UNIT II

Neural Network

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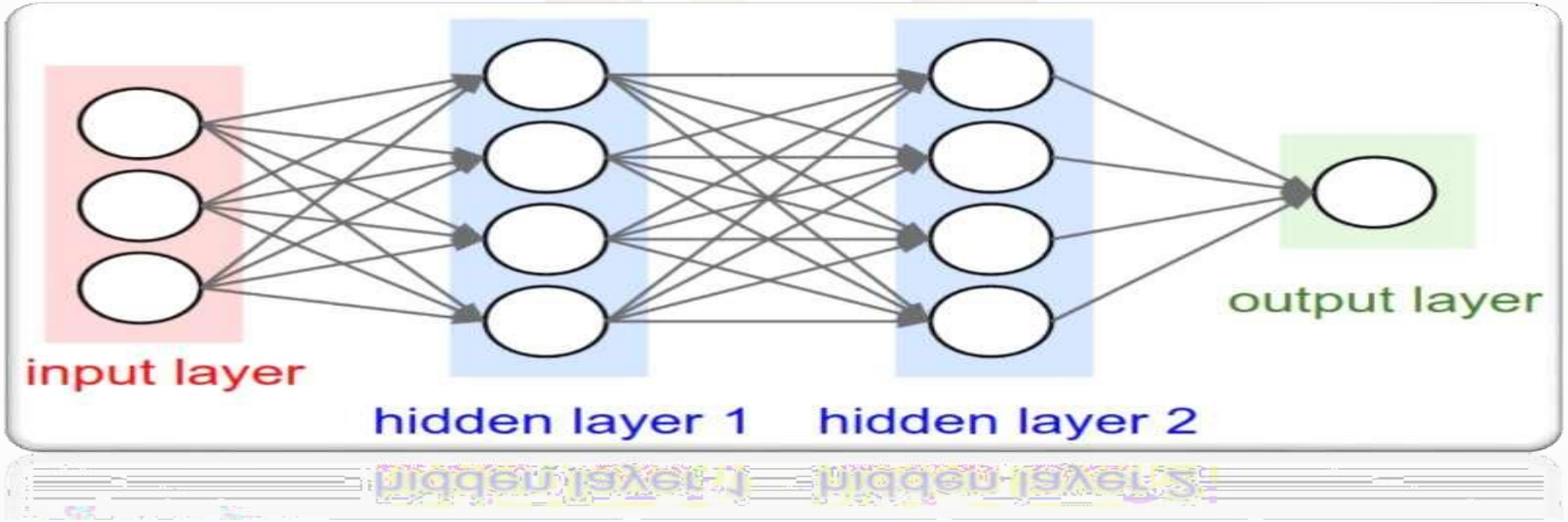
Neural Network

What is Neural Network ?

- An Artificial Neural Network (ANN) is an information processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information.
- It consists of large number of highly interconnected neurons in it to carry information.
- ANNs learn by example which we given as the data's.
- Ex: Pattern recognition or data classification, through a learning process.

Neural Network

- Neural Network: A computational model that works in a similar way to the neurons in the human brain.
- Each neuron takes an input, performs some operations then passes the output to the followingneuron.



Why use Neural Network?

- Neural networks, with their remarkable ability to derive and detect trends that are too complex to be noticed by either humans or other computer techniques.
- A trained neural network can be thought of as an "expert" in the category of information it has been given to analyze.
- Other advantages include:

Neural Network

- **Adaptive learning:** An ability to learn how to do tasks based on the data given for training or initial experience.
- **Self- Organization :** An ANN can create its own organization or representation of the information it receives during learning time.

History and Evolutions:-

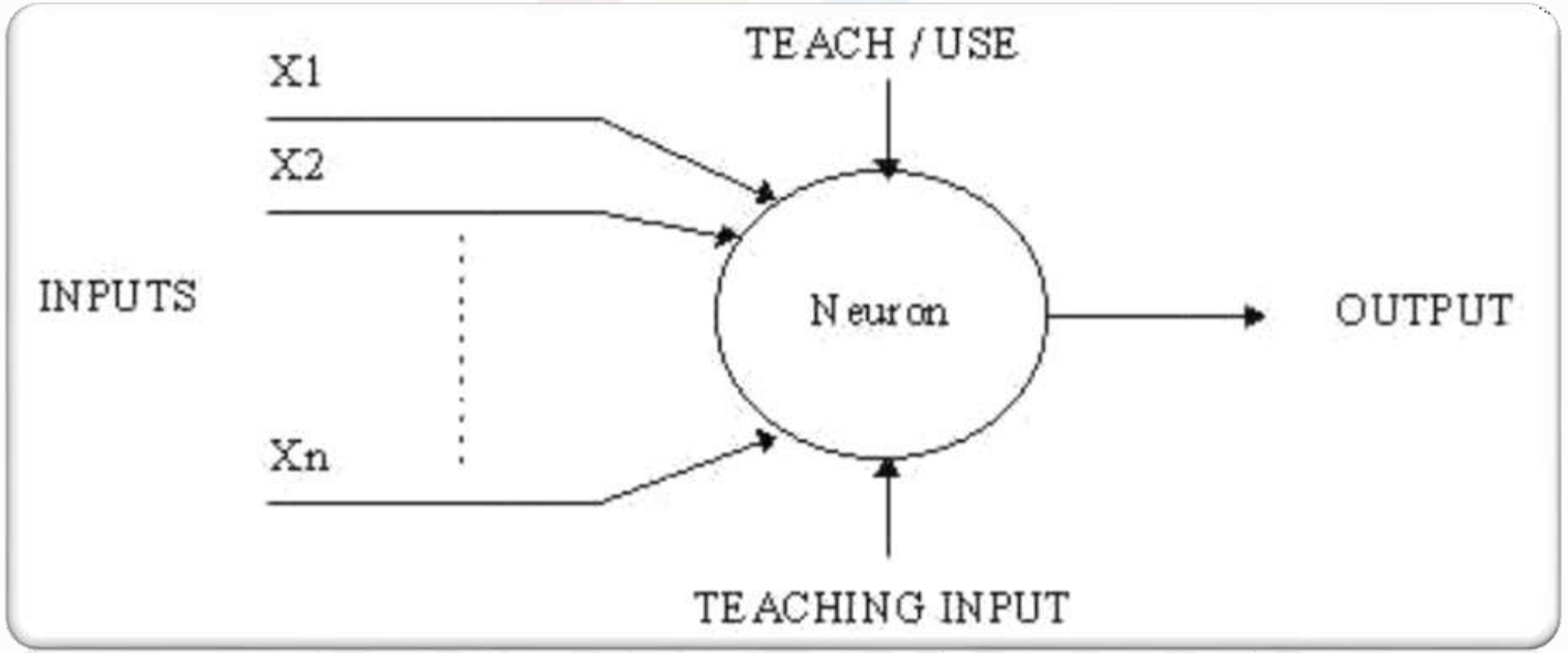
- Neural network simulations appear to be a recent development. However, this field was established before the advent of computers, and has survived at least one major setback and several eras.
- In 1943, neurophysiologist Warren McCulloch and mathematician Walter Pitts wrote a paper on how neurons might work.
- The first multi-layered network was developed in 1975, an unsupervised network.

