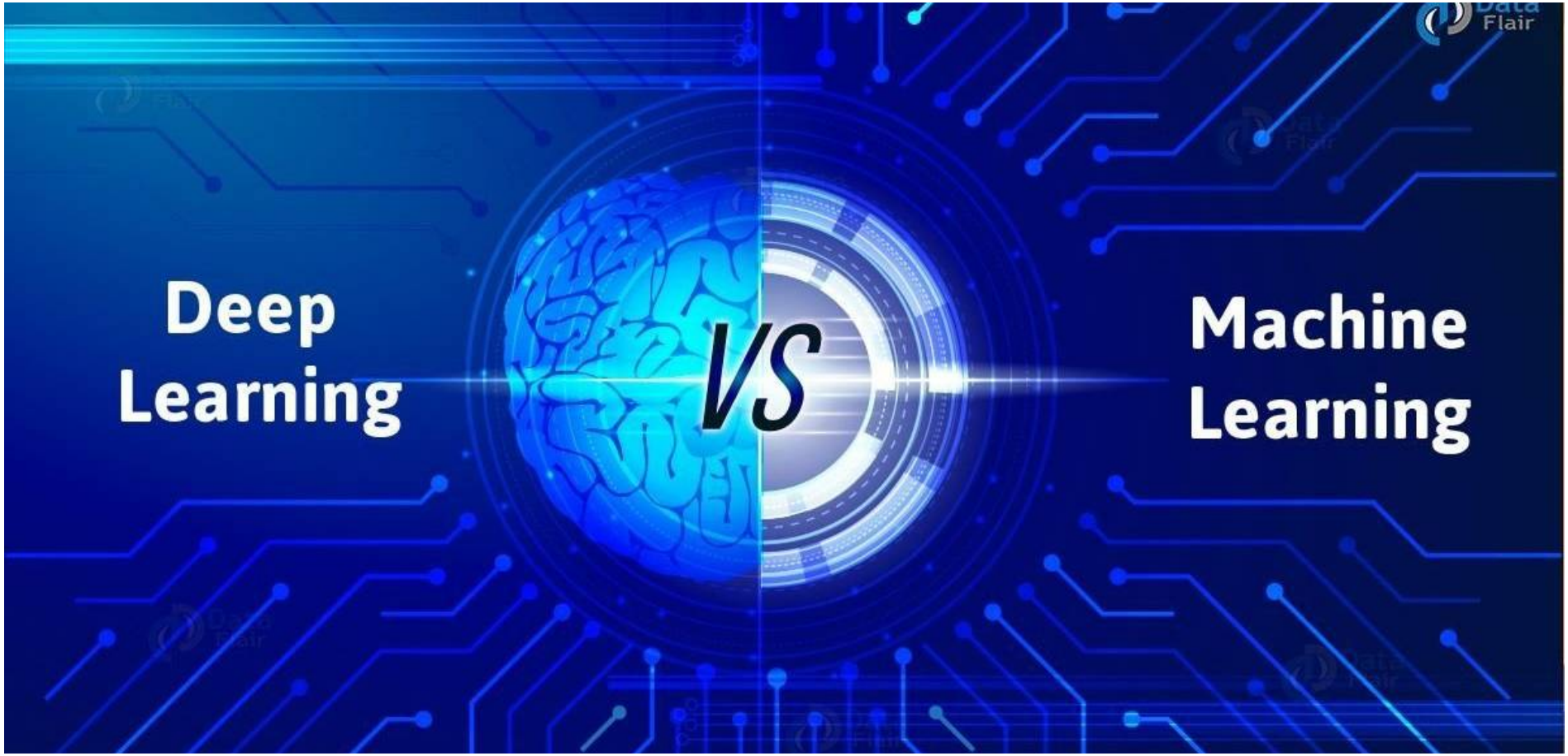
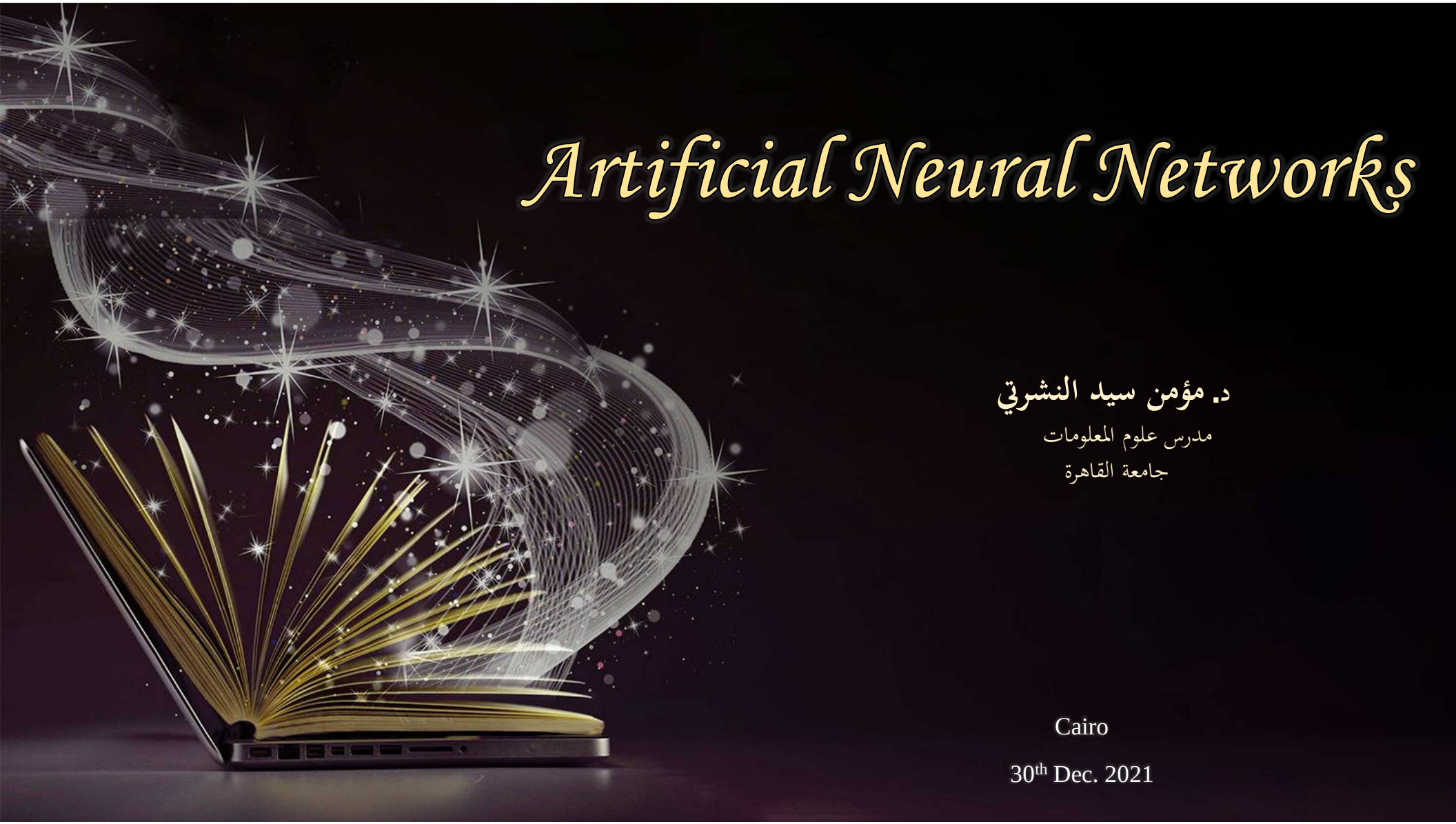

