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Exploring the Deep Learning platforms

Aim :- To understand the fundamental features and differences among key deep learning platforms such as Tensorflow, PyTorch, Google colab, and Jupyter Notebook.

Tensorflow :-

Tensorflow is an open source deep learning framework developed by Google Brain. It allows developers to build and train machine learning models using computational graphs.

Features :-

1.) open source deep learning framework.
2.) supports both cpu and Gpu computation.
3.) uses static computational graphs.

Use cases :-

1.) Image and speech recognition
2.) Natural Language processing
3.) Deep reinforcement learning.

2) pytorch :-

Pytorch is an open source deep learning library developed by Facebook's AI Research Lab. It is known for its dynamic computation graph and flexibility.

Features :-

1) open-source and pythonic.
2) Strong support for Gpu acceleration.
3) seamless integration with Numpy and Python Ecosystem.

Use cases :-

1.) Research prototypes.
2) NLP (used in hugging face Transformers)
3.) computer vision

3) Keras :-

Keras is a high level deep learning API's written in python that runs on top of lower-level frameworks like Tensorflow. Keras allows fast prototyping and easy development of deep learning models.

Features :-

1) simple and easy to use syntax.
2) offers both sequential API and functional API.
3) Includes commonly used layers, loss functions.

Use cases :-

1) quick model development and Experimentation.
2) Training Image and text classification models.
3) Building CNN and RNN.

Deep learning platforms

1) Google colab :-

Google colab is a cloud-based interactive coding platform developed by Google Research. It supports Python and provides free access to GPU/TPU for ML and DL Experiments.

Features :-

1) Free access to GPU/TPU for deep learning tasks.
2) Runs in Browser, no Installation Required.
3) pre Installed Libraries like Tensorflow, Pytorch.

Use cases :-

1) Training ML/DL models using free cloud GPU's.
2) quick prototyping of code and notebooks.
3) Running notebooks without local setup.
4) collaborative projects and student demos.

2) Jupyter Notebook / Jupyter Lab :-

Jupyter Notebook is an interactive computing environment that allows users to write and run code in a web based Interface. Jupyter lab is its enhanced version offering multi-tab support, file Browsing etc..

Features :-

1.) Combines code, output and Notes.
2.) Local (or) cloud-based interactive computing interface.
3.) Jupyter Lab is more advanced, flexible version.

Use cases :-

1.) Data science and exploratory programming.
2.) Research Reports and documentation.
3.) machine learning pipelines.

3.) Kaggle Kernels :-

Kaggle Kernels are cloud-based coding environments provided by Kaggle that allow you to run Jupyter Notebooks (or) scripts in browser. They offer free access to GPU / TPU and are integrated with Kaggles Datasets.

Features :-

1.) Direct access to datasets from Kaggle.
2.) Supports both Notebook and script modes.
3.) Easy sharing and version control of notebooks.

Use cases :-

1.) Training and testing models on GPU without local setup.
2.) Exploring datasets and visualizing data.
3.) Running Keras, Tensorflow, pytorch models directly in the Browser.

conclusion :-

In this experiment I have analyzed and explored all the deep learning platforms and frameworks.