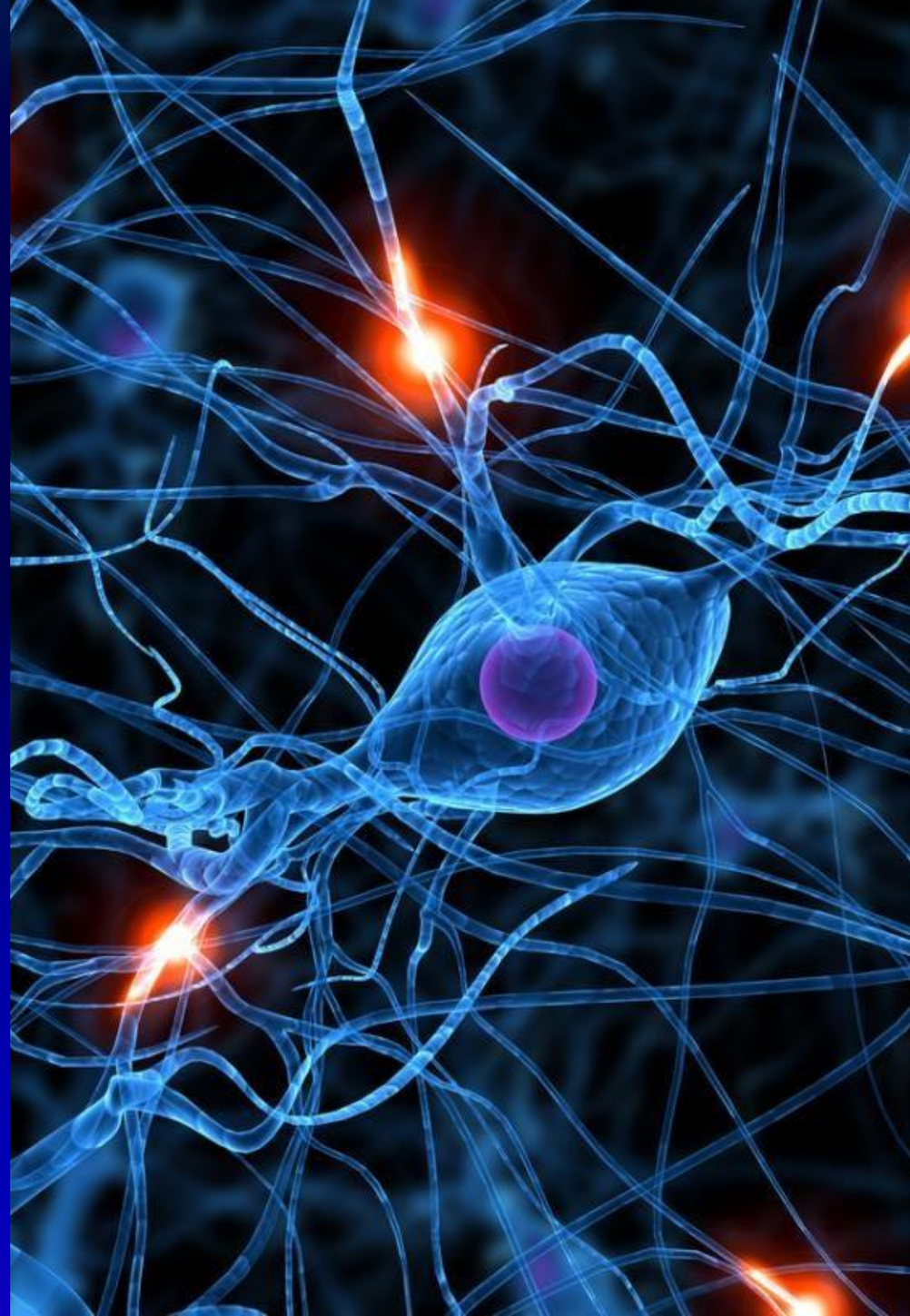
# DEEP LEARNING

Artificail Neural Networks

S.Djellouli

# WHAT IS DEEP LEARNING?



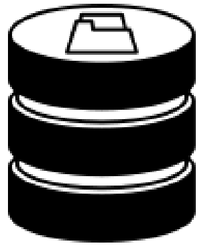
# DEEP LEARNING INVENTION

Deep learning along with neural networks they were around for quite some time , they only start to picking up now and impacting the world right now , but if we took a look in the 80 s even though they invented in the 70 s , it was a trand at the 80 s , everyone was expecting that neural networks will change the world .

