Evolution of Neural networks and their comparison

Thursday, 19 December 2024 12:07

(1) Early Neural Networks

MLP (Multilayer perceptron)

Object detection not possible

Fully connected neural networks, for simple classification.

(2) Convolutional Neural Network

Eg: AlexNet, LeNet-5 (1998) (2012)

Object detection - not possible

(3) Region based object detection.

a. R-CNN (2014)

First successful CNN based object detection model.

b. Fast R-CNN (2015)

improved RCNN with shared feature map and single-stage training.

c. Faster R-CNN (2015)

Introduced region proposal Network, eliminating the need for external region proposal generation.

(4) Single stage detection network.

a. YOLO (You Look only once)

single stage detector - processing entire image in one pass.

b. SSD (Single shot multibox detector (2016)

Used multiple feature maps for detecting objects at different scales.

(5) Advanced CNN architectures for object detection

a. YOLO v_2, YOLO v_3.

b. Retinanet

c. Mask R CNN

d. YOLO v_4, YOLO v_5

(6) Transformer based Networks

(a) Vision Transformer (ViT) (2020) (Not for object detection)?

(b) Detection Transformer. (2020)

(c) YOLO v7, YOLO v_8. (2022)

(7) Emerging architecture (2023-)

(a) swin transformer

(b) SAM

(c) RT-DETR (Real time DETR)

Now lets implement them for our computer vision project to understand in depth. Simultaneously, we will try to cover the difference in architecture & other nuances.