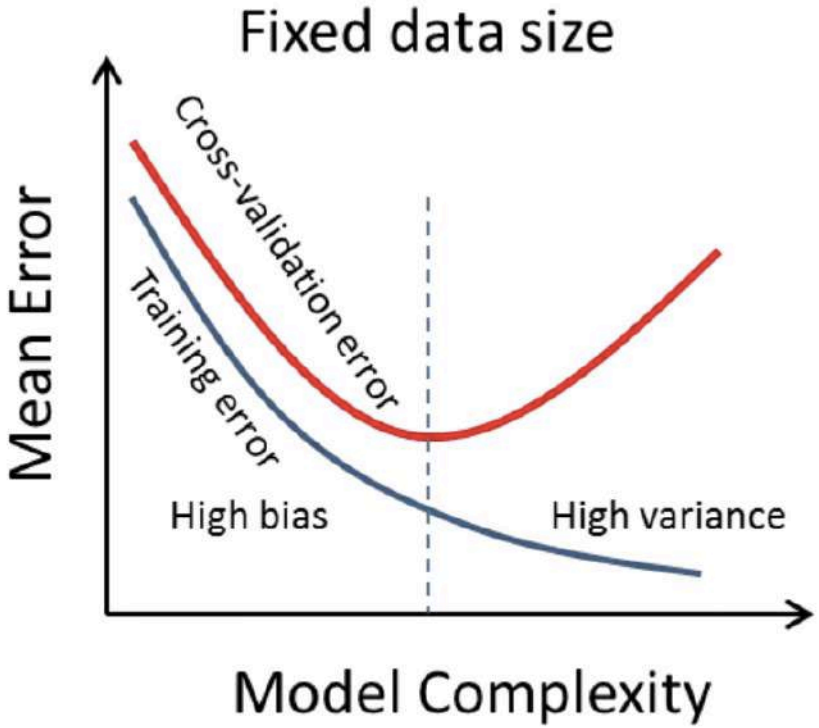




Train/Validation Split



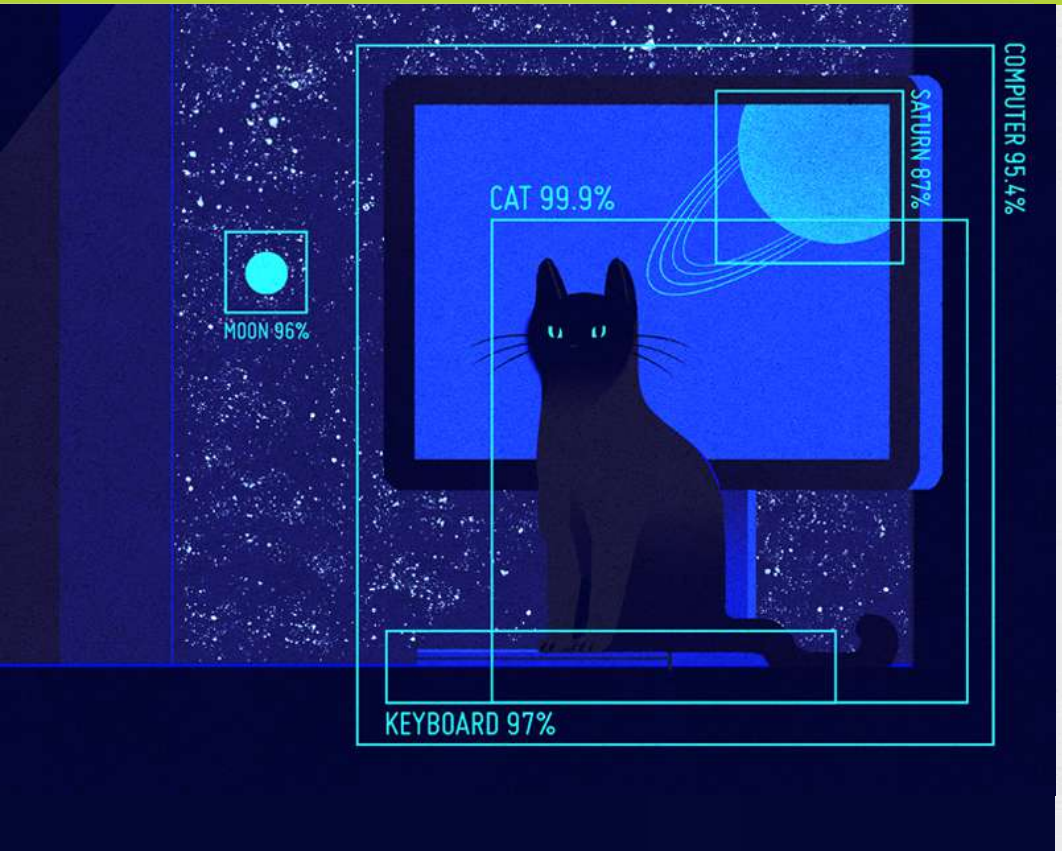
Solve NN Problems



Limitations of DL

