



02:35

The screenshot shows a presentation slide titled "What is Deep Learning?". The slide contains two diagrams. The left diagram is a Venn diagram with three concentric ellipses: a large yellow one labeled "Artificial Intelligence", a medium pink one labeled "Machine Learning" inside it, and a small blue one labeled "Deep Learning" inside the pink one. The right diagram is a neural network with four layers: an "input layer" with 3 yellow nodes, "hidden layer 1" with 3 blue nodes, "hidden layer 2" with 3 green nodes, and an "output layer" with 1 red node. All nodes in adjacent layers are connected by lines.

Deep Learning is a subfield of Artificial Intelligence and Machine Learning that is inspired by the structure of a human brain.

Machine Learning is subfield of Artificial Intelligence, focus on stastical data.

Deep Learning : It is subfield of Machine learning, that is inspired by human brain.

Logical unit is perceptron.

1)Perceptron

2)Layer

a)Input Layer

b)Hidden Layer

c)Output Layer

3)Weight

There are different type of Neural Network

a)ANN

b)CNN- Image

c)RNN -speech

d)GAN - generate text

=>Deep learning follow logical structure instead of a stastical structure

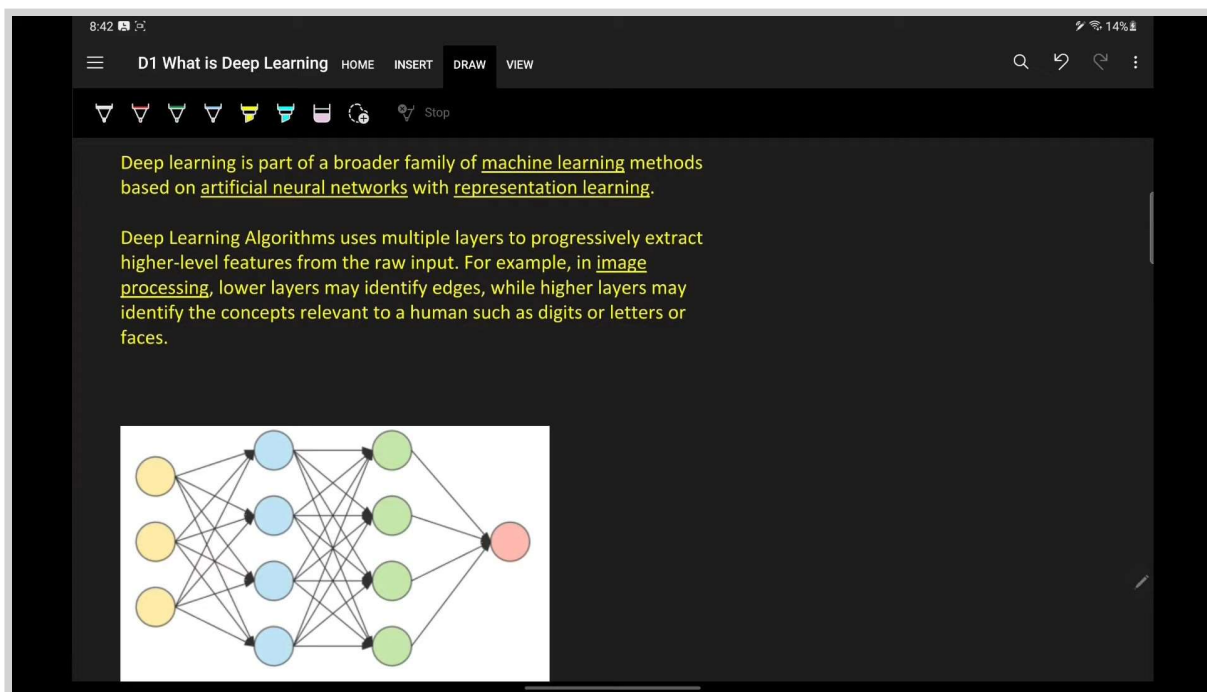
Why is deep Learning get famous?

=>Applicability - It is applicable in large domain

=>Performance - high-performance state-of-the-art GO game

Alphago AI win 4 matches out of 5

[13:26](#)



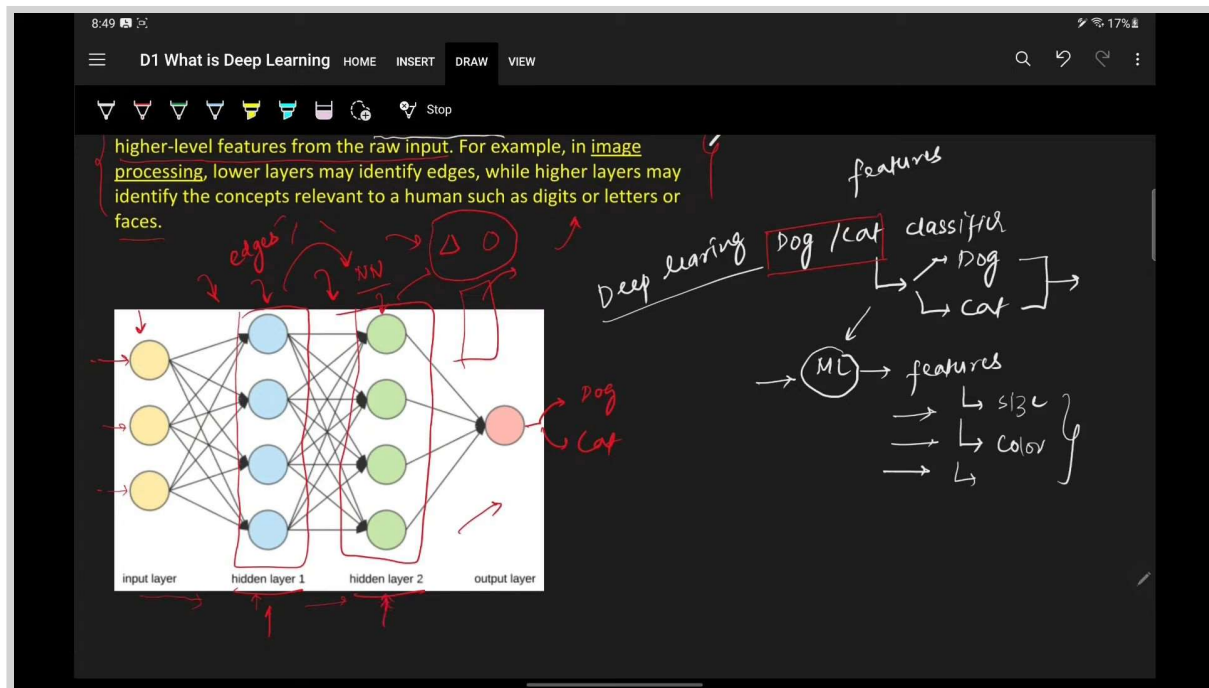
The screenshot shows a presentation slide with a dark background. At the top, there is a navigation bar with the title 'D1 What is Deep Learning' and tabs for 'HOME', 'INSERT', 'DRAW', and 'VIEW'. Below the navigation bar, there is a toolbar with various icons. The main content area contains two paragraphs of text in yellow font. The first paragraph states: 'Deep learning is part of a broader family of machine learning methods based on artificial neural networks with representation learning.' The second paragraph states: 'Deep Learning Algorithms uses multiple layers to progressively extract higher-level features from the raw input. For example, in image processing, lower layers may identify edges, while higher layers may identify the concepts relevant to a human such as digits or letters or faces.' Below the text, there is a diagram of a neural network with four layers of nodes. The first layer has 4 yellow nodes, the second has 3 blue nodes, the third has 4 green nodes, and the fourth has 1 red node. All nodes in one layer are connected to all nodes in the next layer.