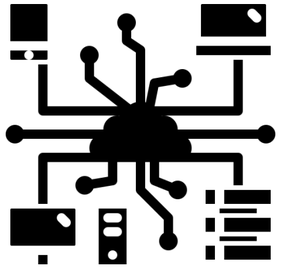
# BUT IT DIDNT CHANGE A THING !!

the raison is technology back than wasnot to the right standards.
in order to facilitate  deep learning we need two things

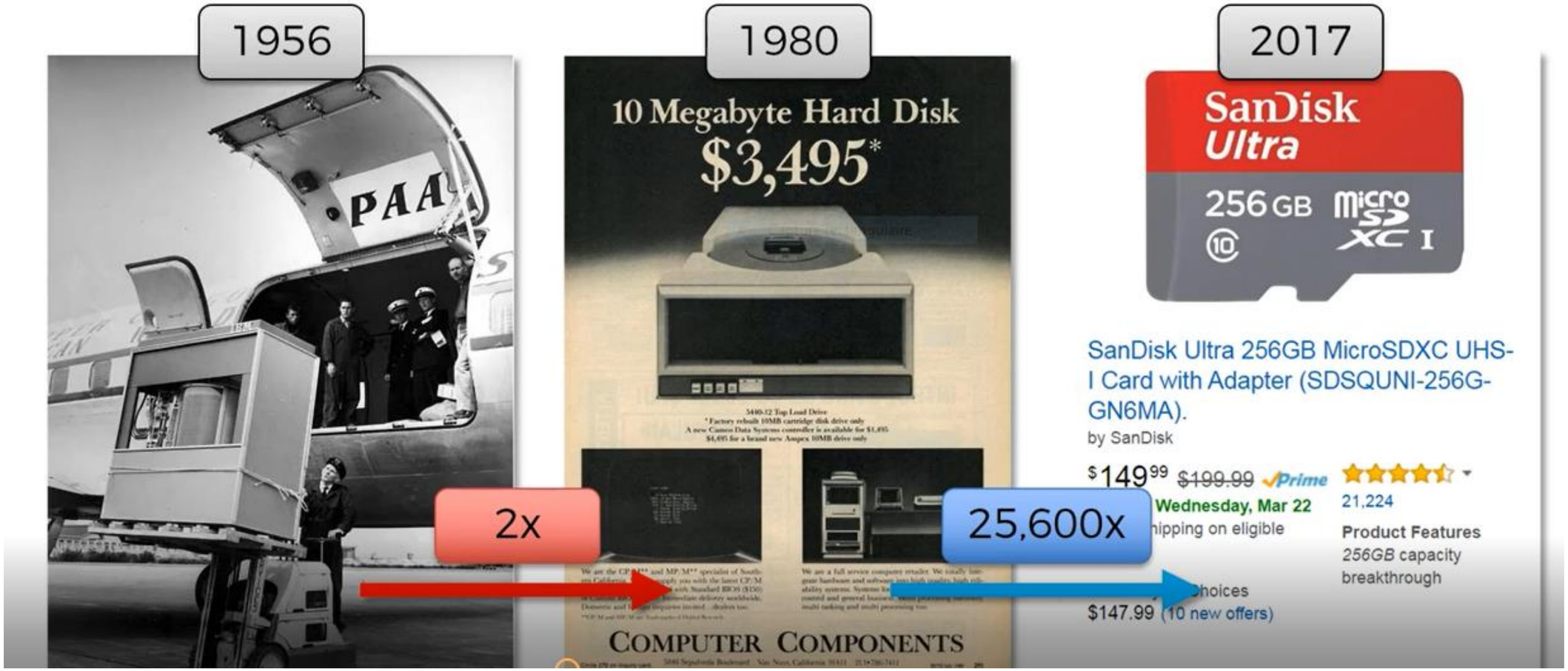
## A LOT OF DATA



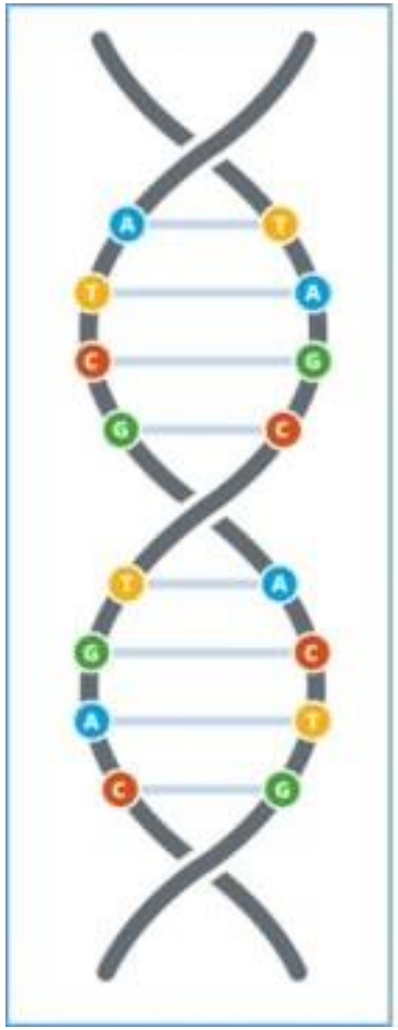
## PROCESSING POWER



# REVOLUTION OF DATA STORAGE



# THE POWER OF DNA



## STORAGE LIMITS

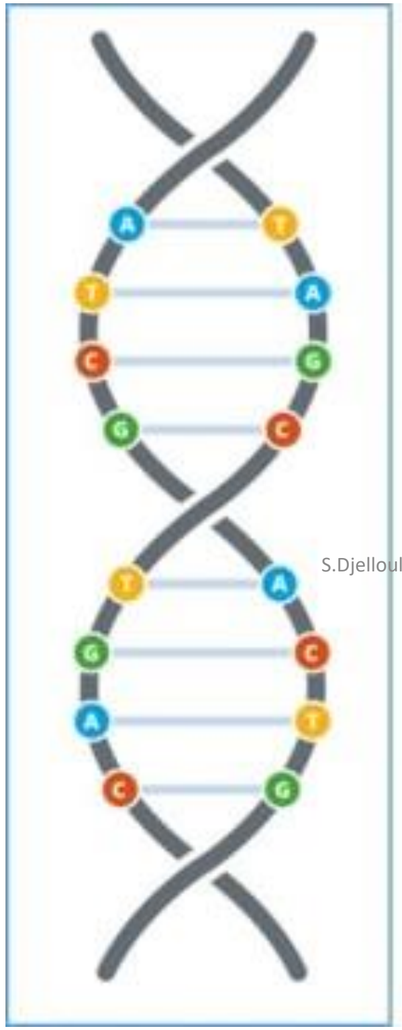
Estimates based on bacterial genetics suggest that digital DNA could one day rival or exceed today's storage technology.

| | Hard disk | Flash memory | Bacterial DNA |
|---|---|---|---|
| **Read–write speed** (μs per bit) | ~3,000–5,000 | ~100 | <100 |
| **Data retention** (years) | >10 | >10 | >100 |
| **Power usage** (watts per gigabyte) | ~0.04 | ~0.01–0.04 | $<10^{-10}$ |
| **Data density** (bits per $cm^3$) | $\sim10^{13}$ | $\sim10^{16}$ | $\sim10^{19}$ |

