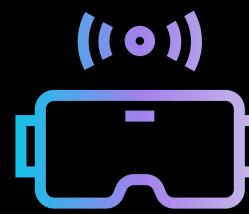


PRESENTATION

ARTIFICIAL NEURAL NETWORK VS BIOLOGICAL NEURAL NETWORK

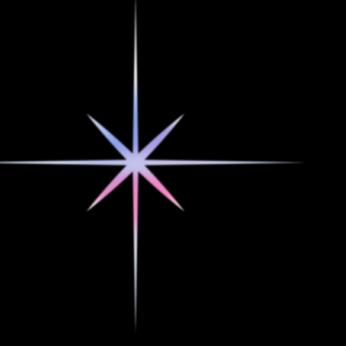
PRESENTED BY : TANNU CHAUDHARY
& LEKHA MAZUMDER





INTRODUCTION

- Both the human brain and artificial intelligence systems are designed to process information.
- Biological Neural Networks (BNNs) exist naturally in human and animal brains.
- Artificial Neural Networks (ANNs) are designed using computer algorithms inspired by the brain.
- This presentation compares BNNs and ANNs in terms of structure, function, learning, and applications.

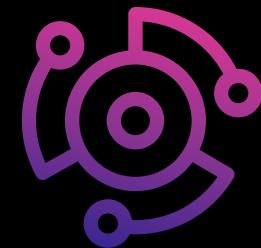




WHAT IS BIOLOGICAL NEURAL NETWOK ?



- A Biological Neural Network is a network of neurons in the human or animal brain.
 - It processes and transmits information using electrochemical signals.
 - Neurons communicate through synapses, where signals are passed from one neuron to another.
 - These networks are highly adaptive and can change based on learning and experience.
 - This ability to adapt is called neuroplasticity.
- 



WHAT IS AN ARTIFICIAL NEURAL NETWORK

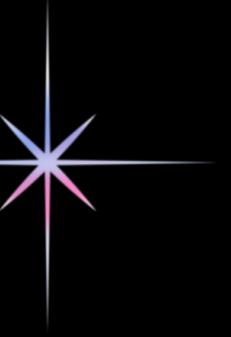


- An Artificial Neural Network is a machine learning model inspired by the human brain.
- It consists of artificial neurons (also called nodes) organized in layers: input, hidden, and output.
- Each neuron processes mathematical inputs and passes the output to the next layer.
- ANNs learn patterns from data using training algorithms like backpropagation.
- They are widely used in tasks like image recognition, speech processing, and predictive analytics.



COMPARISON

FEATURES	BIOLOGICAL NEURAL NETWORK	ARTIFICIAL NEURAL NETWORK
Neuron Type	Real neurons	Artificial nodes (mathematical units)
Signal transmission	Electrochemical signals	Numerical values
Learning Method	Synaptic plasticity	Algorithm-based (e.g backpropagation)
Energy Efficiency	Highly efficient	Requires more computing power
Adaptability	Very high (lifelong learning)	Limited to training data



SIMILARITIES

- Both are networks of interconnected units (neurons or nodes).
- Both are capable of processing information.
- Both use a layered structure to transmit data.
- Both learn from input and improve performance over time.
- ANNs are inspired by the structure and function of BNNs.



DIFFERENCES

ORIGIN:

BNN: EXISTS NATURALLY IN LIVING BEINGS.

- ANN: DESIGNED BY HUMANS USING ALGORITHMS.

COMMUNICATION:

- BNN: Uses chemical and electrical signals.
- ANN: Uses numbers and mathematical functions.

LEARNING:

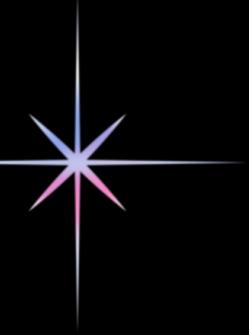
- BNN: Learns from real experiences.
- ANN: Learns from data through training.

ADAPTABILITY:

- BNN: Highly flexible and self-repairing.
- ANN: Limited by training data and model design.

ENERGY:

- BNN: Very energy-efficient.
- ANN: Requires high computational power.



APPLICATIONS OF NEURAL NETWORK



BIOLOGICAL NEURAL NETWORK

- Human thinking and memory
- Reflexes and motor control
- Learning and emotional responses



ARTIFICIAL NEURAL NETWORK

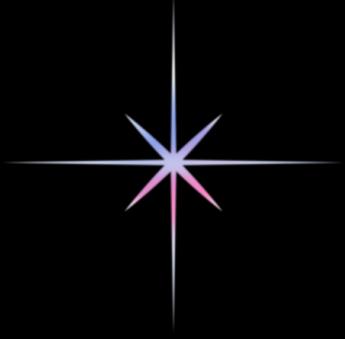
- Face and speech recognition
- Autonomous vehicles (self-driving cars)
- Virtual assistants and chatbots
- Disease diagnosis (e.g., cancer detection)





CONCLUSION

- Biological and Artificial Neural Networks both process and learn from data.
- ANNs are inspired by the functioning of BNNs.
- While BNNs are more adaptive and efficient, ANNs excel at specific tasks with large datasets.
- The future of AI lies in combining the strengths of both systems for better intelligence.





THANK YOU!