An engineering approach:

SIMPLE NEURON:

- An artificial neuron is a device with many inputs and one output.
- The neuron has two modes of operation; the training mode and the using mode. In the training mode, the neuron can be trained to fire (or not), for particular input patterns.
- In the using mode, when a taught input pattern is detected at the input, its associated output becomes the current output.
- If the input pattern does not belong in the taught list of input patterns, the firing rule is used to determine whether to fire or not.

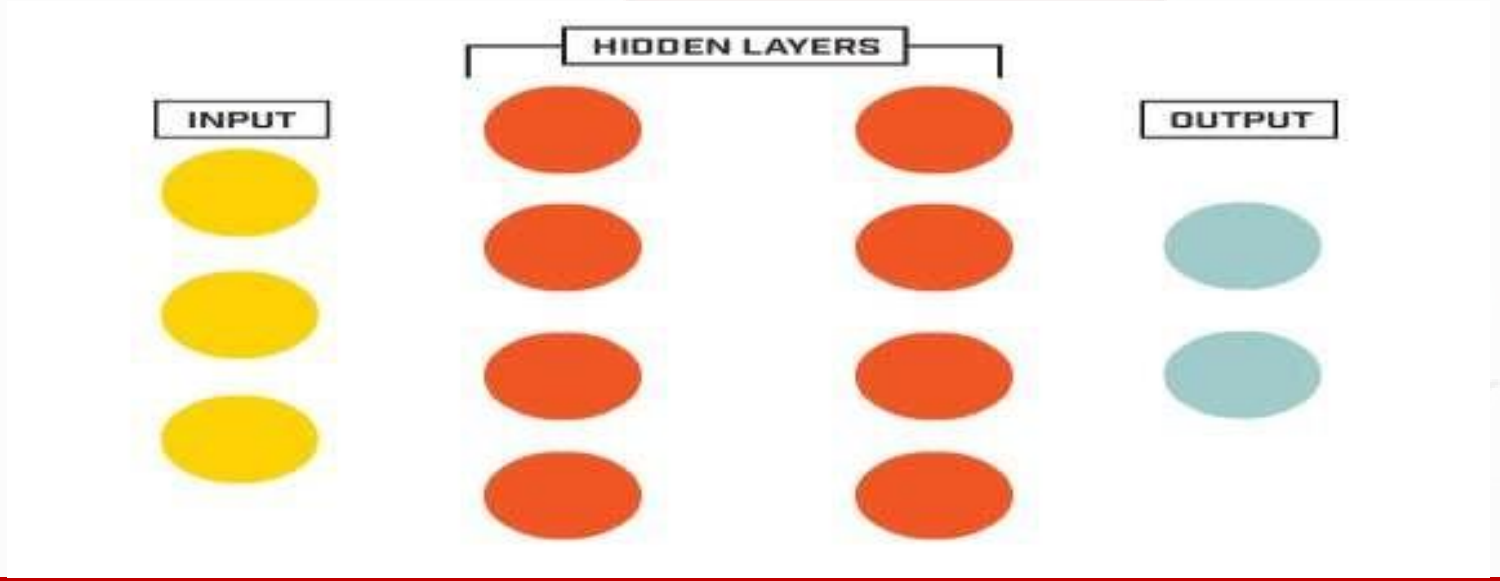
Artificial Neuron:



Architecture of Neural Network

NETWORK LAYER:

- The commonest type of artificial neural network consists of three groups, or layers of units:
- a layer of "**input**" units is connected to a layer of "**hidden**" units, which is connected to a layer of **"output**" units.



TYPESOF NEURONS:

- Feed forward Neural Network – Artificial Neuron
- Radial basis function Neural Network
- Kohonen Self Organizing Neural Network
- Recurrent Neural Network(RNN) – Long Short Term1Memory
- Convolutional Neural Network
- Modular Neural Network

Conclusion:

- The computing world has a lot to gain from neural networks.
- Their ability to learn by example makes them very flexible and powerful
- They are also very well suited for real time systems
- Neural networks also contribute to other areas of research such as neurology andpsychology
- Finally, I would like to state that even though neural networks have a huge potential we will only get the best of them. when they are integrated with computing, AI, fuzzy logic and related subjects.

Thank You