Deep
Learning
VS
Machine
Learning



Artificial Neural Networks

د. مؤمن سيد النشرتي

مدرس علوم المعلومات

جامعة القاهرة

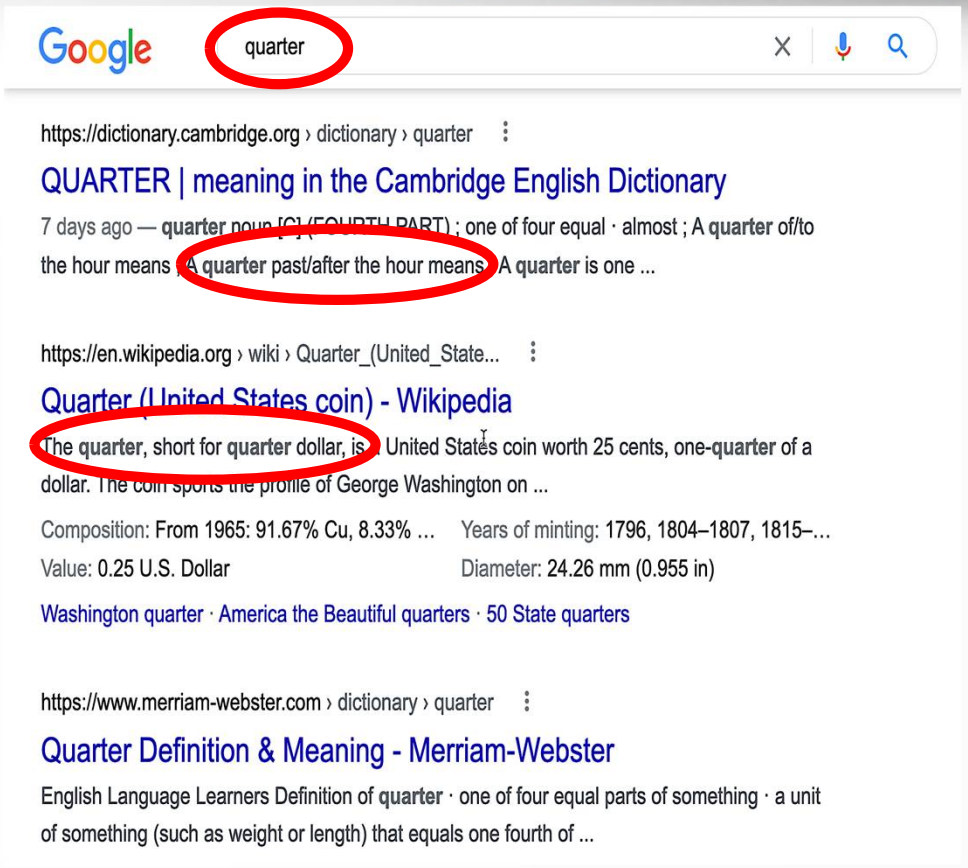
Cairo

30th Dec. 2021

One of The Greatest Problems Faced Content Processing Is !!!

Homographs !!!

Homographs in Retrieval



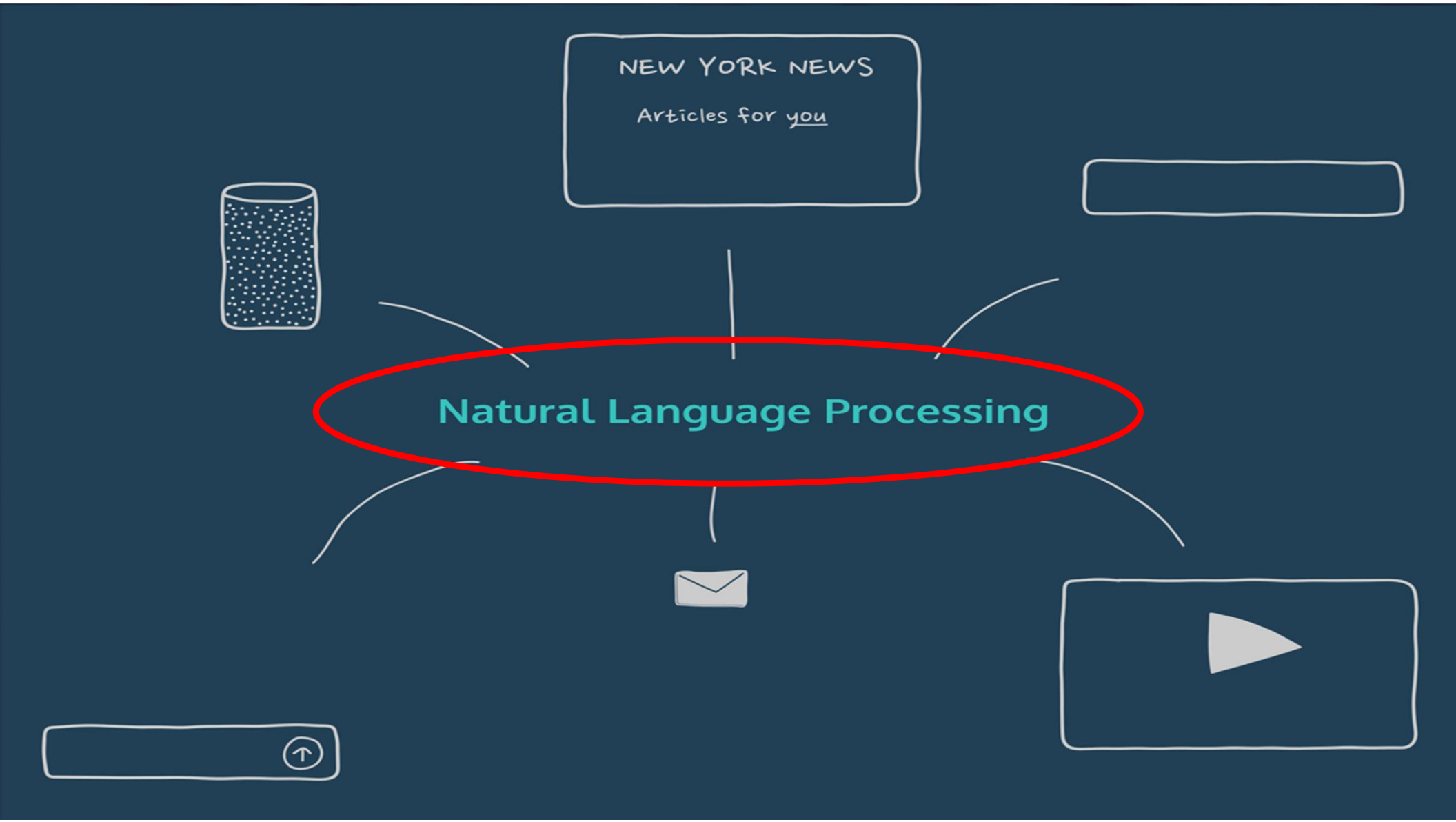
The Question is:

How Can a Machine Understand the Meaning of Words?