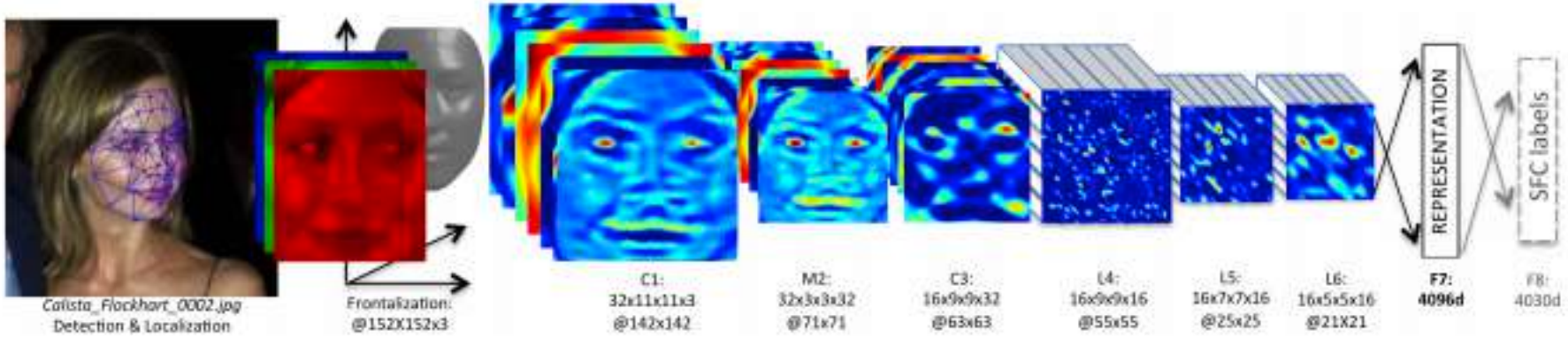
- It’s mostly a ‘black box’
  - Difficult to understand hidden processes
- Can’t explain reasoning