WEIGHT OF DNA NEEDED TO STORE WORLD'S DATA


©nature

# THE POWER OF DNA

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~1 kg

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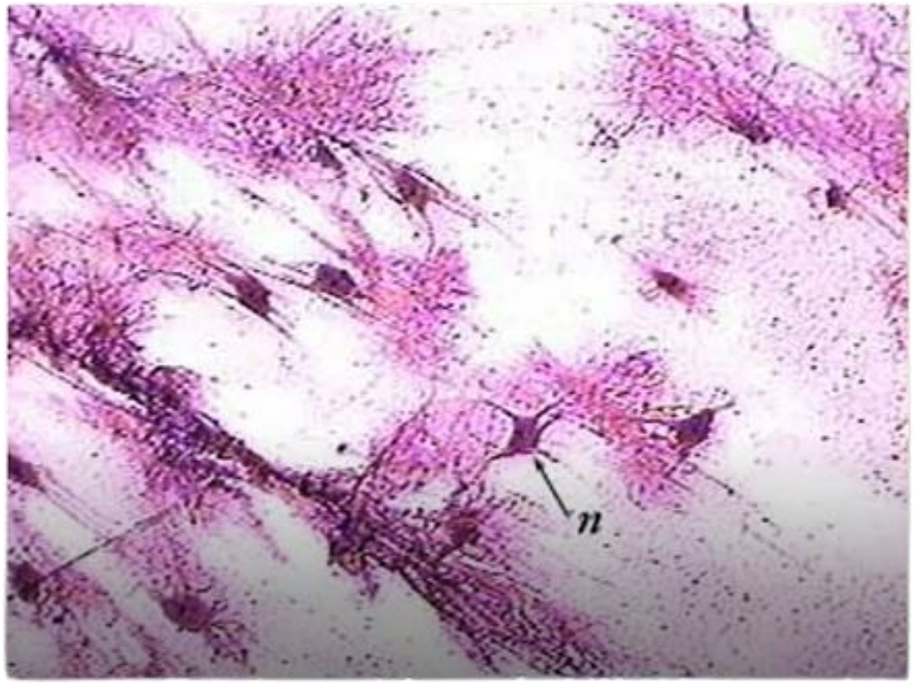
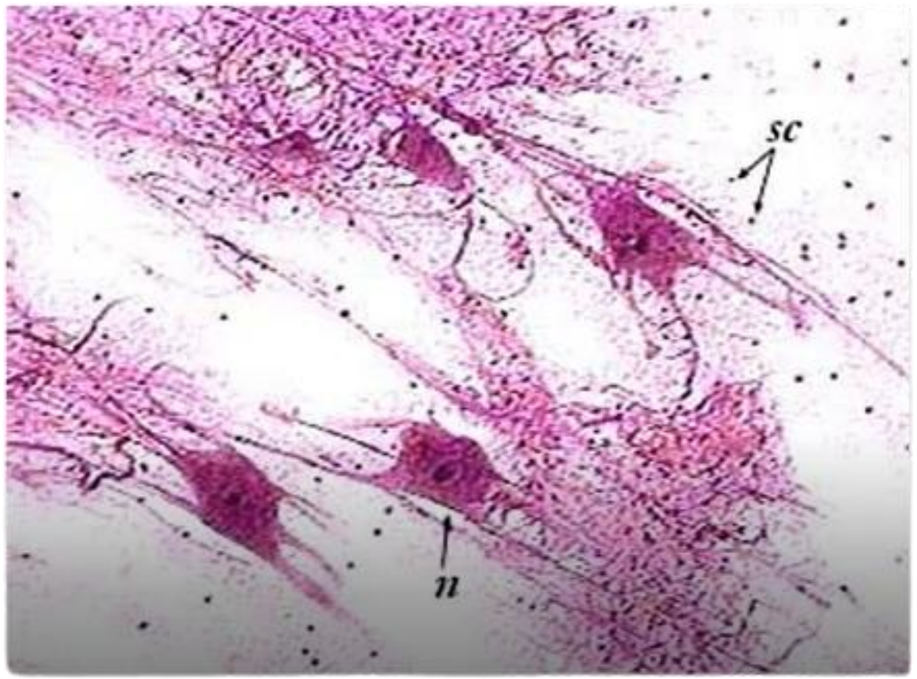
# SO LET US REPEAT OUR QUESTION !