Deep learning is part or a broader faily of machine learning methods based on artificial neural networks with representation learning.

Representation Learning- feature learning or representation learning, no need manually do feature extraction, feature engineering.

=>The initial layer extract edges, higher layers may identify the complex concept.

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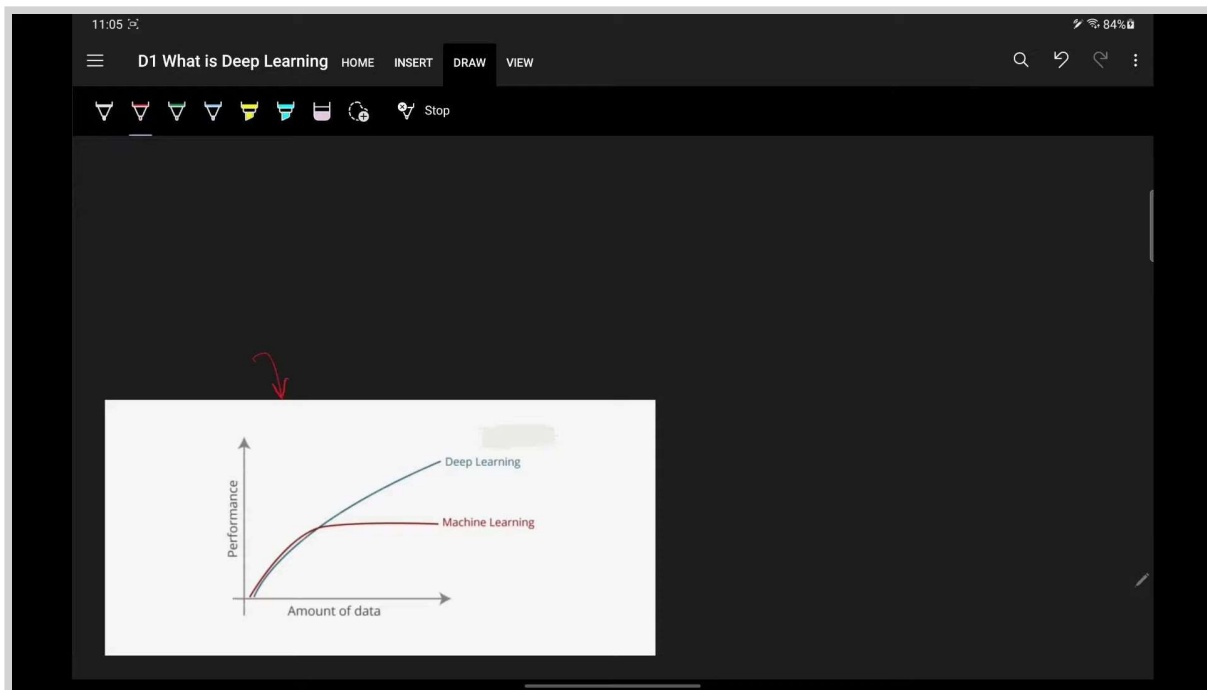


Deep Learning VS Machine Learning

1.Data Dependency -

Need more data in comparison to ML.

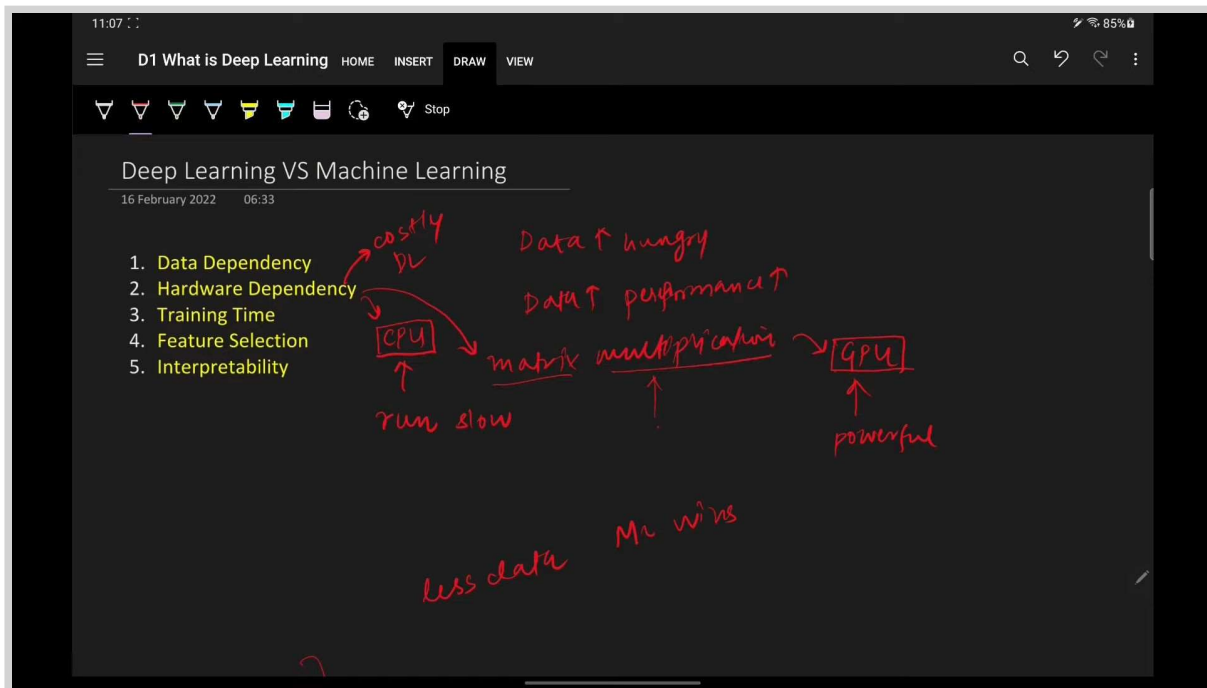
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=>for less data ML win, after adding more data no effect on ML but increase performance of DL.

