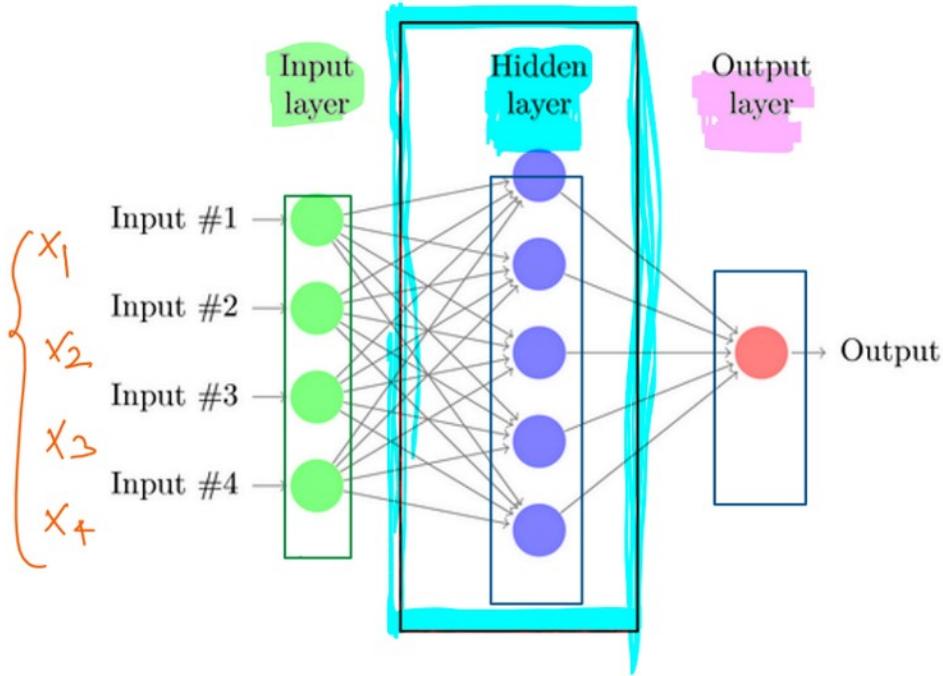


2. HIDDEN LAYER(S)



WHY IS HIDDEN LAYER CALLED SO ?

A hidden layer is called so because it's neither the part of the input layer nor the part of the output layer. Actually it exists between them and it performs complex computations which are not directly observable from the outside.

Note: We don't directly access the computations or activations inside hidden layers (more like a black box) hence they are considered hidden.

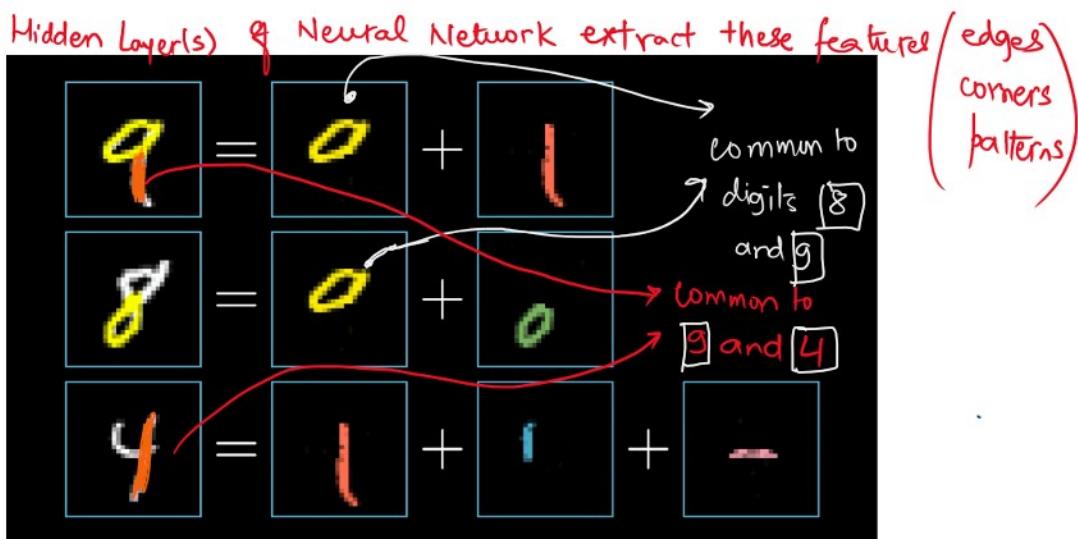
This is the second layer in the neural n/w architecture diagram.