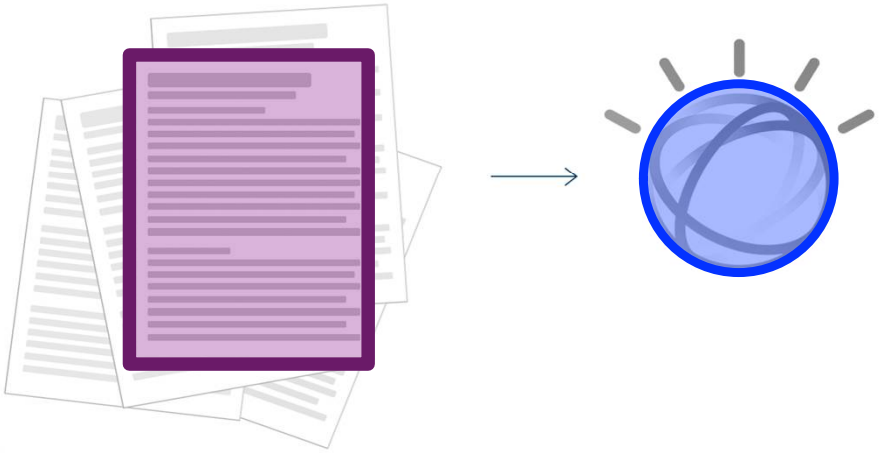
The Answer is:

by

NLP Techniques


NEW YORK NEWS
Articles for you
Natural Language Processing

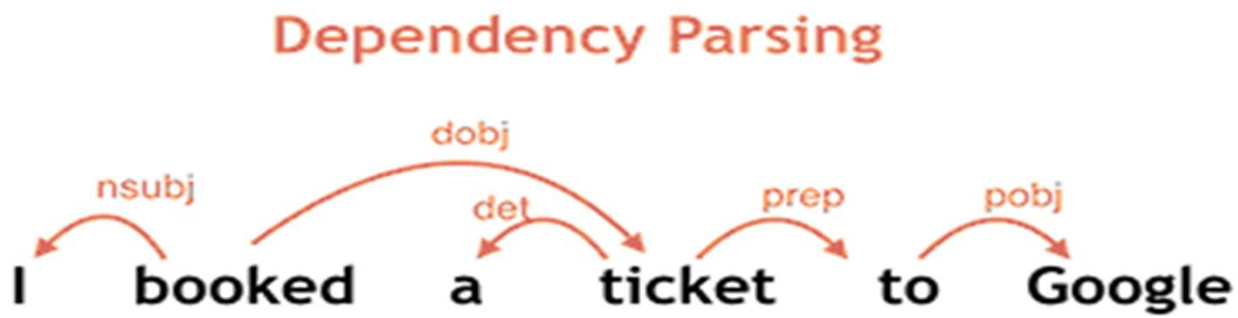
NLP for Documents Processing



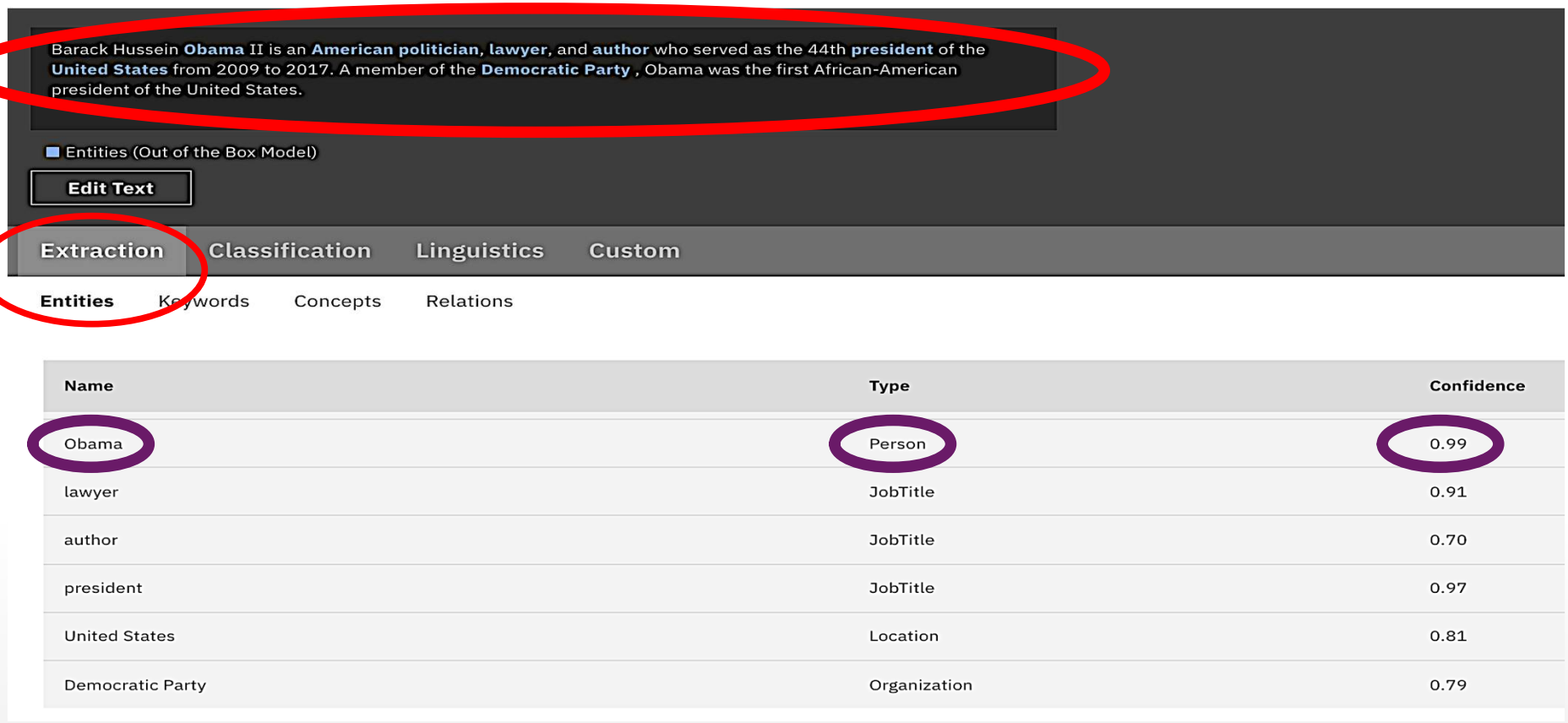
By Extracting:

- **Entites.**
- **Keywords.**
- **Concepts.**
- **Other LS.**

NLP for Resouces Indexing



Let's Try !



Name	Type	Confidence
Obama	Person	0.99
lawyer	JobTitle	0.91
author	JobTitle	0.70
president	JobTitle	0.97
United States	Location	0.81
Democratic Party	Organization	0.79