2. Hardware Dependency- for handling you need GPU, with more memory .

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3. Training Time-

=>high training time it can take month and year.

=>Prediction Time very fast but varies in ML

4.Feature Selection- automatically extract relevant feature from data.

Using ML-

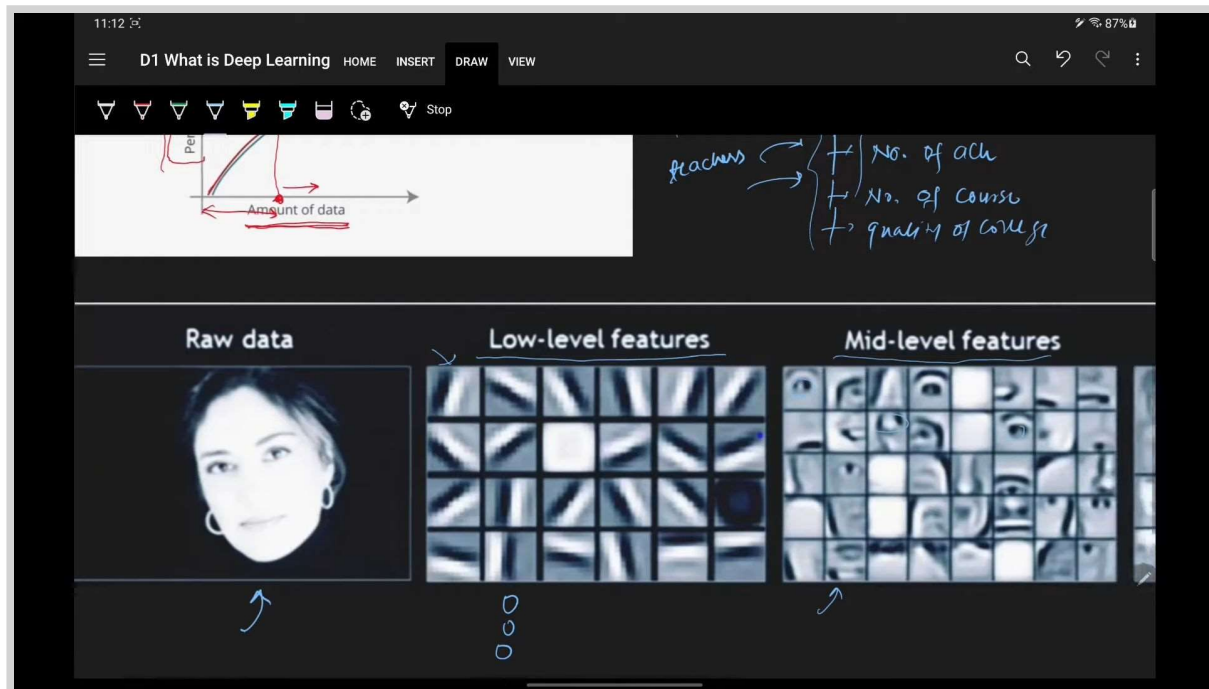
Placement Prediction-

- 1)12th marks
- 2)10th Marks
- 3)No of Achivement
- 4)No of Course
- 5)Quality of course