- - - - - yes this is the neural network architecture diagram.

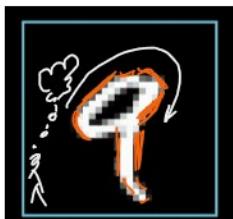
↳ Hidden layer can be one or many more → minimum one hidden layer (HL) is a must!

Working of Hidden Layers

- Hidden layers help to extract features such as  edges
corners
patterns



From <



Hidden layer is the most critical layer
where most of the computation happens
↓

allowing the model to learn

representations and patterns from
the data ↴

Pro-tip**

What do you mean by 'feature extraction' and how does.

... ?

What do you mean by 'feature extraction' and how does.

ANN do it?

(Artificial Neural Network : ANN)

In the context of ANN, feature extraction refers to the process of automatically identifying the most important and relevant patterns, structures or signals in the raw data that are useful for solving a specific problem.

Classification regression:

edges, corners, outlines and patterns → training data



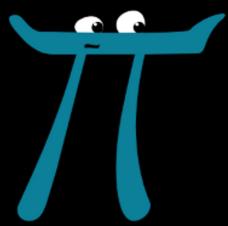
which are not explicitly visible.

→ Each successive hidden layer learns increasingly complex features

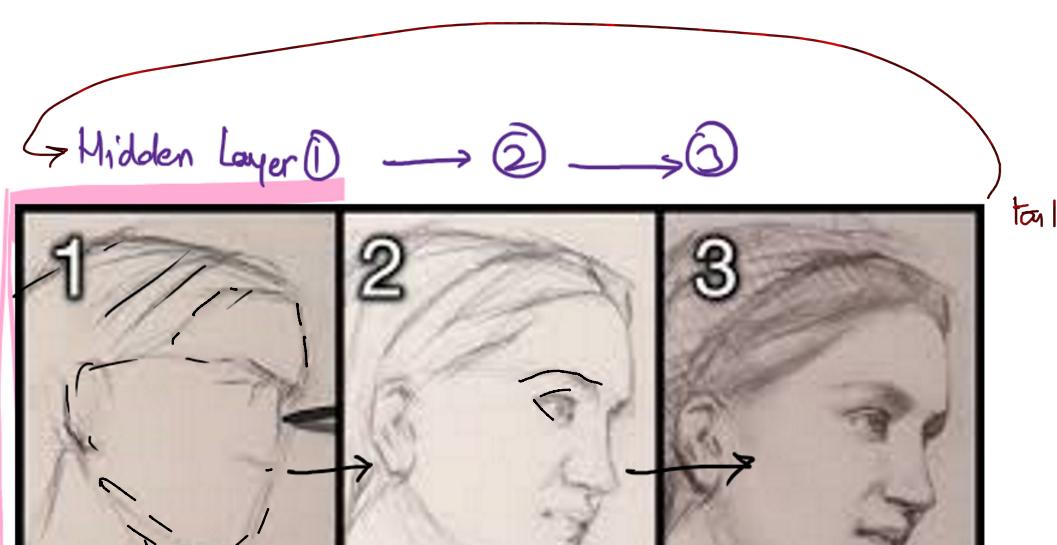
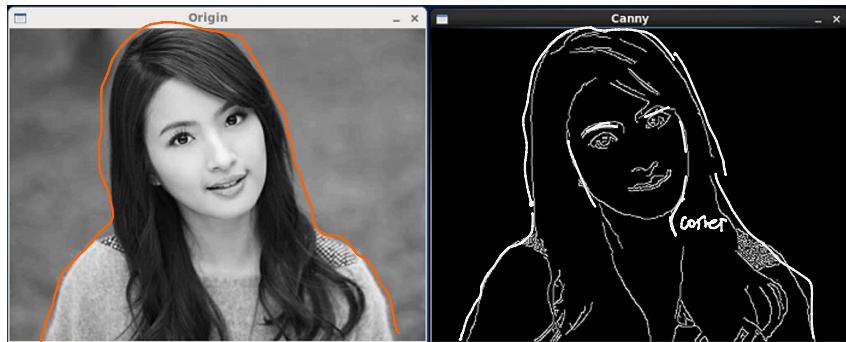
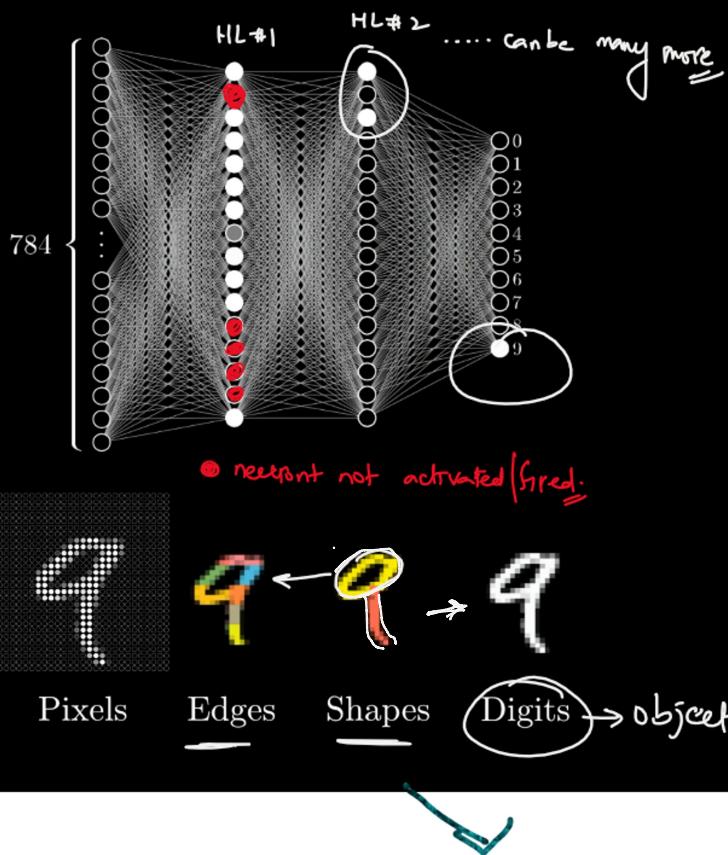
For example:

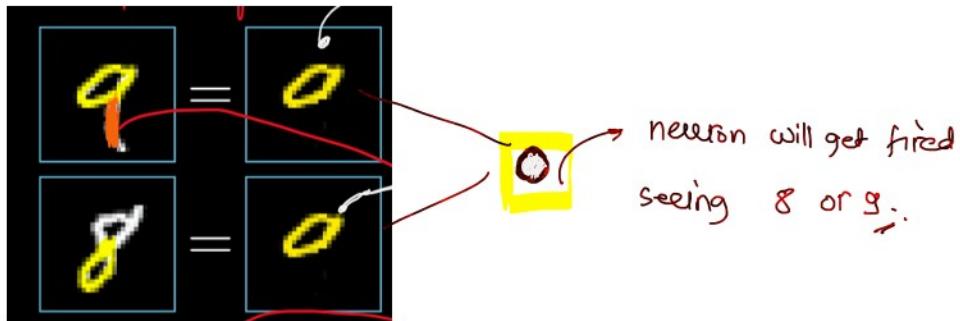
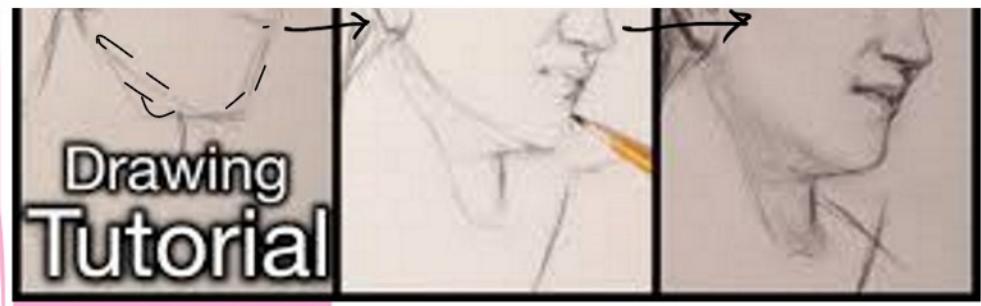
- Early hidden layers might detect edges or corners or outlines.
- Middle hidden layers might detect shapes or textures
- Deeper hidden layers may identify objects or patterns

Does the network actually do this?



