

# Deep Learning

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# Introduction

- ❑ **Deep learning** is an **artificial intelligence (AI)** technology that trains computers to analyze data in a manner similar to that of the human brain.
- ❑ **Deep learning** models are capable of recognizing complex patterns in images, text, sounds, and other data in order to generate accurate insights and predictions.



# Motivation

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Diagnosis



Segmentation



Exploring



# Diagnosis

Deep learning algorithms are particularly well-suited for medical diagnosis jobs because they can learn to extract significant features from enormous datasets without explicit programming. Deep learning systems, for example, can learn to identify abnormalities in X-rays or MRIs by evaluating hundreds of images and identifying patterns that suggest sickness.





# Segmentation

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- § Deep learning-based segmentation approaches have gained traction in recent years, particularly in medical imaging applications. Typically, these methods require training a neural network to recognize and segment specific structures or features in an image.
- § Segmentation is the process of identifying and isolating various items or structures within an image or video.

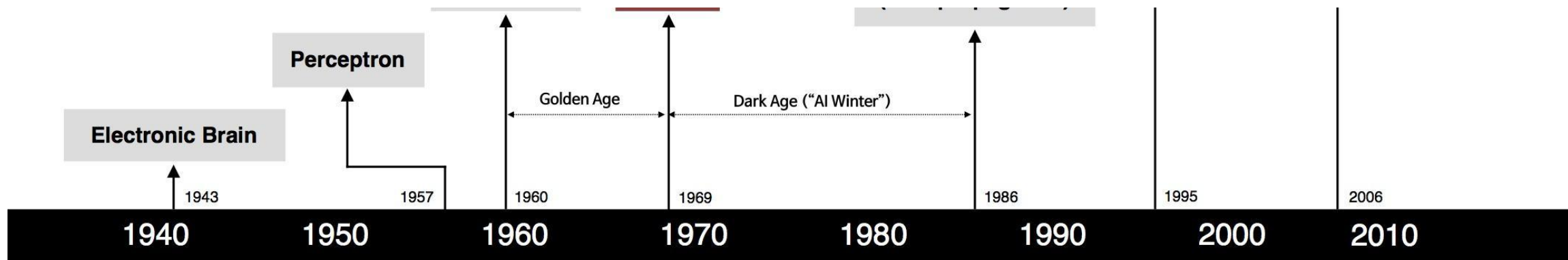




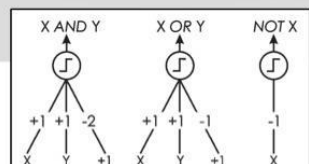
# Exploring

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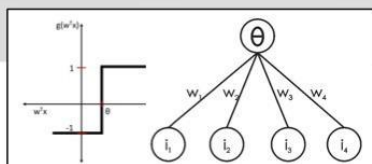
- Deep learning exploration is the process of evaluating and comprehending the behavior and performance of deep learning models. This process entails assessing the model's strengths, shortcomings, and limits, as well as identifying areas for development.
- Visualization techniques, performance indicators, and explainability tools are among the tools and strategies available for analyzing deep learning models.