Using DL-

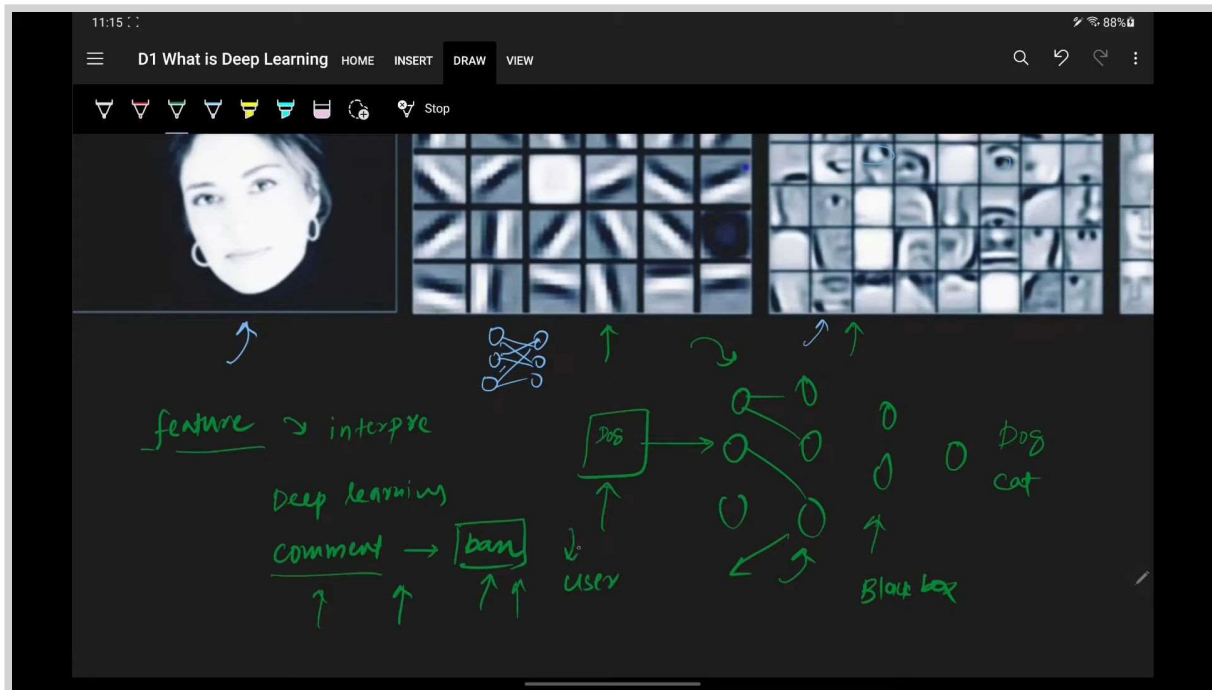
Does not need feature manually

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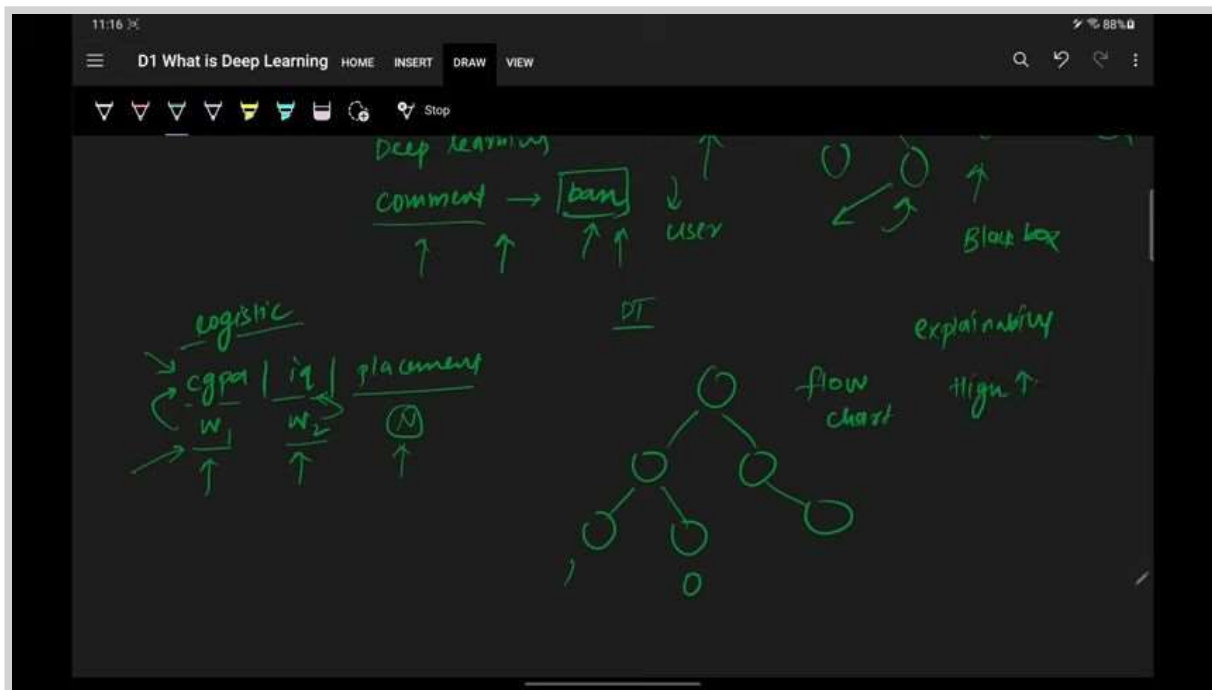
5. Interpretability- features are extracted automatically. You cannot interpret. It happen like a black box.

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In Machine learning has high interpretability.

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Deep Learning Cannot replace Deep Learning

Why Deep Learning get Famous?

Alan Turing → 1960's

why after 2012 get famous more?

- 1) Datasets
- 2) Frameworks
- 3) Architecture
- 4) Hardware
- 5) Community

1) Datasets-

It is data hungry,

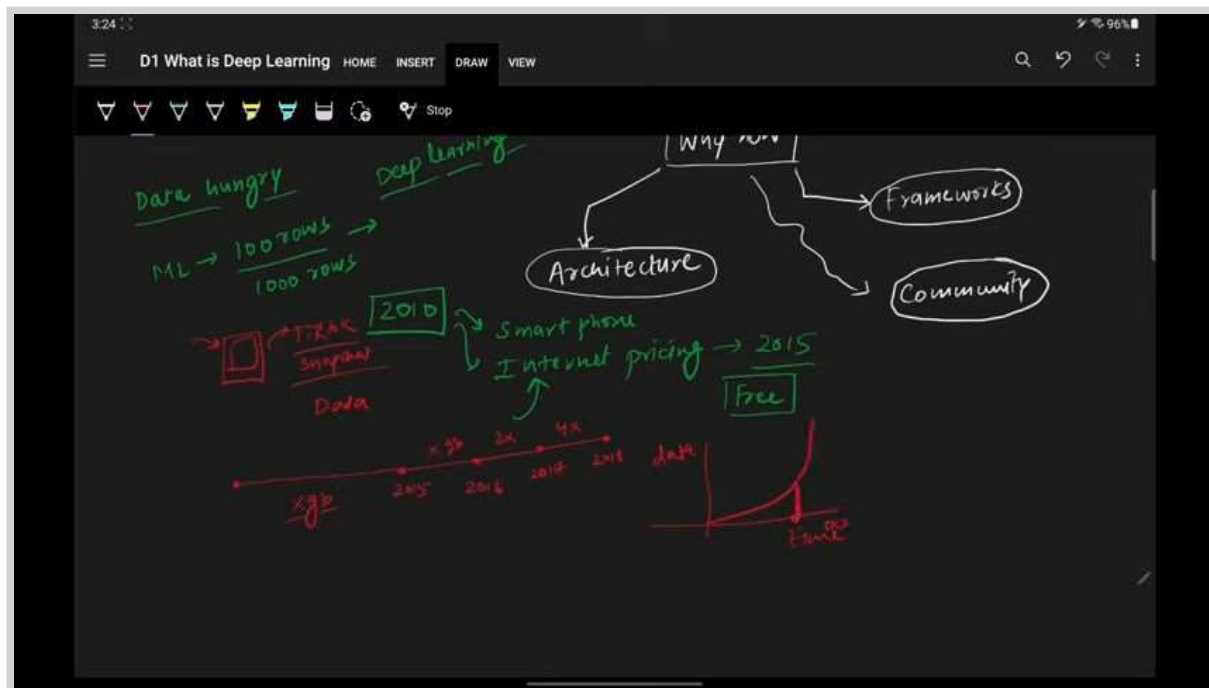
ML can work good with less data also
after 2010