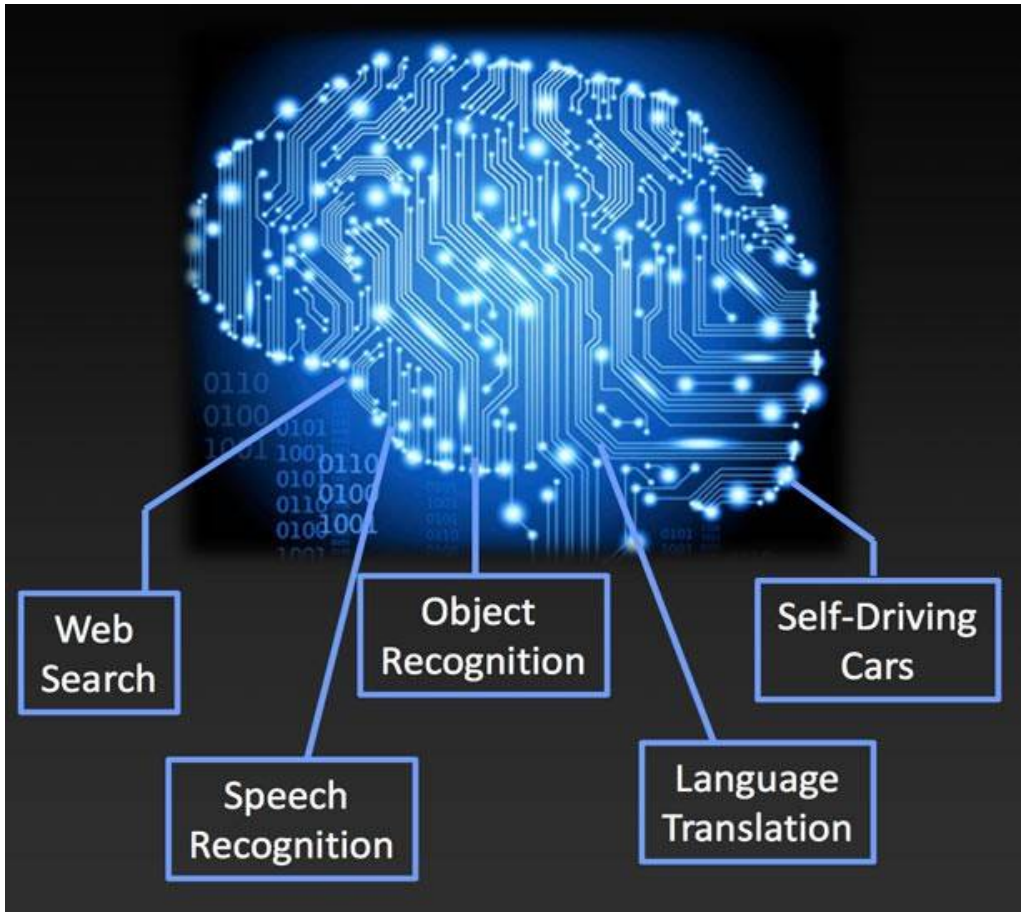
Now

How Can to Machine Do That's?

The Answer is:
by

Artificial Neural Networks

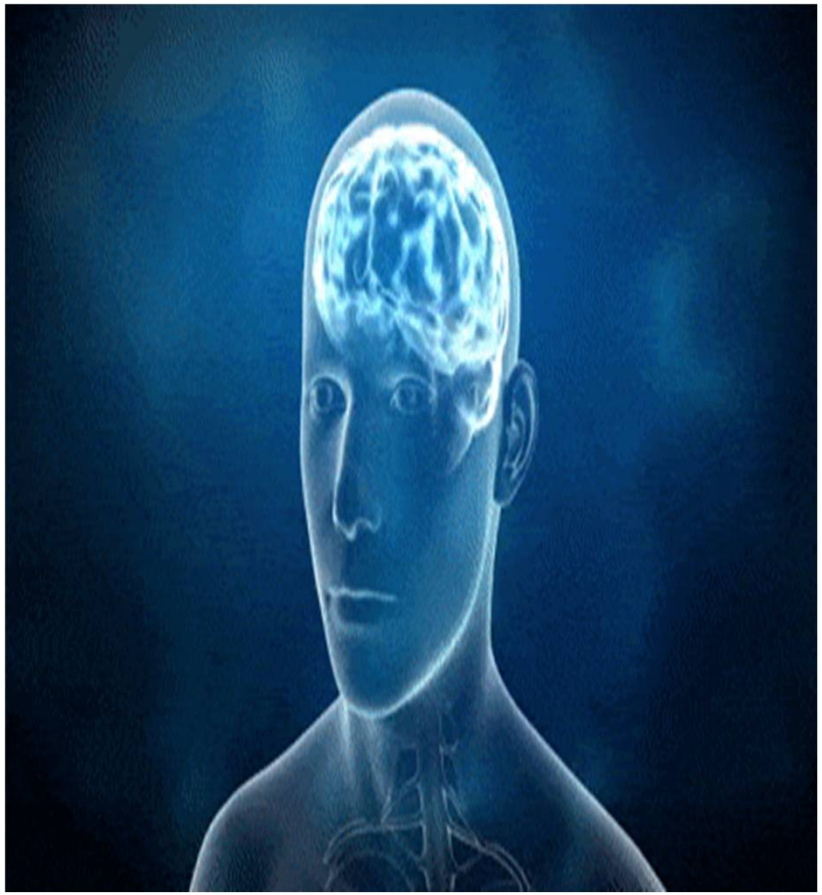
To Understand How Artificial Neural Networks Works You Should First Realize the Biological Neural Networks !



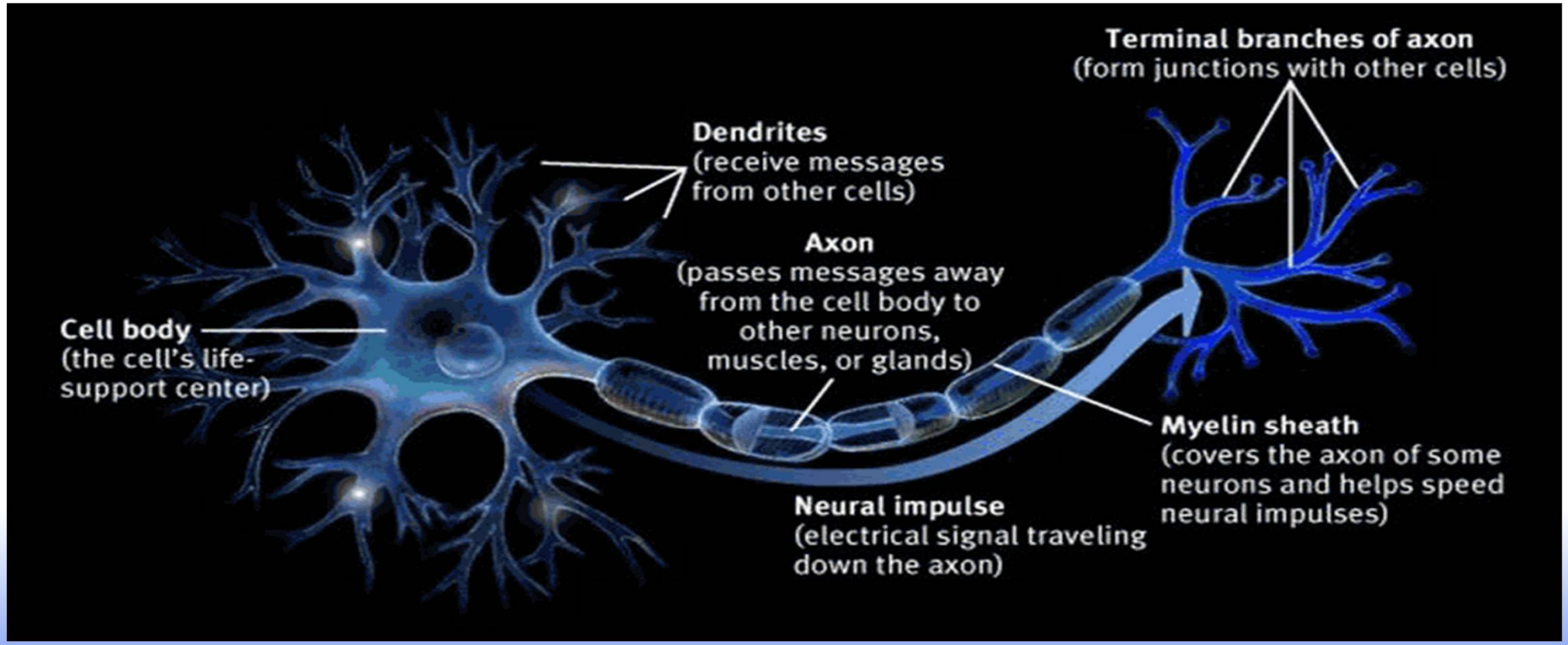
BNN

- ***The Brain is a Highly Complex, Non-linear, Parallel Information Processing System.***