# WHAT IS DEEP LEARNING ?

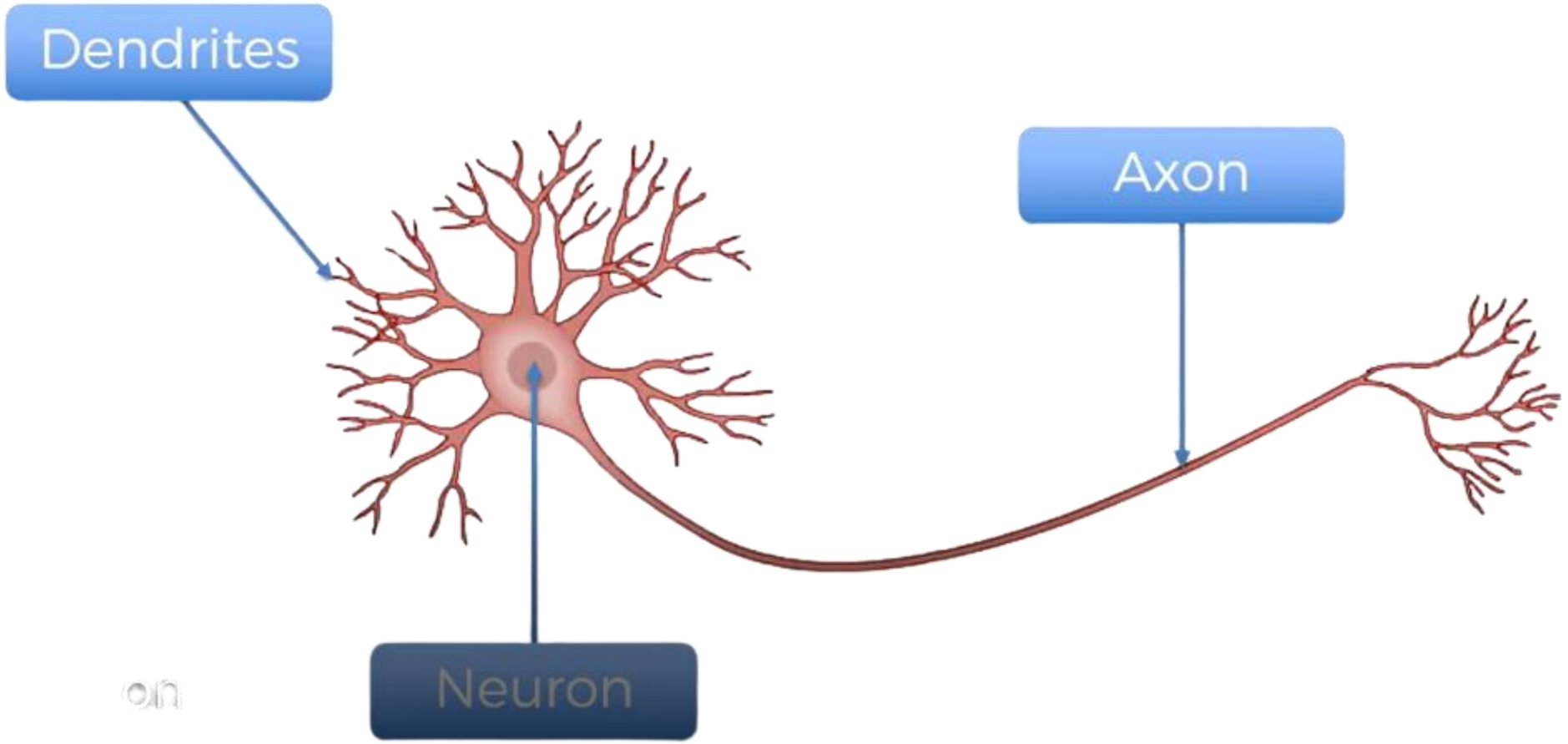
Deep learning mimic the human brain  how it operates .
the human brain contains billions of neurons they are connected to each other to inablee him to make descisions