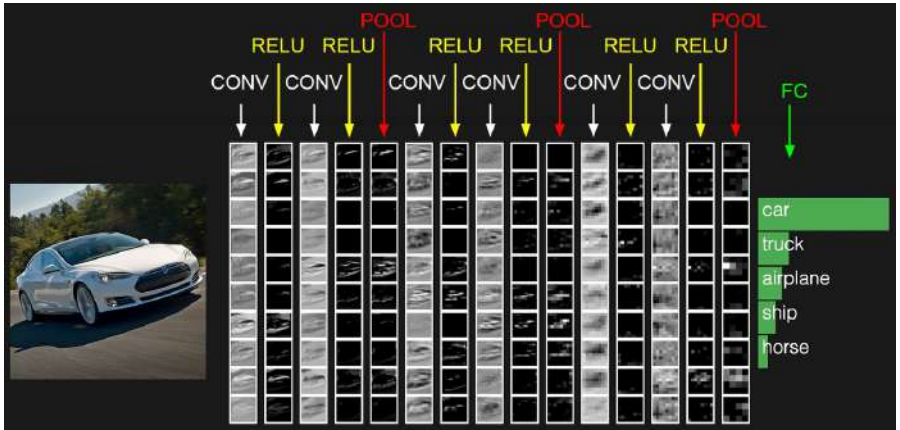
Difficulties with Image Classification



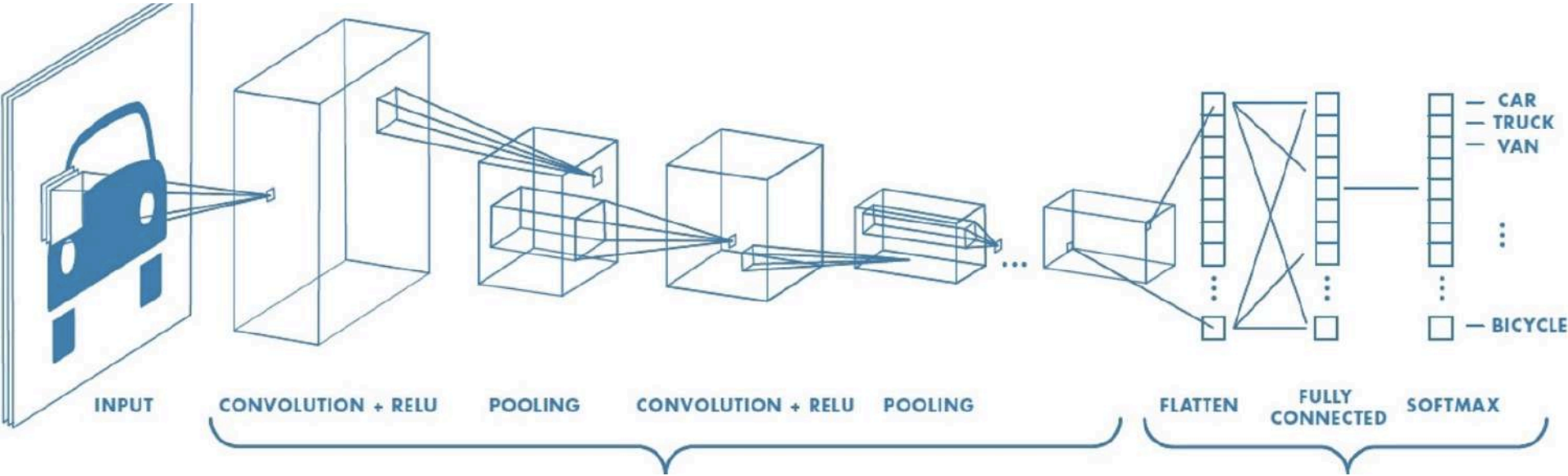
- In the Past:
  - Hand Coded Features
  - Variability in Images
  - Difficulty in Novel Image Classification
  - Edge Detection, Color Histogram, etc.
- With ML:
  - Automatic, easy image classification for variable images

Convolutional Neural Network (CNN)