- ***It Performs Tasks Like Pattern Recognition, Perception, Motor Control, Many Times Faster than the Fastest Digital Computers.***



BNN


Terminal branches of axon
(form junctions with other cells)
Dendrites
(receive messages
from other cells)
Axon
(passes messages away
from the cell body to
other neurons,
muscles, or glands)
Cell body
(the cell's life-
support center)
Myelin sheath
(covers the axon of some
neurons and helps speed
neural impulses)
Neural impulse
(electrical signal traveling
down the axon)

BNN

Neuron	*A cell of the brain and nervous system, responsible for sending signals to other cells.*
Dendrite:	*A neuron extension, which receives stimuli and transmits signals to the other neurons.*
Axon	*A long, thin structure responsible for the generation and processing of the signal in the neuron.*
Synapse	*Communication point, in which sending neurons transmit the message to receiving neurons.*
Weight	*A special tool, which enables modification of the signal.*

Who's The God Fathers of ANN?

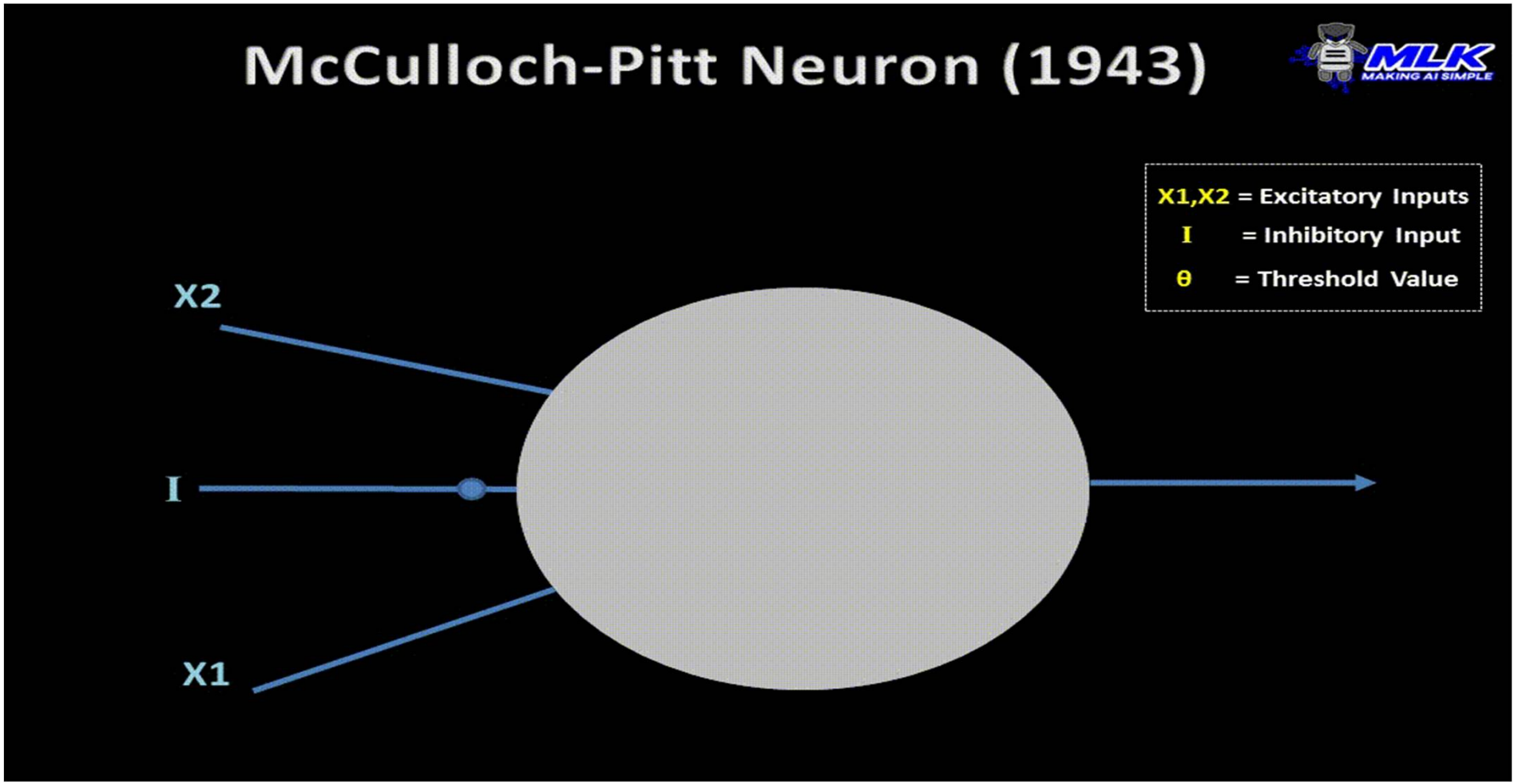
Warren Sturgis McCulloch

(1898 – 1969)

Walter Harry Pitts, Jr.

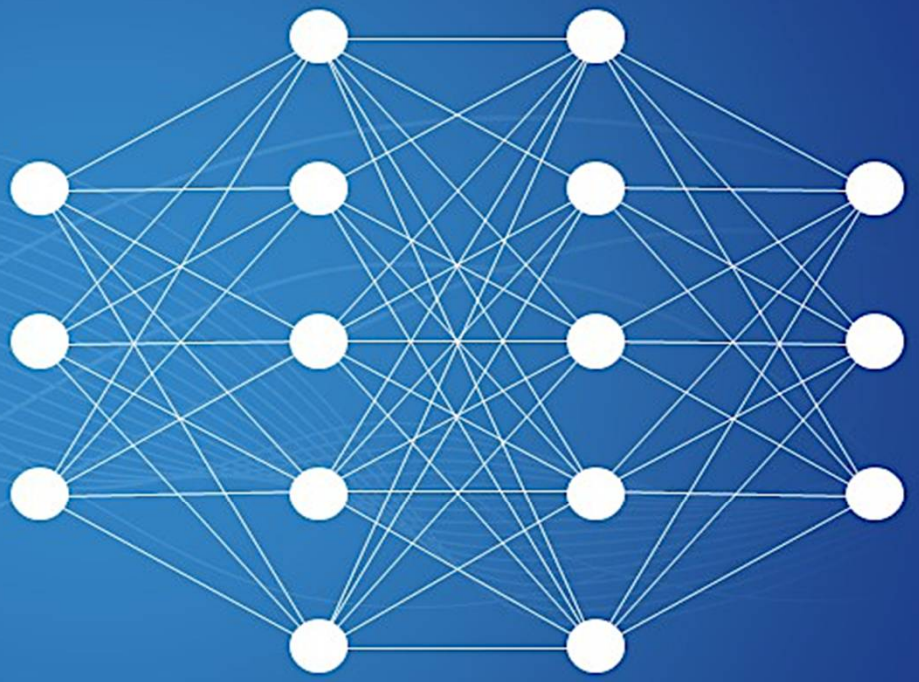
(1923 – 1969)