=> we get smart phone

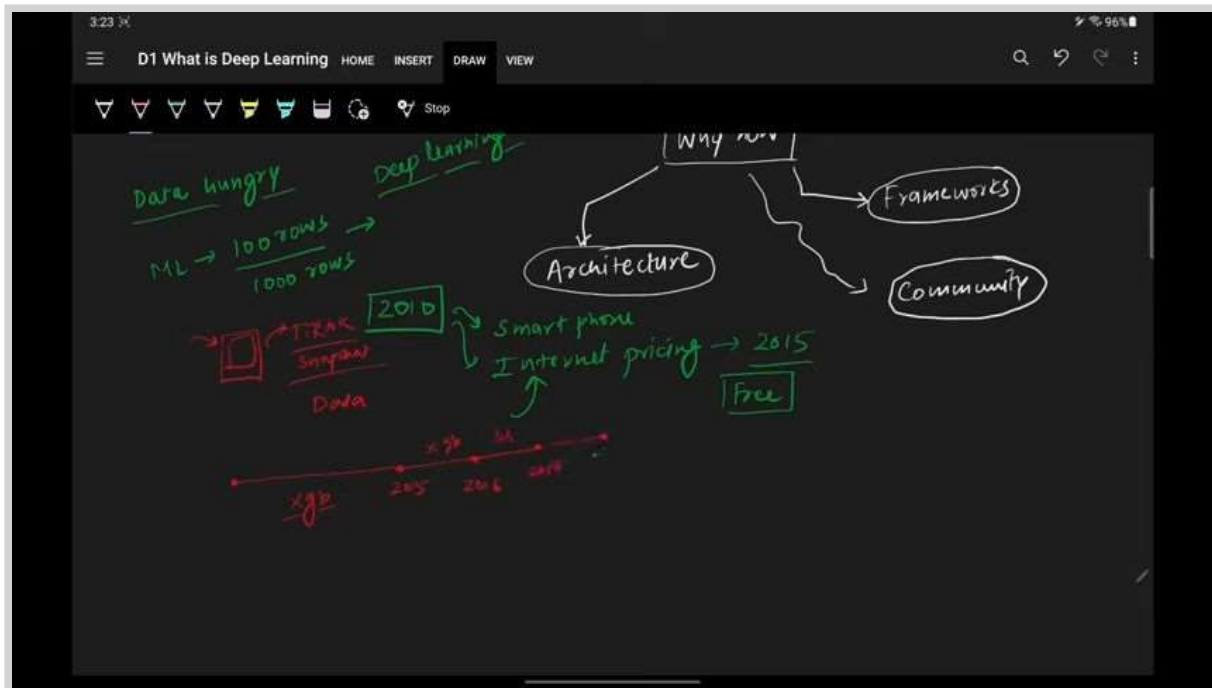
=> Internet pricing low -> 2015

therefore we can generate high data.

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41:08

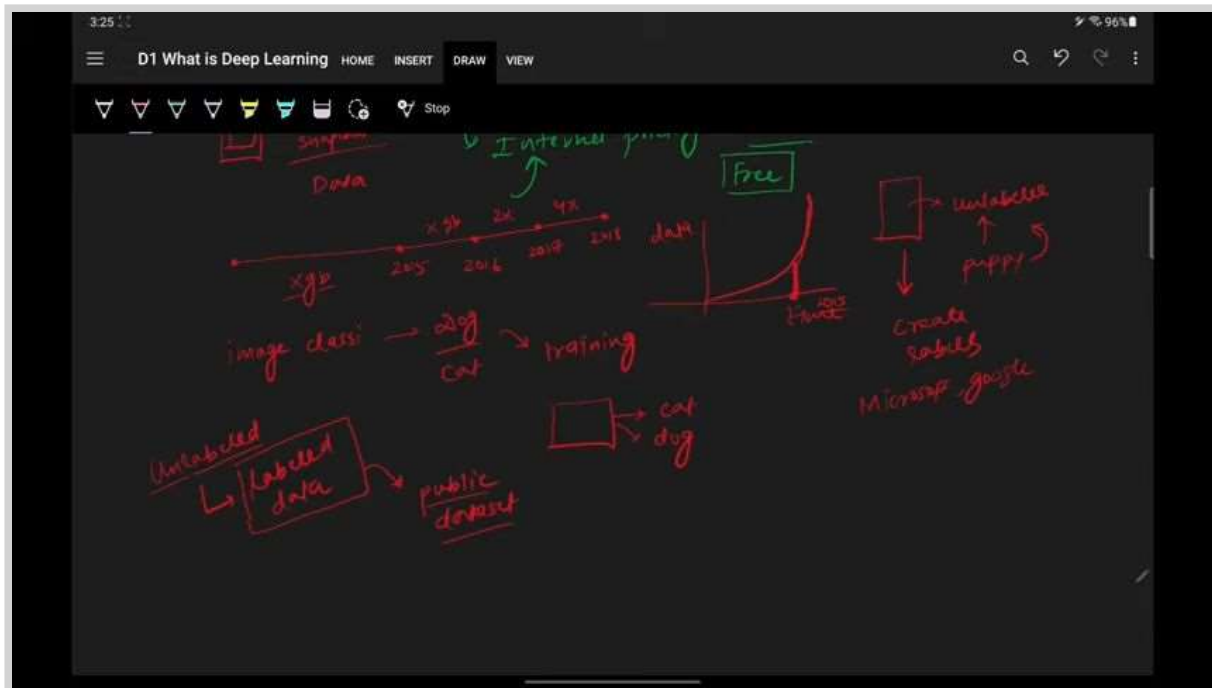


Image data- Microsoft Coco

use for image detection

video -Youtube 8M 6.1 million videos

Text - SQuAd

Audio- google Audioset 20lakh extract from youtube

Hardware-

Moore's Law : No of transistors double the transistor in every two and electronic cost decreases and performance increases.

Lot of data -> Matrix operations -> cpu -> low speed -> 2010

parallel processing -> We can use GPU

so we can use GPU for Deep Learning

NVIDIA can use to make GPU .

