1.0 INTRODUCTION TO PyTorch

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2002 → Torch → can be used to perform tensor based operations
↓
These tensor based operations could be performed on GPUs as well.

Torch ↓ powerful scientic framework came in picture in 2002

so researcher started using it to build deep learning applications as well. Then lots of neural network's implimention was done in Torch → AlexNet, VGGNet etc.

2 biggest Limitations of Torch:

① Torch was 'Lua' based framework. That means whole whole Torch was written in Lua programming language.

⇒ So, if we wanted to build any of the application using Torch, then we had to code in Torch.

② The computational graph that were used in Torch were static in nature.

Then to resolve this issue, Meta AI researcher came up with a new library named 'PyTorch' that combines the capabilities of 'Torch' and the most common coding language among researchers i.e. 'Python'

PyTorch OVERVIEW

- **Open-Source Deep Learning Library:** Developed by Meta AI (formerly Facebook AI Research).
- **Python & Torch:** Combines Python's ease of use with the efficiency of the Torch scientific computing framework, originally built with Lua. Torch was known for high-performance tensor-based operations, especially on GPUs.

PyTorch RELEASE TIMELINE

PyTorch 0.1 (2017)

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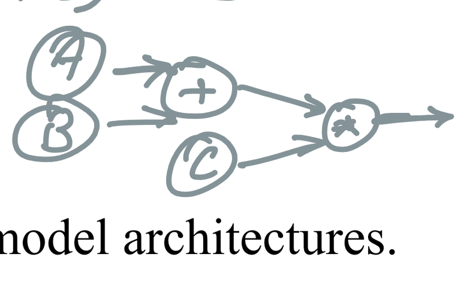

- *Key Features:*
  - Introduced the dynamic computation graph (a visual way to represent mathematical operation), enabling more flexible model architectures.
  - Seamless integration with other Python libraries (e.g., numpy, scipy).
- *Impact:*
  - Gained popularity among researchers due to its intuitive, Pythonic interface and flexibility.
  - Quickly featured in numerous research papers.

PyTorch 1.0 (2018)

- *Key Features:*
  - Bridged the gap between research and production environments.
  - Introduced TorchScript for model serialization and optimization.
  - Improved performance with Caffe2 integration.
- *Impact:*
  - Enabled smoother transitions of models from research to deployment.

PyTorch 1.x Series

- *Key Features:*
  - Support for distributed training.
  - ONNX(Open Neural Network Exchange) compatibility for interoperability with other frameworks.
  - Introduced quantization for model compression and efficiency.
  - Expanded ecosystem with torchvision (CV), torchtext (NLP), and torchaudio (audio).
- *Impact:*
  - Increased adoption by the research community and industry.
  - Inspired community libraries like PyTorch Lightning and Hugging Face Transformers.
  - Strengthened cloud support for easy deployment.

PyTorch 2.0

- *Key Features:*
  - Significant performance improvements in terms of latency and throughput.
  - Enhanced support for deployment and production-readiness.
  - Optimized for modern hardware (TPUs, custom AI chips).
- *Impact:*
  - Improved speed and scalability for real-world applications.
  - Better compatibility with a variety of deployment environments.