$\rightarrow [3 \text{ blue} | \text{brown}] \leftarrow$

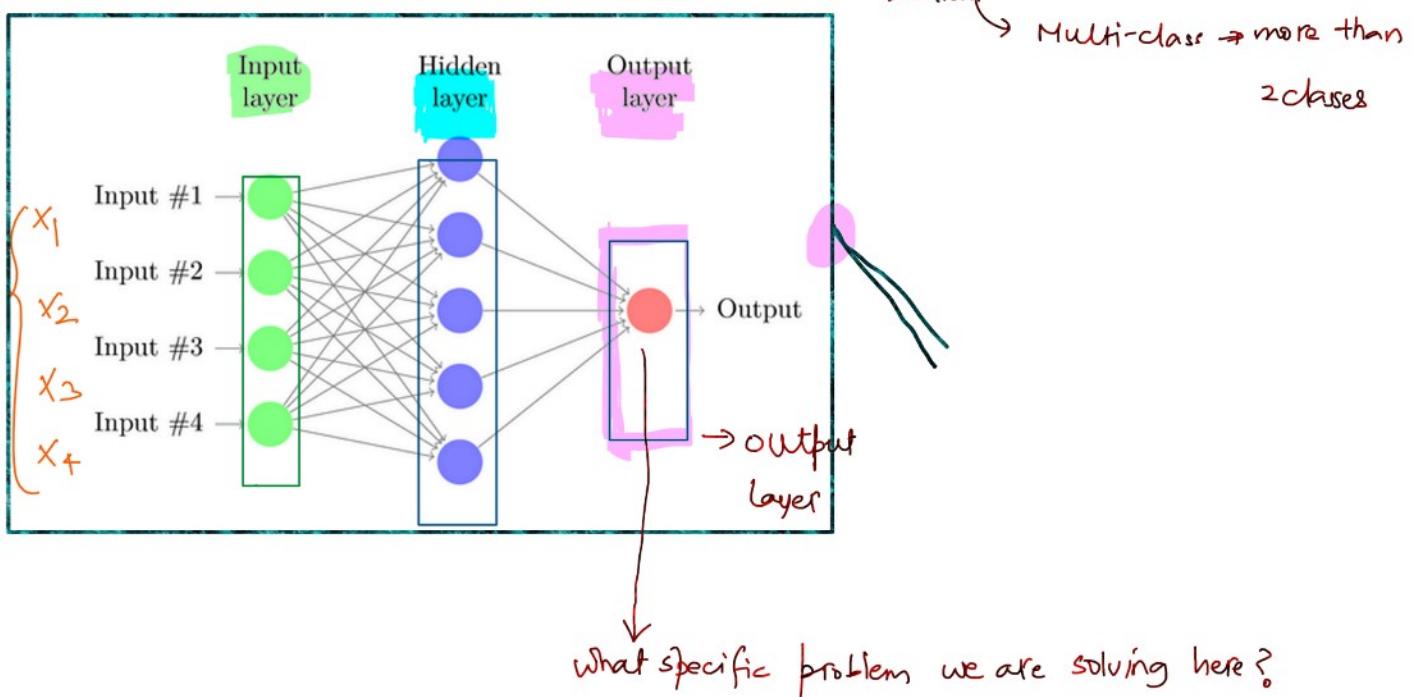




#3. Output Layer

- ↳ The final layer that produces the o/p for neural n/w model
- ↳ output layer configuration depends on the specific problem.

a) ↗ Regression
 b) ↗ Classification
 ↗ Binary → 2 classes
 ↗ Multi-class → more than 2 classes



What specific problem we are solving here?

option #1 **Regression** → one neuron would generate continuous value → 5.2
6
100
-70

option #2 **Classification (Binary)** → Binary classification

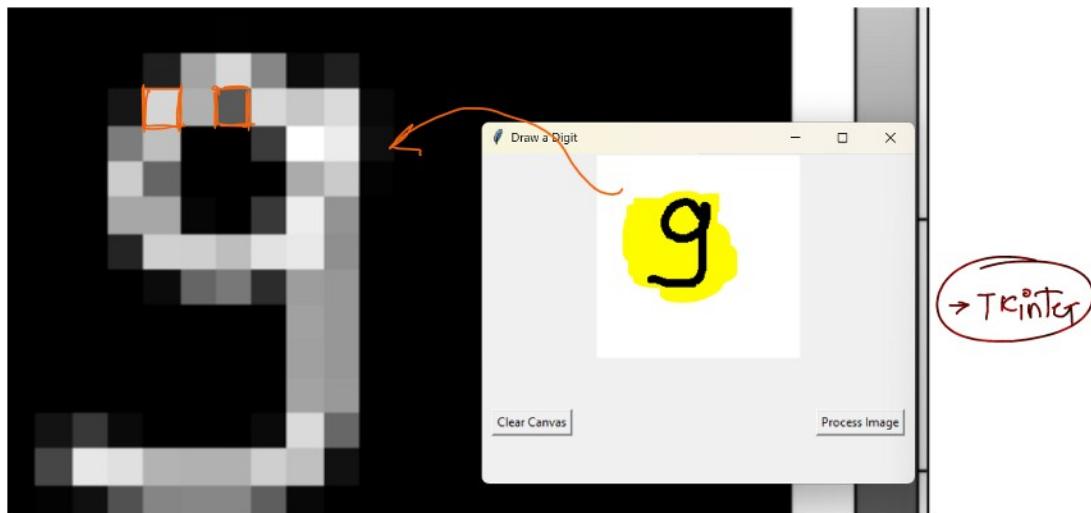
One neuron in the output layer can be used for

- Regression
- 'OR'
- Binary classification
- ↳ **Sigmoid** Activation Function

Multi-class classification →

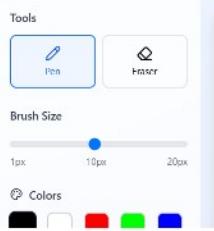
Softmax

TASK: Create an application using `streamlit` or `tkinter` [Tkinter is Python's standard library for creating Graphical User Interfaces (GUIs)] or **Dash Plotly** to scribble any number or text using touchpad/writing pad and convert it into a 'pixelated image' in a live set-up.



[**Digital Canvas** - Convert raw image to pixelated image]

[Kaushik, Aditya, Manish]



Digital Canvas

nuc la -m | ed |

11 -only uni ↪

Tools



Pen



Eraser

Brush Size



Colors



Process Image

Download

Stats

Strokes: 1

3