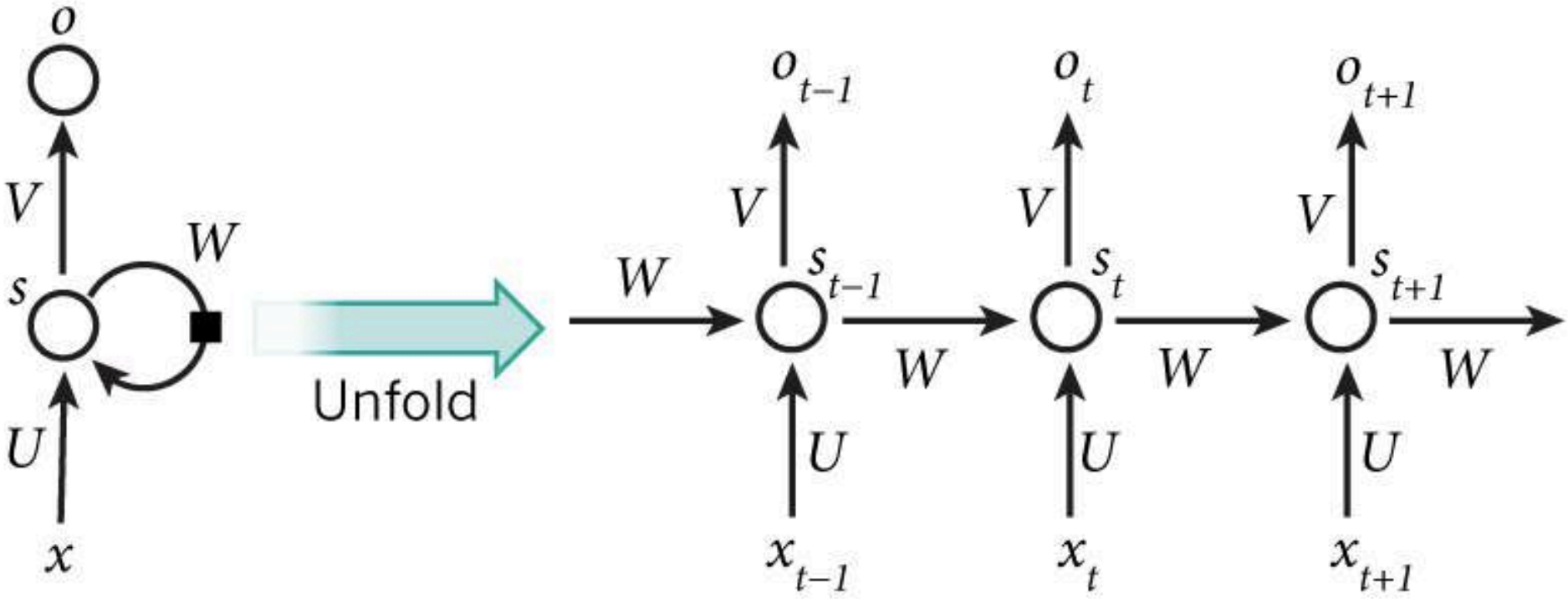




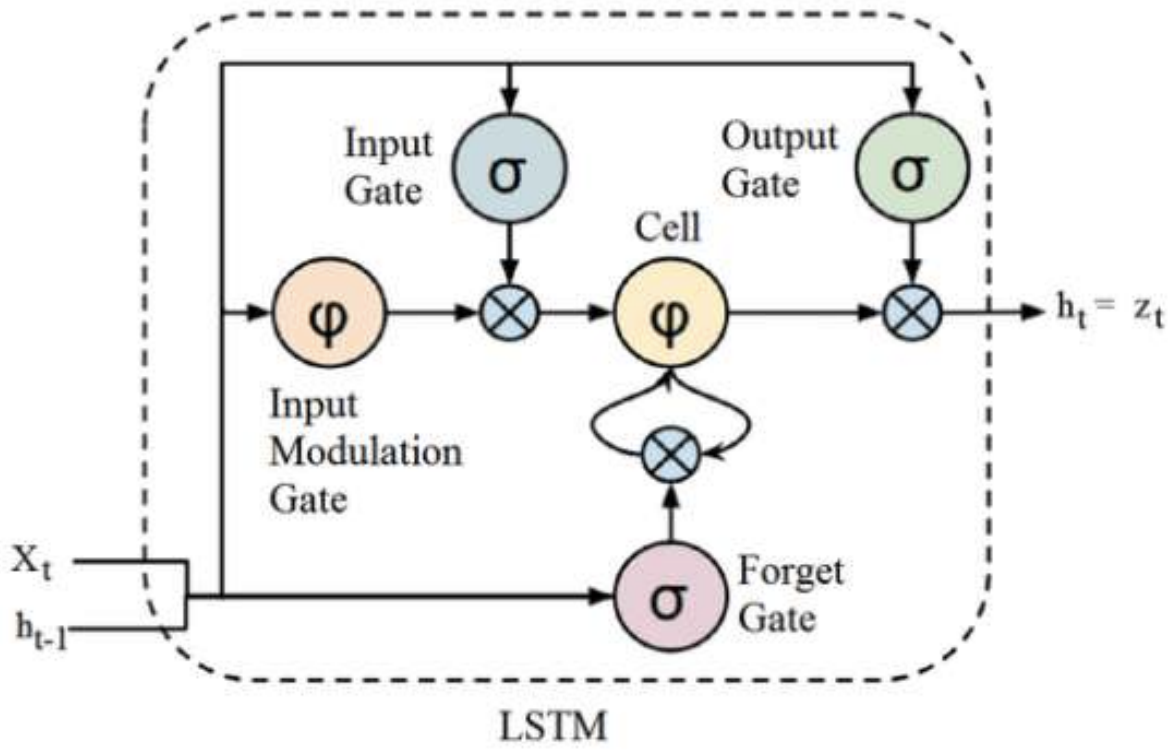
Convolutional Neural Network



Recurrent Neural Network



Long Short-Term Memory Cell



