Contents

1 Deep Learning

Utilized with unstructred data (Ex: image, text, time series).
We will study:

- Computer Vision
- NLP (natural language processing)

1.1 Computer Vision

Challenges: high dimensions and different inputs for the same object when distinguishing images.
State of the art classifies better than humans.
CNN = convolutional neural networks (to learn these boxes, it needs a math operation called convolution or correlation).
In the top layers, there are more smaller boxes. In the last layer, the is a vector representation of all the patterns.
Lower layers catch very simple patterns, second layer starts getting forms. With more layers, it gets more complex objects.

1.1.1 Convolution

Returns a number. Capacity of checking if the boxes are good (extract features from input). Edges and corners are disavantaged in this.

1.1.2 Pooling

- **Max:** 99% of times.
- Min
- Average

Reduce the dimentionaly of the boxes. Superior limit. Corresponds spatially to the original image.