24/07/2025

Exp-1

EXPLORING THE DEEP LEARNING PLATFORMS

AIM:
To explore the deep Learning platforms

TOOLS:

* VS Code
  - ↳ Created by Microsoft

  main features:
  - ⇒ Lightweight, fast IDE
  - ⇒ Integrated terminal and debugger
  - ⇒ Extensions for Py, Jupyter, Git
  - ⇒ IntelliSense & remote SSH support

  Use Cases
  - ⇒ Writing & debugging Py/ML code
  - ⇒ Full-stack ML development
  - ⇒ Connecting to remote servers

* Google Colab
  - ↳ created by Google Research

  main features:
  - ⇒ Cloud-based Jupyter note books
  - ⇒ free GPU/TPU accers
  - ⇒ Auto-installed ML librories
  - ⇒ Save to Google Drive (cloud storage)

  Use Cases
  - ⇒ ML learning
  - ⇒ Quick experiments without local GPU
  - ⇒ But fail to fetch Local data*

FRAME WORKS

* PyTorch:
  - ↳ Developed By Meta AI (Facebook)
  - Main features:
    - => Dynamic computation graph
    - => Easy to debug (Pythonic)
    - => Modular APIs
    - => Strong support for research
  - Use Cases
    - => Research & innavation
    - => Custom model development
    - => NLP, CV, GANs Transformers

Dynamic graph.

* TensorFlow
  - ↳ Developed By Google Brain
  - Main Features:
    - => Production-ready
    - => Cross-platform deployment (TF-Lite, TFJS)
    - => Eager execution + Graph mode
    - => Strong ecosystem (TFX, Serving...)
  - Use Cases
    - => Industrial ML systems
    - => Model deployment
    - => Real time pipelines

Both Static (TF1.x) Dynamic (TF2.x)

⇒ LeNet (LeNet-5) - 1998 - Yann LeCun.
for Digit recognition
Highlights:
* Simple 7 layer including I/P and O/P.
* Activation function Tanh or Sigmoid
* Pooling : Avg Pooling, Stride = 2
* No dropout / batch Normalization.

⇒ AlexNet - 2012 - Alex Krizhevsky.
for Image clasification
Highlights:
* Used ReLU instead of tanh → faster convergence
* Used Dropout, GPU
* Used Max Pooling
* 5 Conv-layers

⇒ U-Net - 2015 - Olaf Ronneberger
for Image Segmentation (Semantic)
Highlights:
* left side convergence (encoder)
* Right side divergence (decoder)