# HUMAN NEURALS



# HUMAN NEURALS CLOSER LOOK

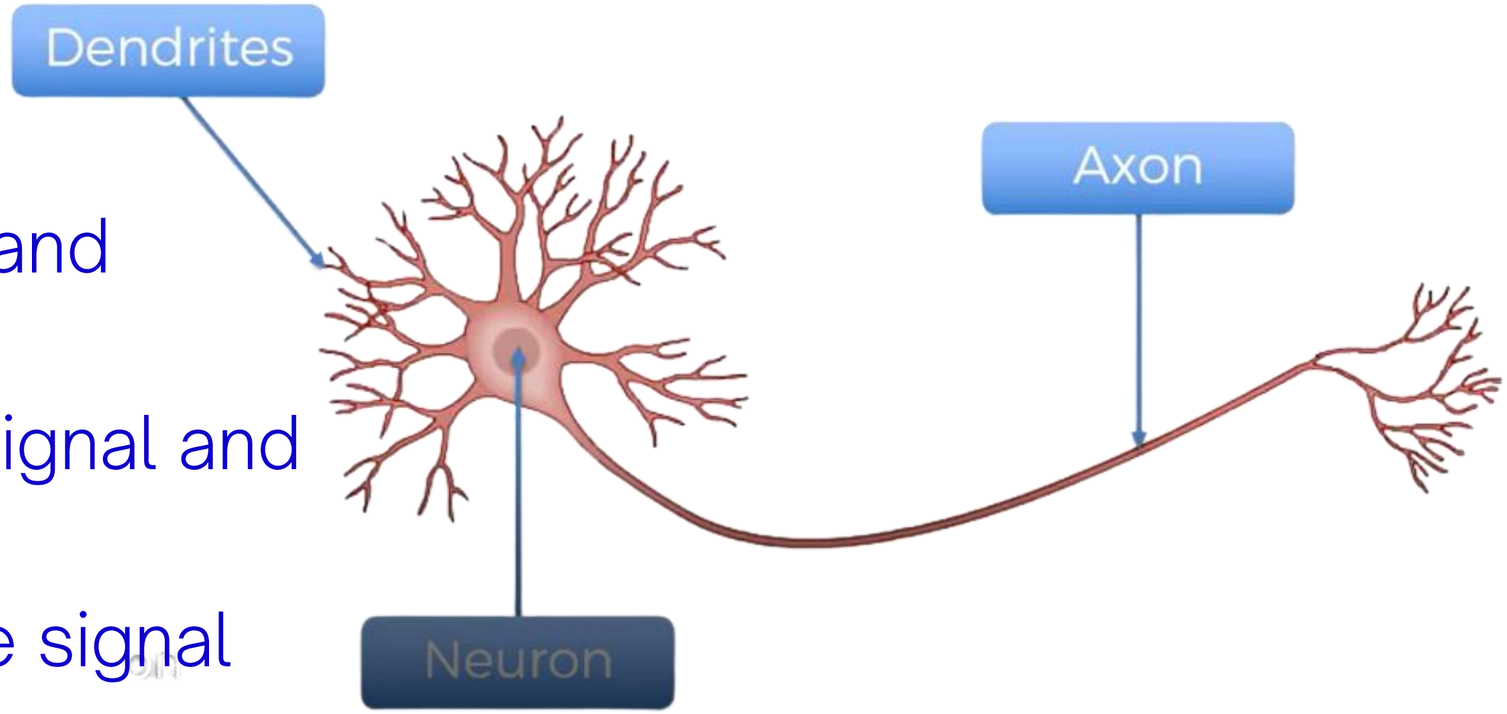


# HUMAN NEURALS CLOSER LOOK

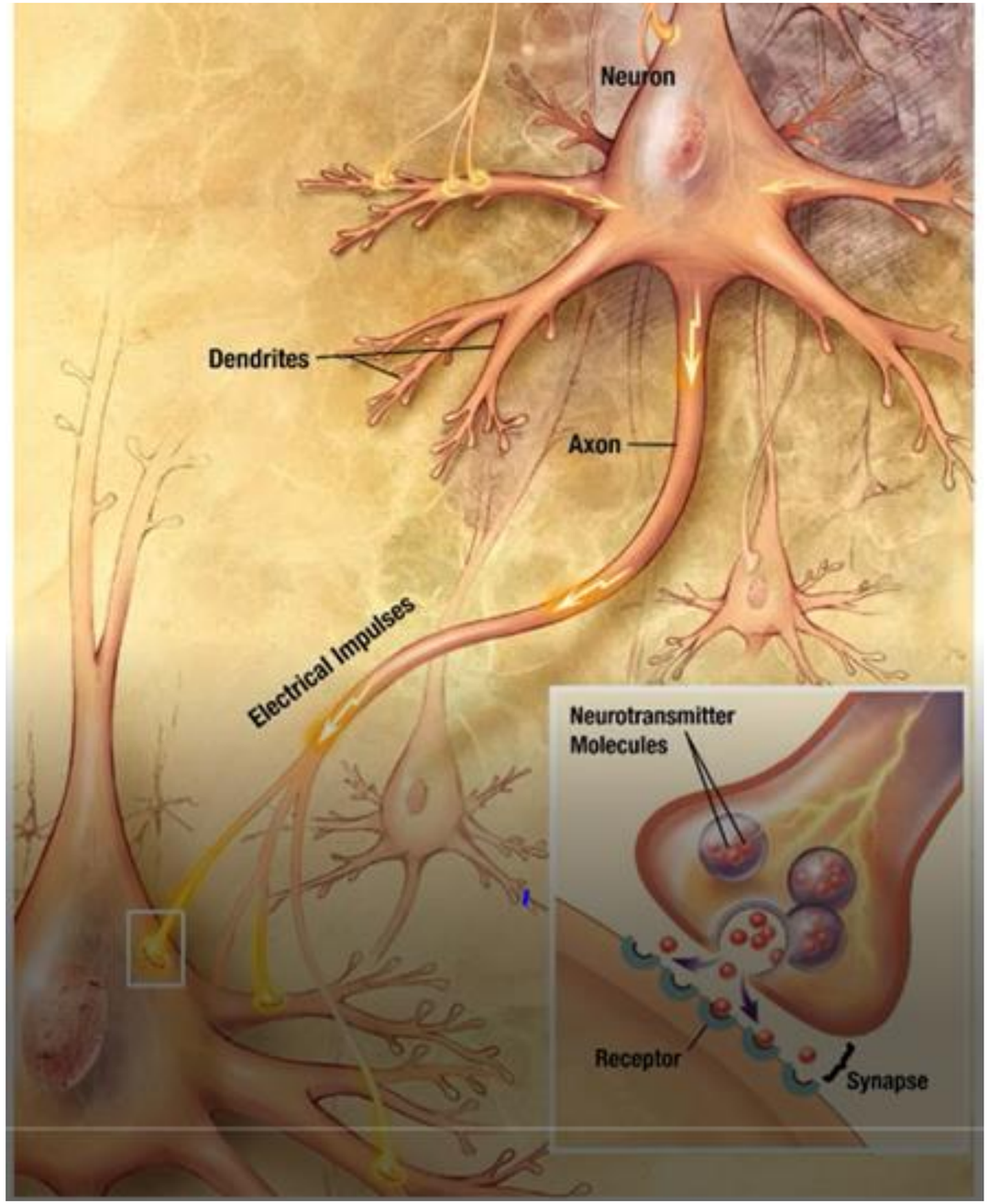
**Dendrites:** recieve data and signals

**Axon:** transmiter of the signal and data

**Neuron cell:** process the signal



here you can see the human neurals are connected with each other every neural is s connected to  many other neurals.



# HOW DO WE CREATE THE NEURAL NETWORKS IN COMPUTERS ?