FPGA-Field Programmable- low power cusomiable , expensive

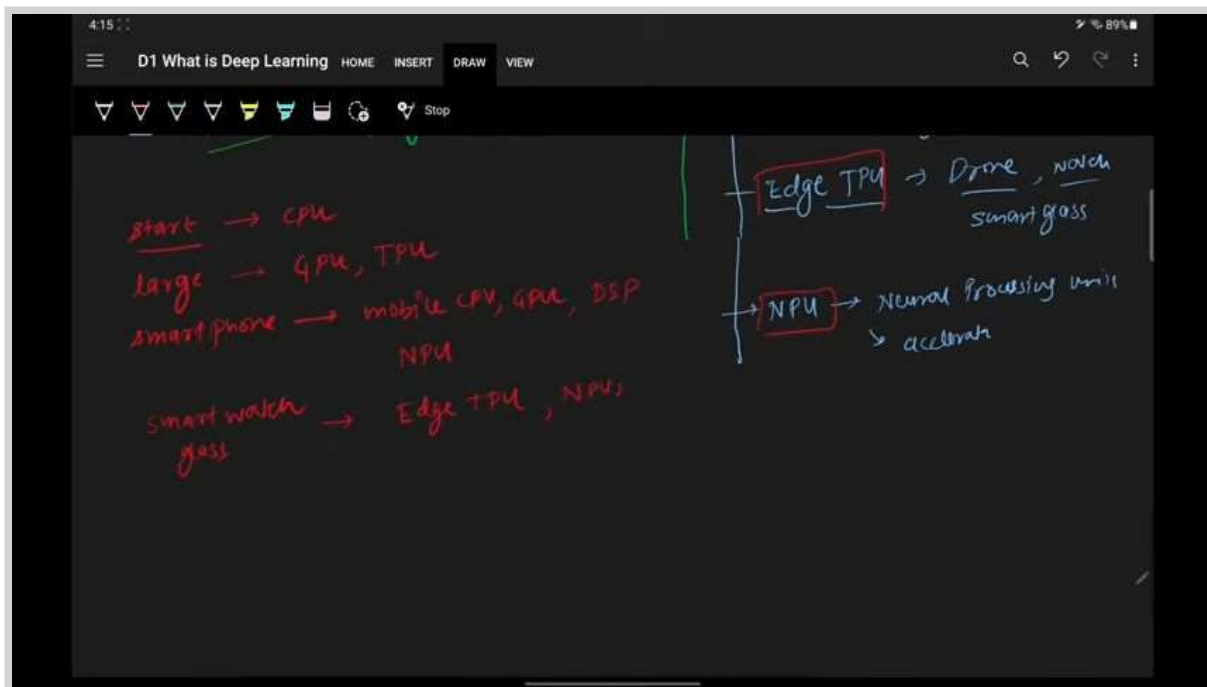
Bing uses FPGA

ASIC-TPU -> Tensoe Processing unit(made by google) especislly in google collab

Edge TPU -> Drone, smart glass

NPU- Neural Processing Unit

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FrameWorks/Libraries

train-> difficult->scratch

TensorFlow by google

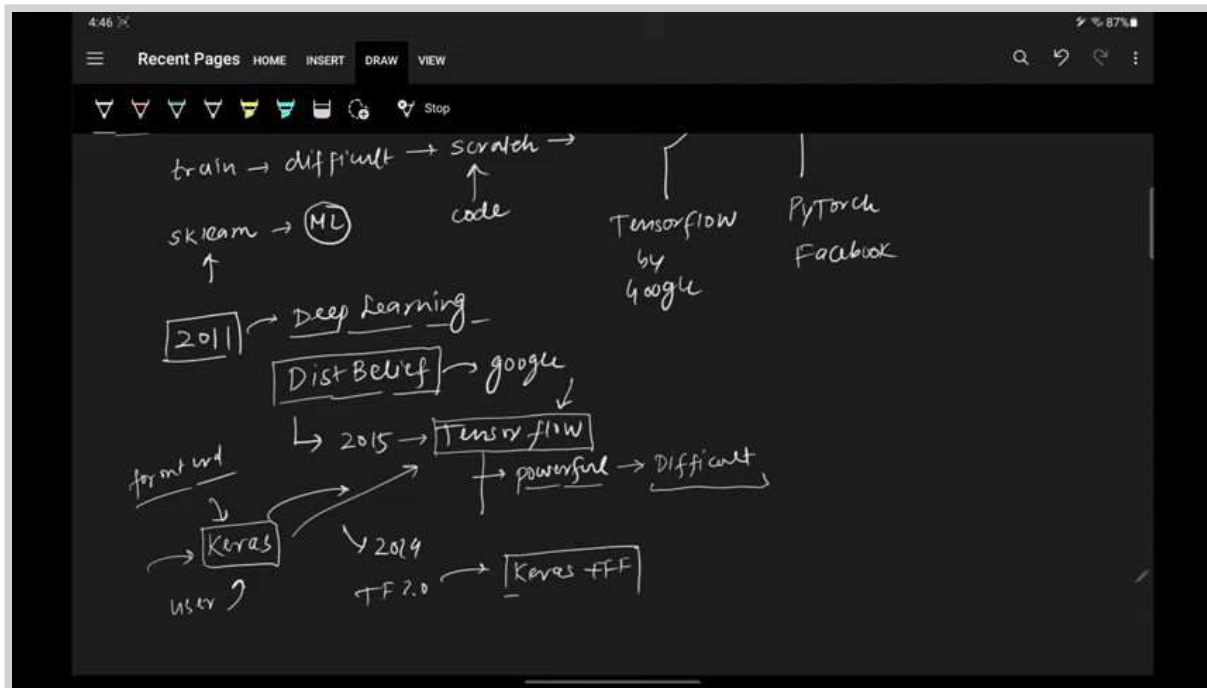
PyTorch by Facebook

DistBelief by google