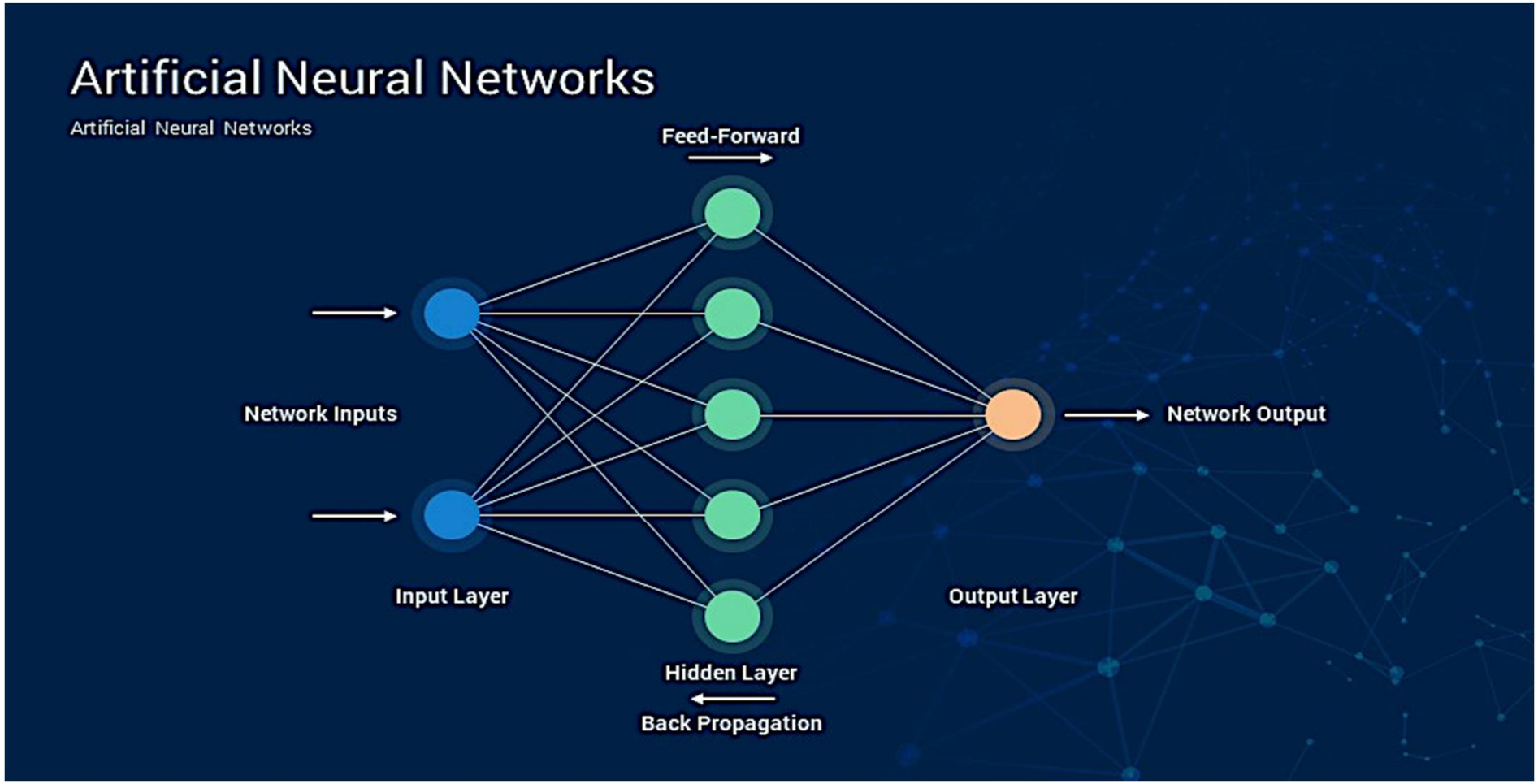
McCulloch-Pitt Neuron (1943)



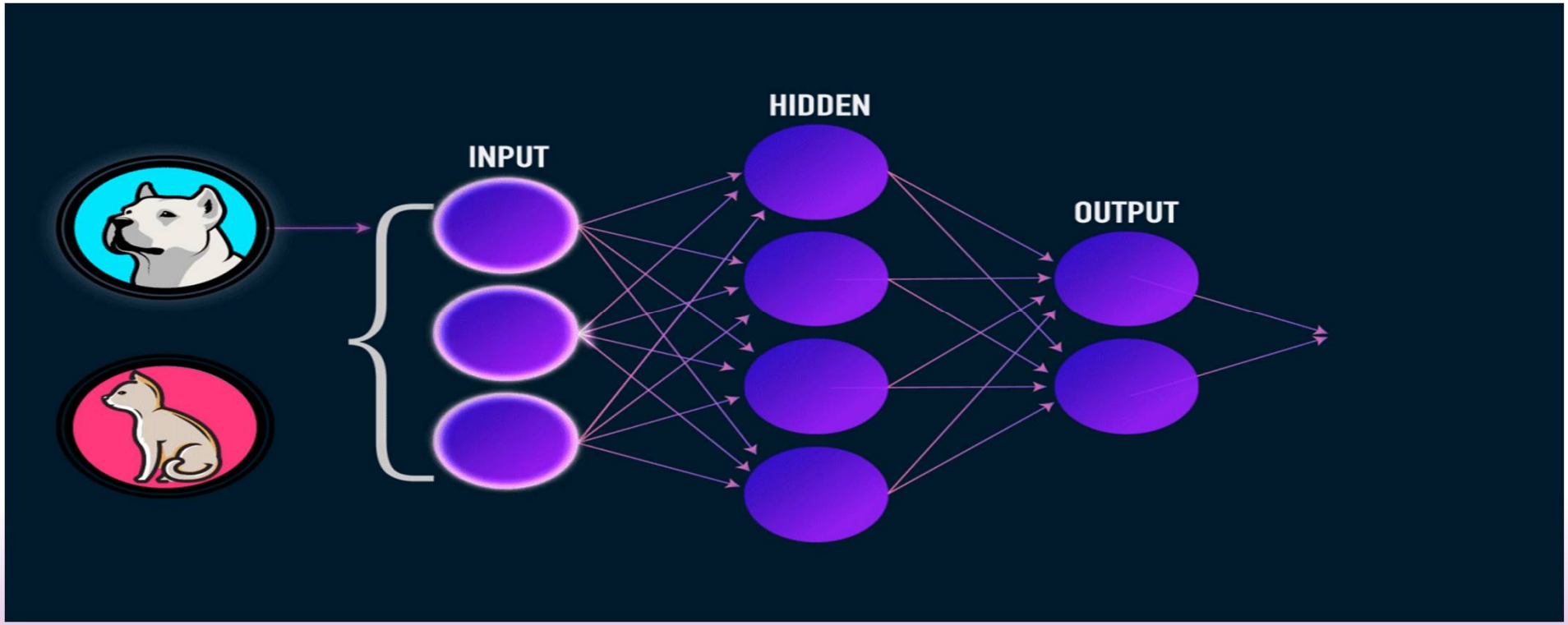
What is Artificial Neural Networks?

A neural network is a group of connected I/O units where each connection has a weight associated with its computer programs. It helps you to build predictive models from large databases. This model builds upon the human nervous system. It helps you to conduct image understanding, human learning, computer speech, etc.