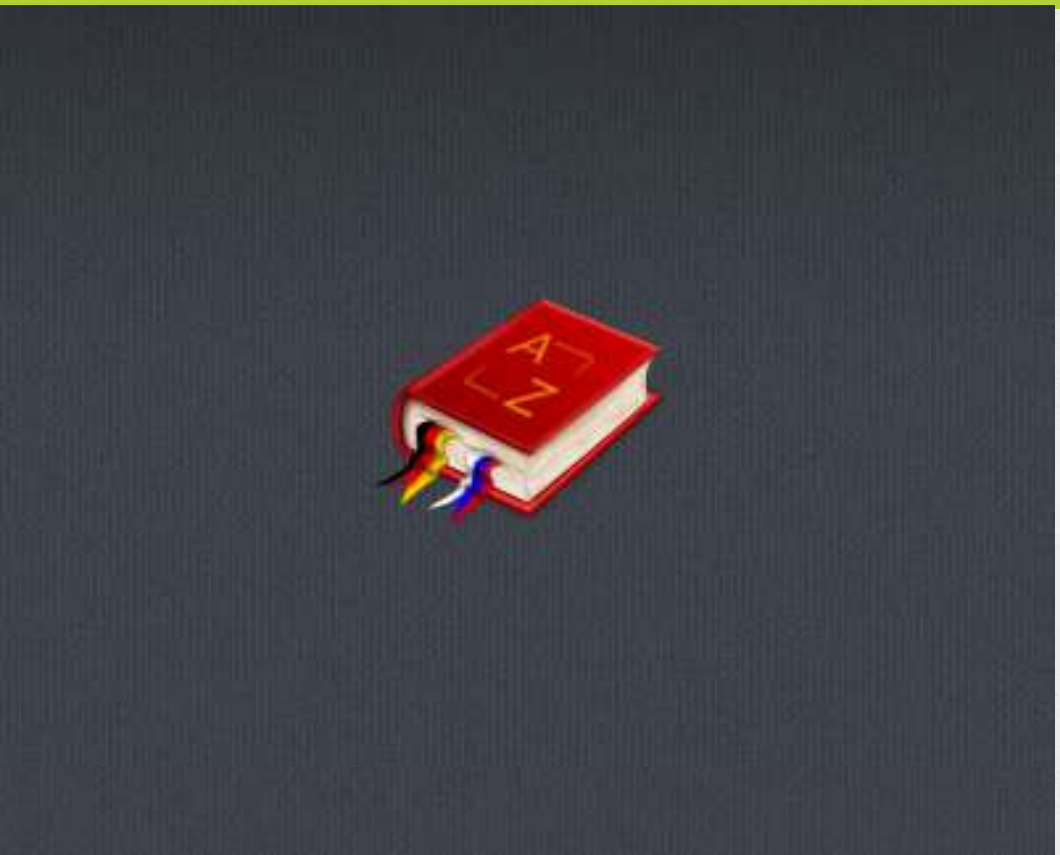
Potential of AI

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!

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