Why Deep Learning is Famous Now?

1960 → Deep Learning pe kaam 1960 se hie chalu tha Alan Turing ke time se

But Breakthrough 2012 mai Mila Deep Learning ko

Reasons:

1.Datasets

2.Frameworks

3. Model Architecture

4.Hardware.

5.Community

Reason 1 Datasets

Deep Learning is Data Hungry it needs a lot of data , whereas in ML even 100 rows ka data hai ya 1k rows ka data we can build model on it

Deep Learning Needs Lakh of Rows

Good thing is around 2010 There were 2 Revolutions

1.) Pricing of Internet
2.) Mobile Phone

This 2 Big revolution contributed to Deep Learning Factors

As Per Research

Human History se 2015 tak X dataset generate hua hai

& 2015 se 2016 ta utna hie x data 1 saal mai generate hua

2016 se 2017 mai 2x

2017 se 2018 se 4x.

For Image: Microsoft Coco Dataset is used much for Image detection it is very powerfull for Object detection

For Video: We have Youtube Dataset

For Text: we have many dataset like Squad from Wikipedia

For Audio: Google ka audio dataset hai which was taken from Youtube it is of more than 600 category

Like this there are thousands of Public data set that are open source.

Reason 2 Hardware

Moore's Law

Moore's Law is the **observation that the number of transistors in an integrated circuit doubles about every two years** [1] [2] [3] [4] [5] It was first postulated by American engineer Gordon

E.g

1 Chip hai let's take i7 isme jo transistor laga hai

Vo Har 2 Saal mai 2x hojata hai & jo cost hota hai transistors & all ka vo

Half hojata hai

This gives a lot of push to Deep Learning

GPU is 10-20 times better than CPU for training

Microsoft Bing ka zyaada vala jo A.I part hai vo FGPI pe chalrha

ASIC

This is also custom made chips it is costly bit , it has TPU (Tensor Processing Unit) this is specially a hardware for This task

Edge TPU for Edge Devices (e.g you have to run DL model on Drone, smart watches etc.)

NPU Neural processing Units → This is for Mobile Phone Operations

Starting Journey -> CPU

Bade Networks -> CUDA

If u have to Use on Mobile then you can use mobile GPU etc.

3.Deep Learning Libraries & Frameworks

Tensorflow By Google

PyTorch Backed by Meta

Tensorflow was difficult to use at start so they combined it with keras.

Keras works on Top of Tensorflow like a Frontend

So Combination of Keras & Tensorlow became famous.

A.I Researchers Love PyTorch.

Caffe2 another Model for PyTorch which was merged with PyTorch

Today 2 Framework hai

Tensorflow + Keras → Used in Industries.

PyTorch → Used for Research Work.

Suppose you have to convert Tensorflow Keras code to PyTorch

Lyk that there are some tools which does this like

AutoML, CreateML

4. Deep Learning Architectures

There are already good existing Architectures which are trained on large corpus of dataset.

*This Concept is known As **transfer Learning** that we will be studying in depth as we go.*

In today's time State of Art hie Architecture directly use hoga as there is already great setup

E.g of Some State of Art Architectures:

For Image Classification -> Resnet Neural Network

For NLP Task & Text Classification -> BERT is Great

For Image Segmentation → UNET

For Image Translation → PIX2PIX

For Object Detection -> YOLO

For Speech generation -> WaveNET.