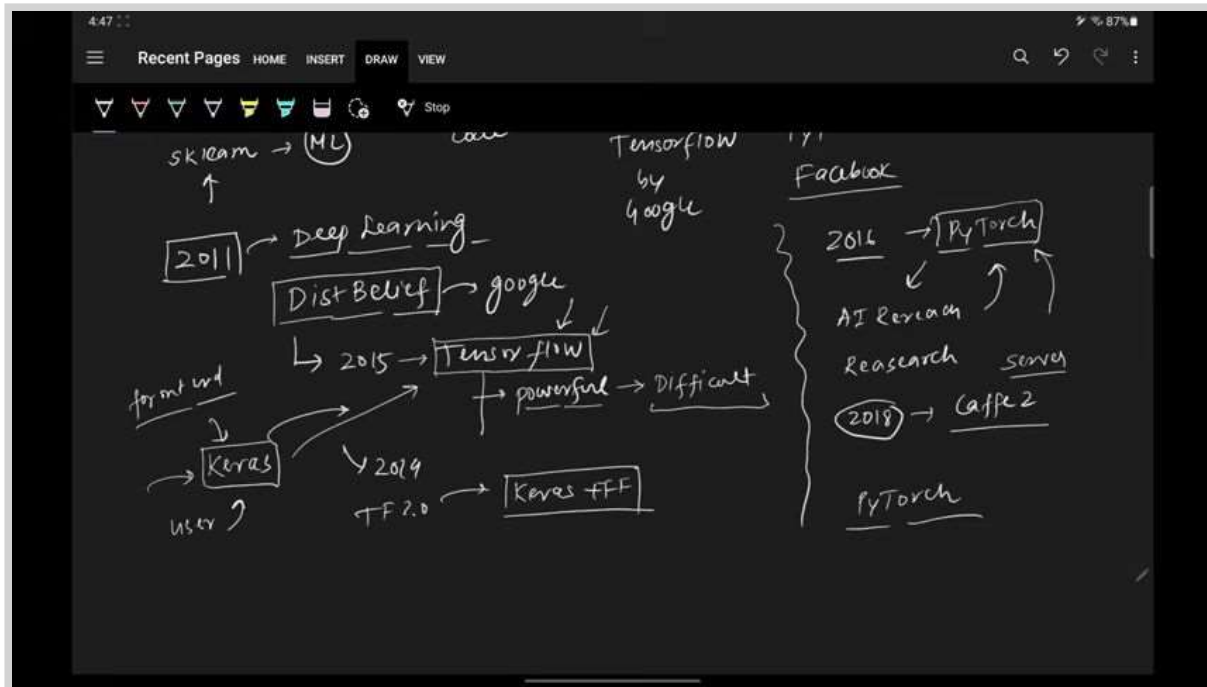
TensorFlow was easy to use

Keras library made on top of TensorFlow

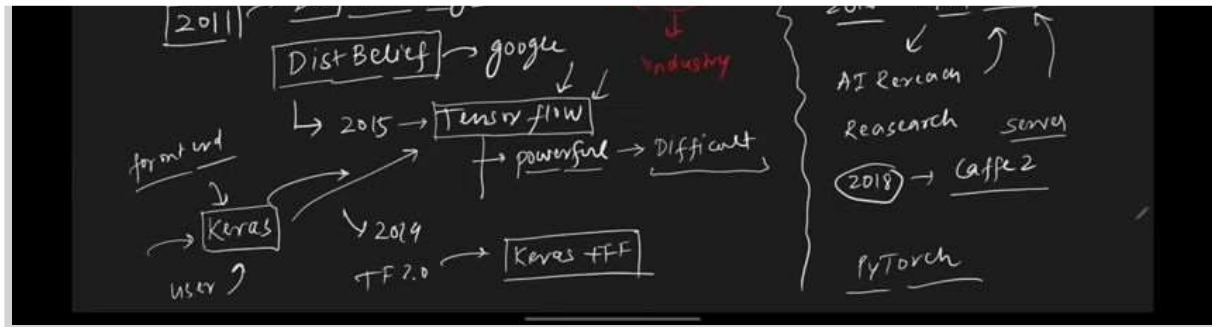
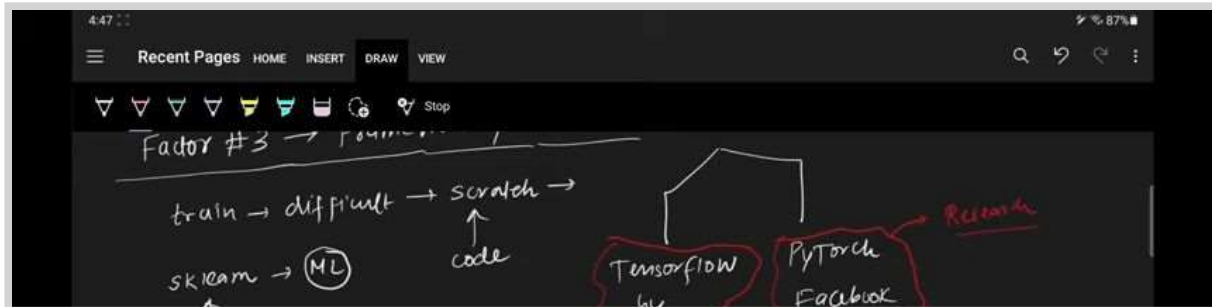
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Sometime we need convert one into another.

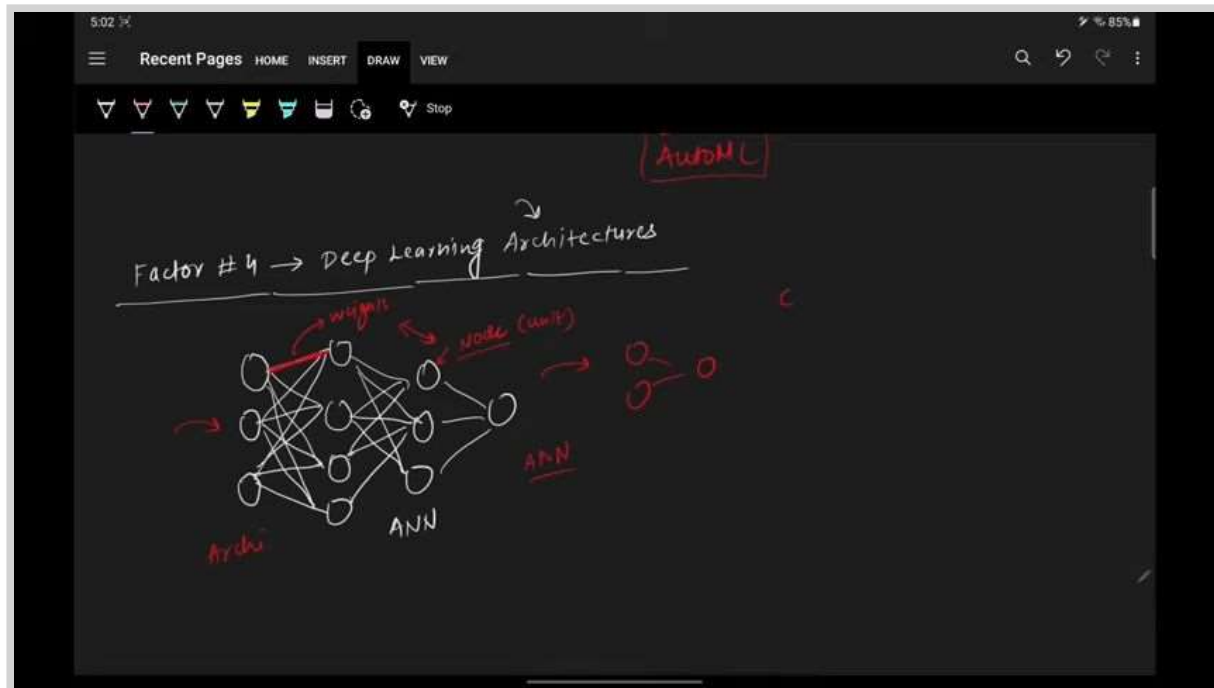
DropDown GUI based application.

AutoML-

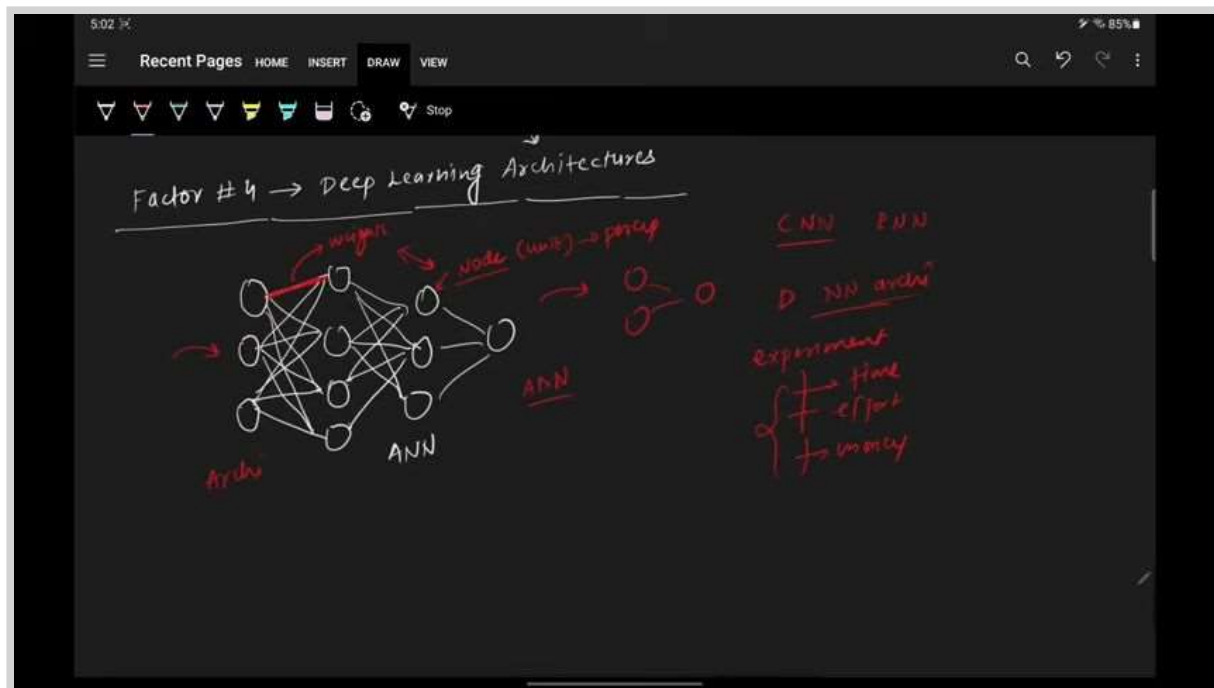
CustomVision AI

DeepLearning Architectures:

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Existing Architecture:

Ready to use known as Transfer learning.

State-of-the-art accuracy

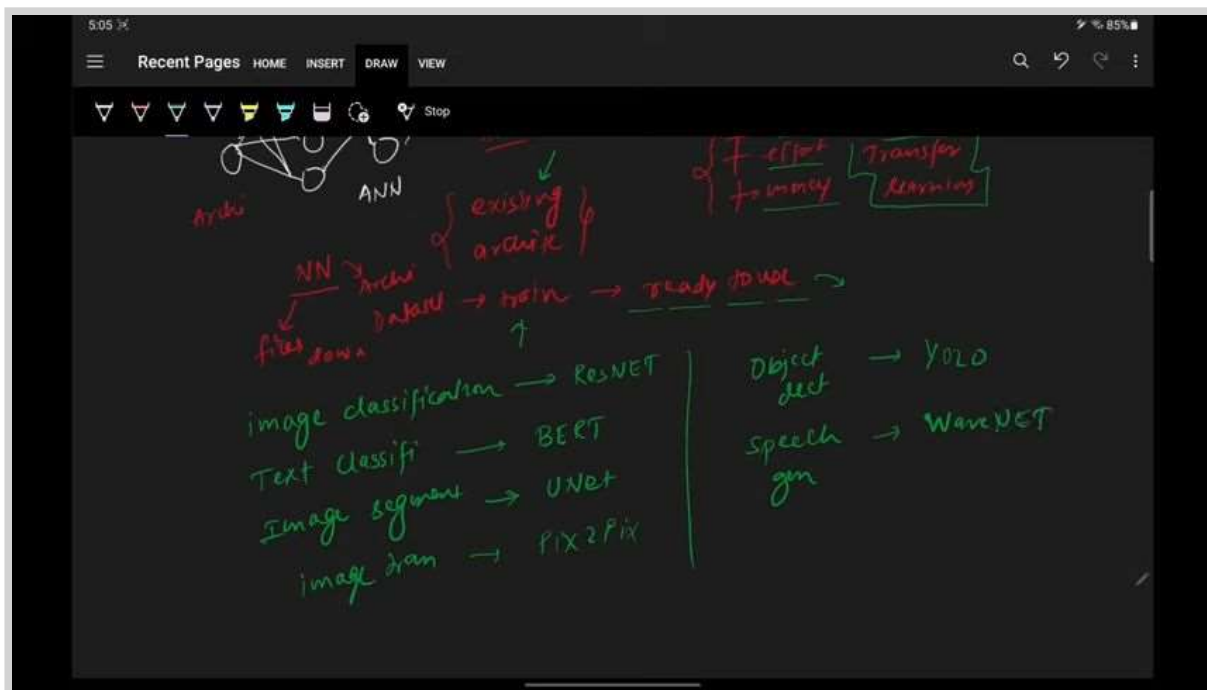
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Image Classification: ResNET

Text classification -> BERT

Image segment -> UNet

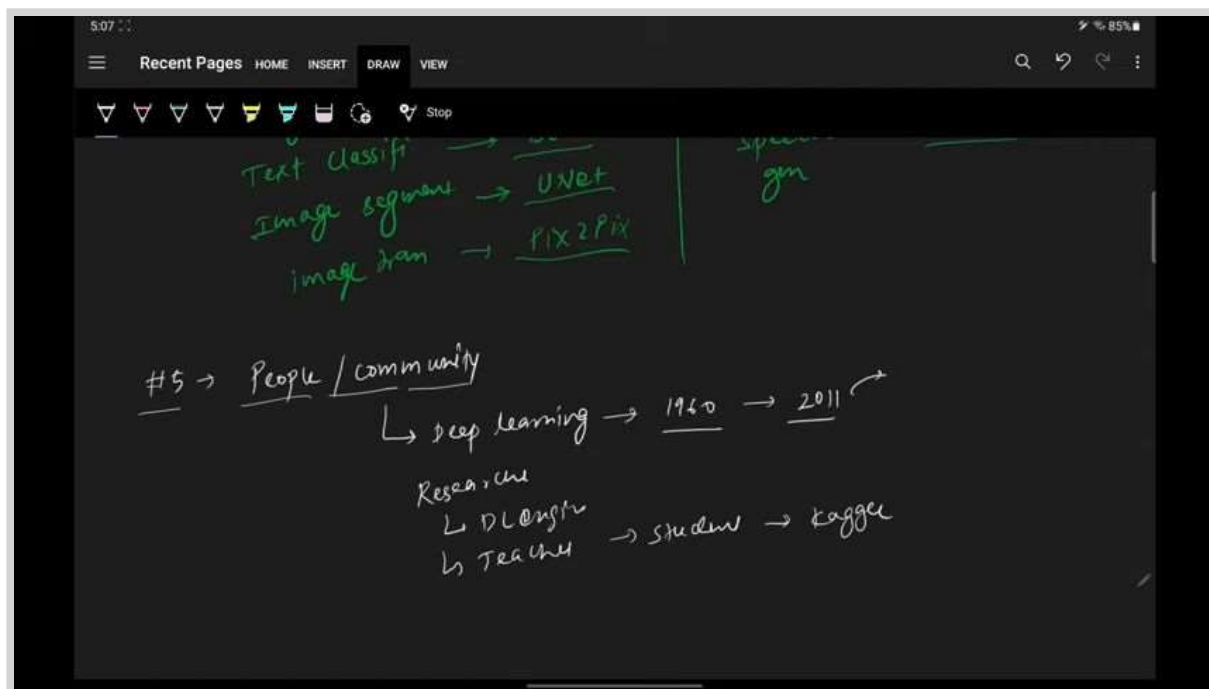
image translation -> Pix2Pix

Object detection -> YOLO

Speech -> WaveNET

Community:

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