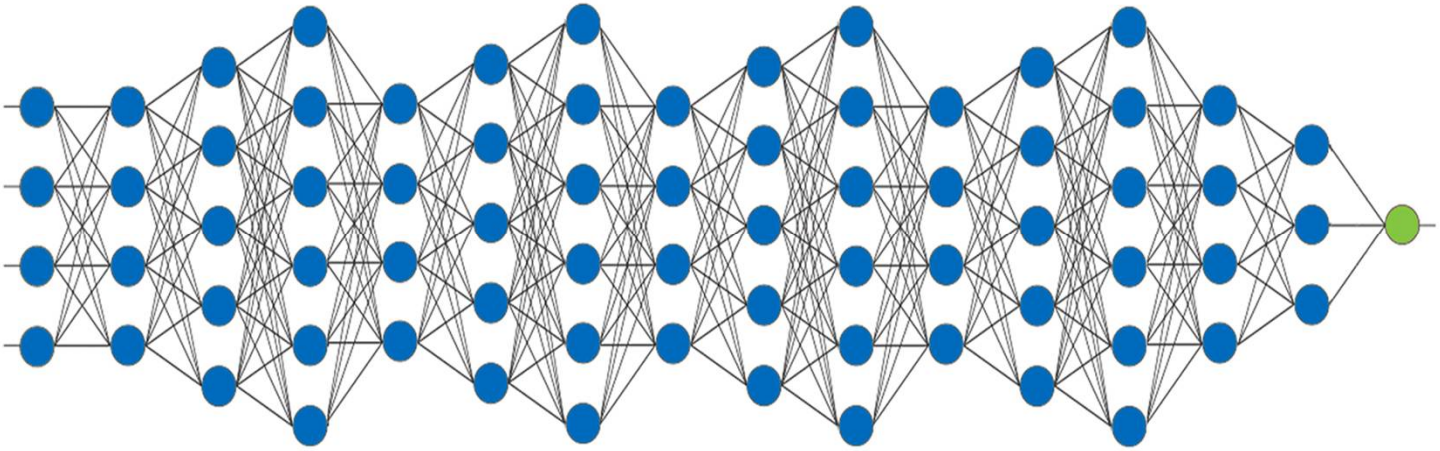



Artificial Neural Networks
Artificial Neural Networks
Feed-Forward
Network Inputs
Network Output
Input Layer
Output Layer
Hidden Layer
Back Propagation

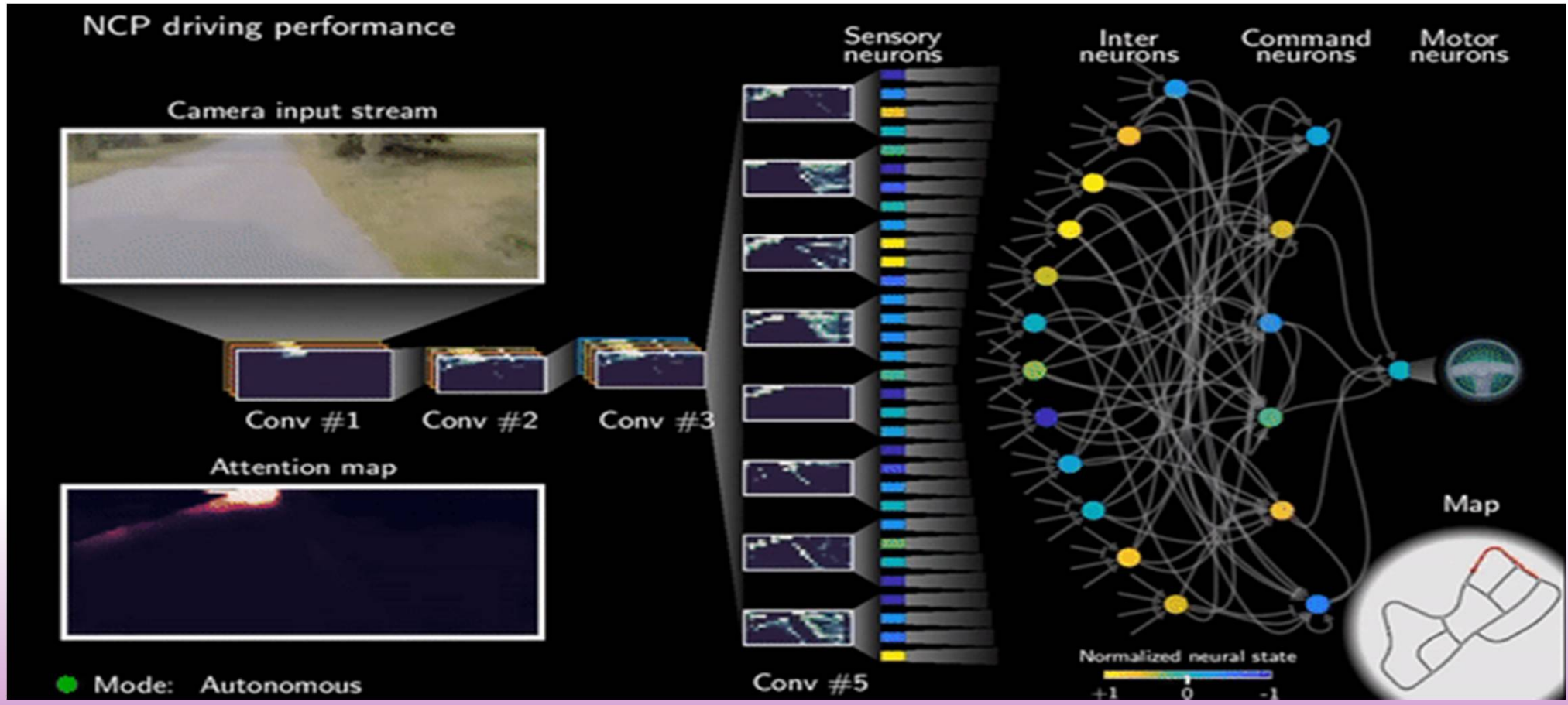
Simple Hidden Layer



Multiple Hidden Layers

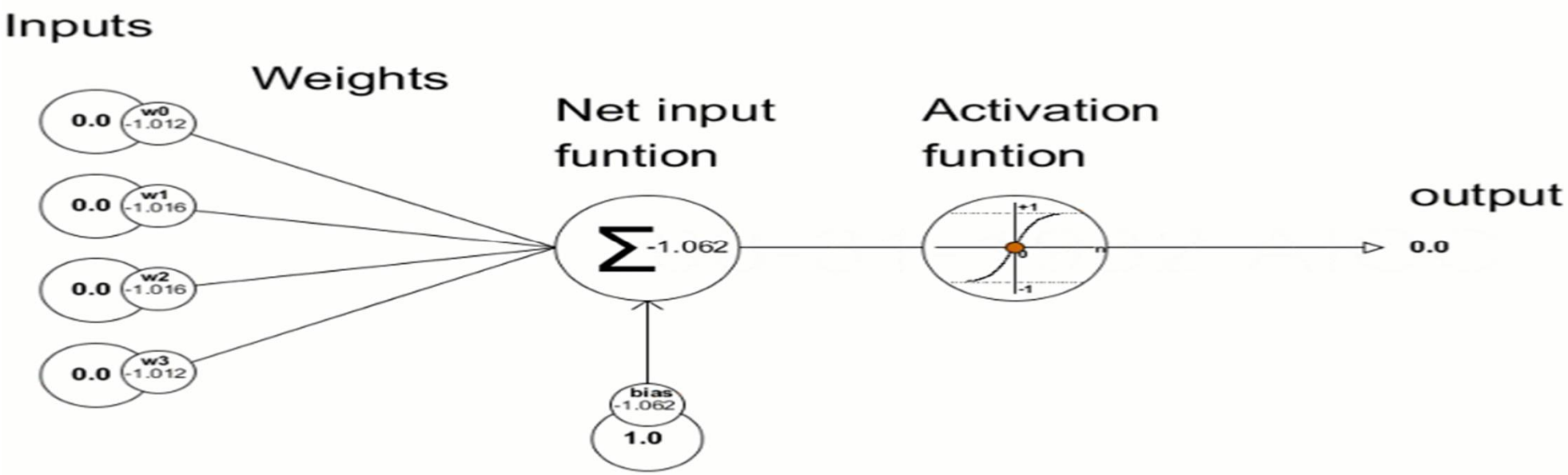


Complicated Hidden Layers



What's Going on Inside It?