S. McCulloch - W. Pitts



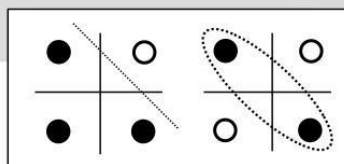
F. Rosenblatt



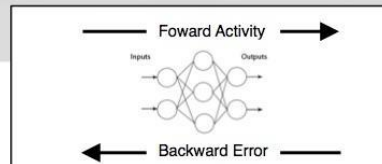
B. Widrow - M. Hoff



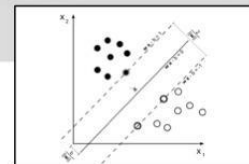
M. Minsky - S. Papert



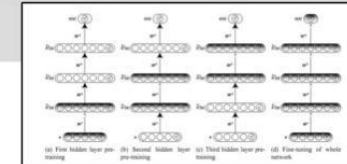
D. Rumelhart - G. Hinton - R. Williams



V. Vapnik - C. Cortes



G. Hinton - S. Ruslan



# History of Deep Learning

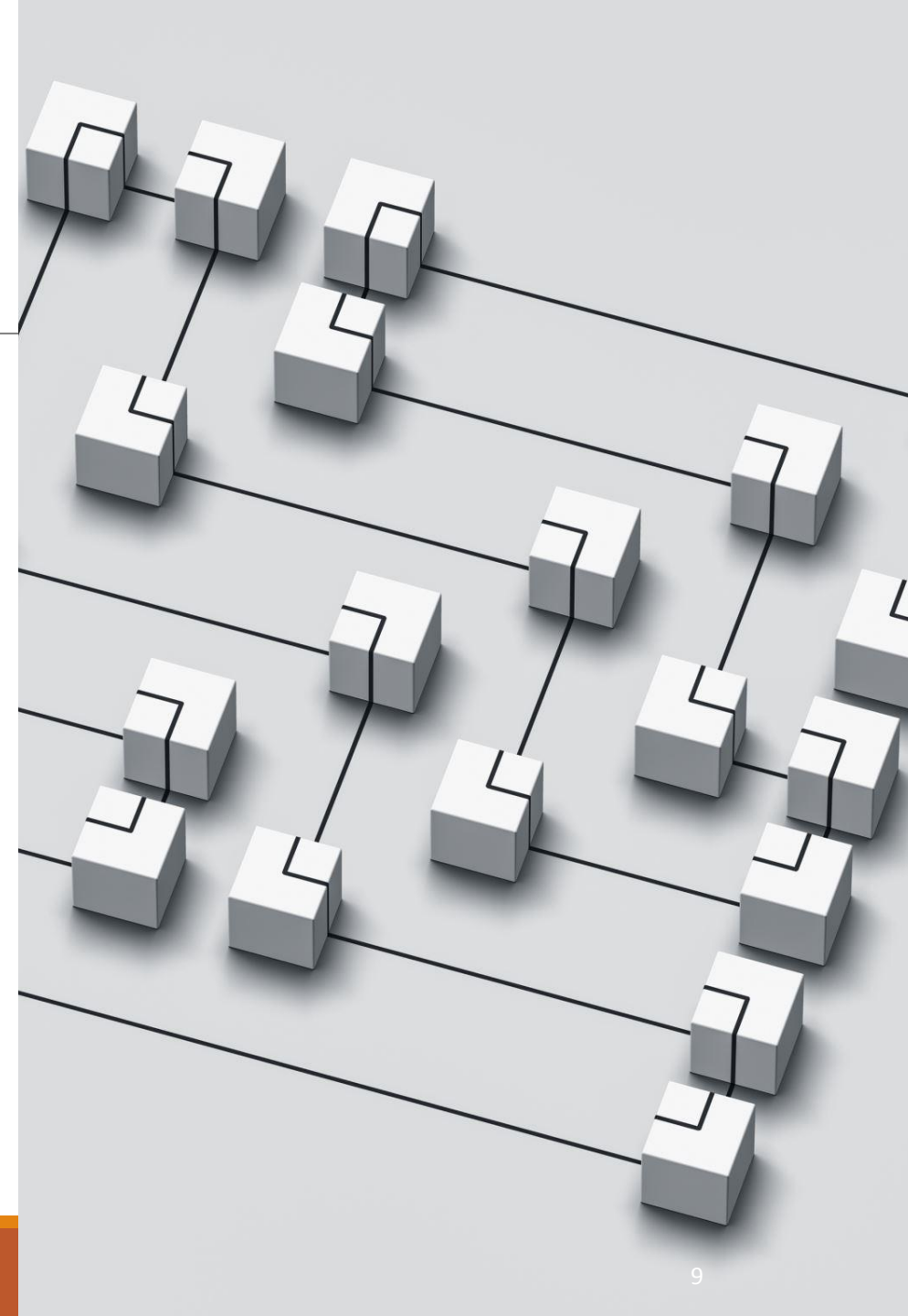


Deep learning data frames are a sort of data structure that is extensively used in machine learning and data analysis. A data frame is a two-dimensional table-like structure with rows and columns, each of which represents an observation and each column a variable.

Data frames are commonly used in deep learning to hold training data, which comprises of input characteristics and output labels. The data required to train the model is represented by the input features, while the output labels reflect the desired output for each input.

Data frames can be built from a variety of data sources, including CSV files, databases, and web APIs. Data frames can be preprocessed and changed after they are created, employing techniques such as normalization, feature scaling, and one-hot encoding, among others.

## Data Frame





# History of Data Frameworks

Deep learning frameworks like **Kera's**, **MX Net**, and **CNTK** have proliferated in recent years. Each framework has advantages and disadvantages, and the framework chosen typically relies on the project's specific requirements.

**Caffe**, the first deep learning framework, was created in 2014 by the Berkeley Vision and Learning Center.

**Google** launched **TensorFlow** as an open-source deep learning framework in 2015.

**Facebook** published **PyTorch** as an open-source deep-learning platform in 2016.

The Montreal Institute for Learning Algorithms also released **Theano** in 2015. (**MILA**).

# Why this is the era of Deep Learning?

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Deep learning has gained popularity in recent years for numerous reasons:

- ❑ Big Data
- ❑ Better Hardware
- ❑ Improved Algorithms





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# Applications

Natural Language Processing

Computer Vision

Health Care

Finance

Gaming

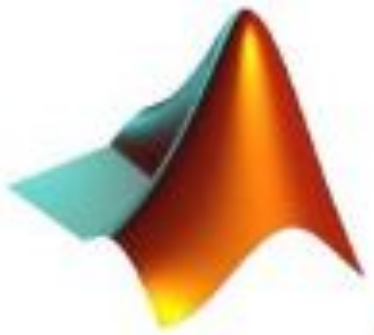
Robotics

Marketing

Agriculture

Energy

Social Media



## Tools



# Popular Tool

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TensorFlow is the most widely used deep learning technology. TensorFlow is a Google open-source software library for constructing and training neural networks. It supports a wide range of platforms, including CPUs, GPUs, and TPUs, and provides a high-level interface for constructing and deploying deep learning models (Tensor Processing Units).

TensorFlow is widely used in academia and industry, and it has a large user and developer community. It includes data preparation, data augmentation, visualization, and model tweaking tools and features for developing and training deep learning models.



*Thank  
you*