To Make an Artificial Neural Network, We Need to Use the Most Universal Language Mathematics.



ANN In Libraries in 1996 !

NEURAL NETWORKS IN LIBRARIES: the Poten- tial of a New Information Technology

Tamas E. Doszkocs

National Library of Medicine
Bethesda, Maryland, USA

Keywords: Artificial Neural Networks, Connectionist Models, Parallel Distri- buted Processing, Intelligent Information Retrieval, Associative Processing, Machine Learning, Library and Information Technologies.

Abstract: Conventional library applications, including information retrieval, data-base management, expert systems and multimedia, follow the von Neumann model of computing1 in which sequentially executed computer programs (algorithms) operate on passive (symbolic) data in a predetermined way. Artificial Neural Networks (ANN) were born out of the difficulties in programming von Neumann computers to perform with human-like intelligence. Artificial Neural Networks represent a fundamentally different information processing paradigm better suited for the handling of perceptual and cognitive tasks that are routinely and efficiently performed by humans, yet have proved to be difficult or impossible to handle via traditional computing methods and technologies. Examples of such tasks involve associative information storage and recall, pattern recognition, common sense reasoning and learning. This paper will describe the potential of artificial neural network technology for self-organizing and adaptive information representation and retrieval, offering new and complementary capabilities for dynamic information categorization, generalization, classification, feature extraction and learning. Existing and potential neural network applications in cataloging, indexing and online searching in libraries will be discussed.

1. Introduction

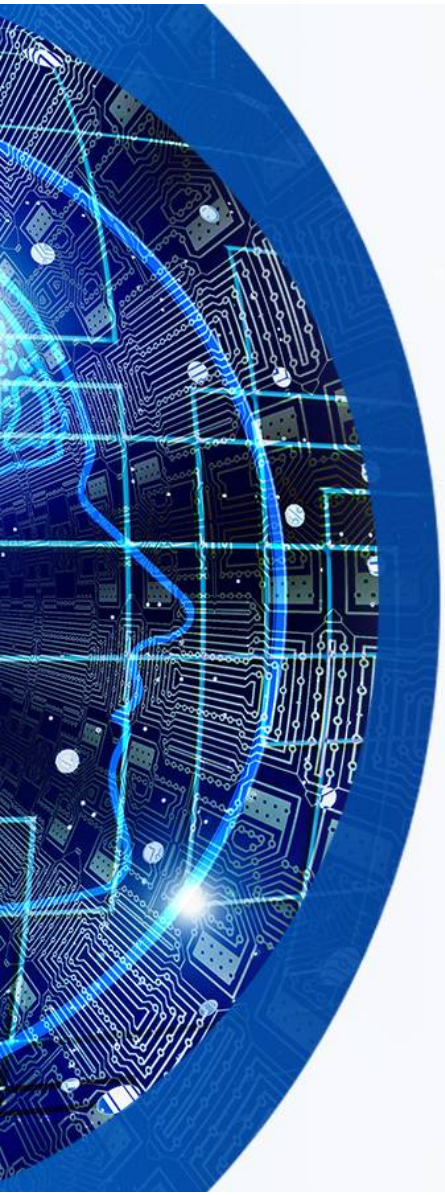
Historically, even the most imaginative library automation efforts have suffered from the fundamental limitation of traditional information processing approaches, namely their inability to manifest human-like behavior, such as learning, intelligence, adaptation and self-improve-

ment over time in response to changes in and interaction with their environment.

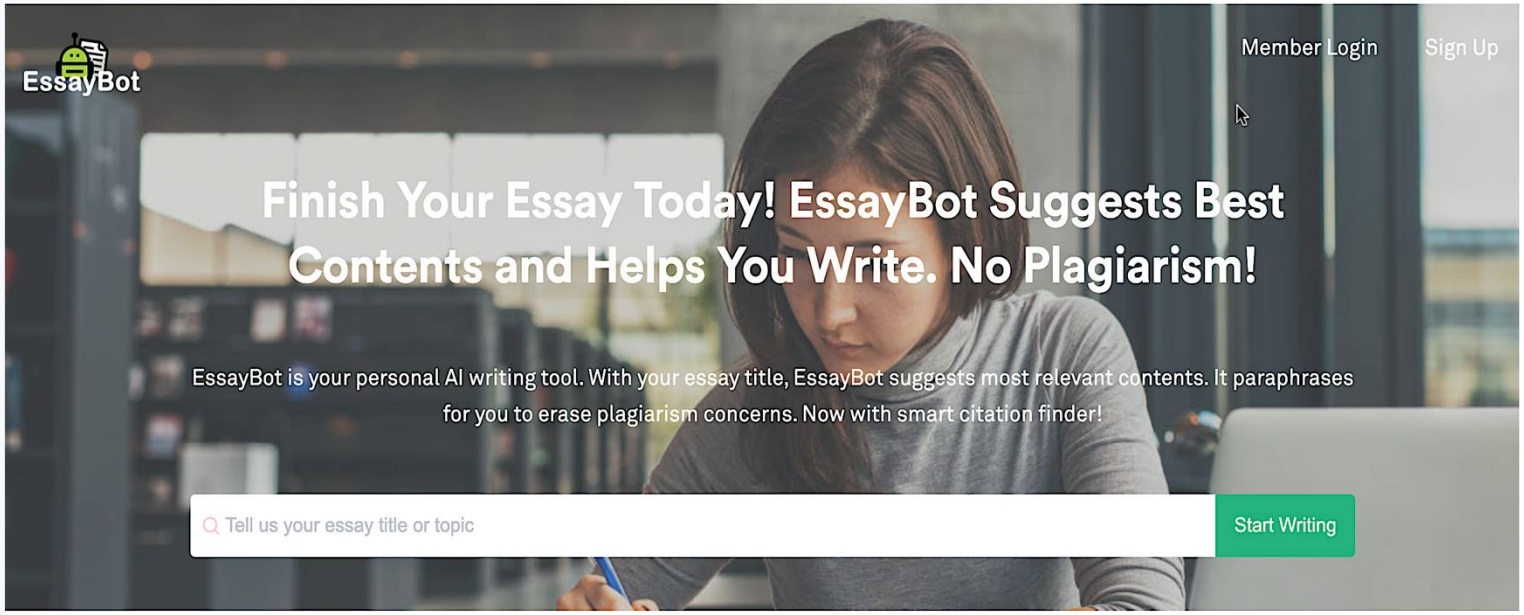
From the earliest days of computing, many researchers, from computer scientists and neurophysiologists to librarians and philosophers, have been interested in creating computers that mimic human behavior and excellence in handling perceptual and cognitive tasks that are easily accomplished by people, including young children, yet are handled clumsily, if at all, by conventional computing techniques. Familiar examples include recognizing faces, learning one's native tongue or a foreign language, and recalling complete information from fragmen-tary clues. Such basic capabilities have been the goal of artificial neural networks, also known as "connectionist models," and "parallel distributed processing".

In a 1990 survey, (Doszkocs, Reggia, & Lin, 1990) described emerging R & D applica-tions of neural network technology in library settings.

2. ARTIFICIAL neural networks



Knowledge Creation



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Any Questions!?