

Artificial Intelligence



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Artificial Intelligence

An Introduction to Artificial Intelligence
History of Artificial Intelligence
Future and Market Trends in Artificial Intelligence
Intelligent Agents – Perceive-Reason-Act Loop
Search and Symbolic Search
Constraint-based Reasoning
Simple Adversarial Search (Game-Playing)
Neural Networks and Perceptrons
Understanding Feedforward Networks
Boltzmann Machines and Autoencoders
Exploring Backpropagation

Deep Networks and Structured Knowledge

Deep Networks/Deep Learning
Knowledge-based Reasoning
First-order Logic and Theorem
Rules and Rule-based Reasoning
Studying Blackboard Systems
Structured Knowledge: Frames, Cyc, Conceptual Dependency
Description Logic
Reasoning with Uncertainty
Probability & Certainty-Factors
What are Bayesian Networks?
Understanding Sensor Processing
Natural Language Processing
Studying Neural Elements
Convolutional Networks
Recurrent Networks
Long Short-Term Memory (LSTM) Networks



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Machine Learning

Machine learning Introduction
Machine Learning Categories
Machine Learning Supervised
Machine Learning Unsupervised
Machine Learning Implementing

Natural Language Processing

Natural Language Processing
Natural Language Processing in Python

Deep Learning

Studying Deep Learning
Artificial Neural Networks
ANN Intuition
Plan of Attack
Studying the Neuron
The Activation Function
Working of Neural Networks
Exploring Gradient Descent
Stochastic Gradient Descent
Exploring Backpropagation

Artificial and Conventional Neural Network

Understanding Artificial Neural Network
Building an ANN
Building Problem Description
Evaluation the ANN
Improving the ANN
Tuning the ANN
Conventional Neural Networks
CNN Intuition
Convolution Operation
ReLU Layer
Pooling and Flattening
Full Connection
Softmax and Cross-Entropy
Building a CNN
Evaluating the CNN
Improving the CNN
Tuning the CNN



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Recurrent Neural Network

Recurrent Neural Network
RNN Intuition
The Vanishing Gradient Problem
LSTMs and LSTM Variations
Practical Intuition
Building an RNN
Evaluating the RNN
Improving the RNN
Tuning the RNN

Self-Organizing Maps

Self-Organizing Maps
SOMs Intuition
Plan of Attack
Working of Self-Organizing Maps
Revisiting K-Means
K-Means Clustering
Reading an Advanced SOM
Building an SOM

Boltzmann Machines

Energy-Based Models (EBM)
Restricted Boltzmann Machine
Exploring Contrastive Divergence
Deep Belief Networks
Deep Boltzmann Machines
Building a Boltzmann Machine
Installing Ubuntu on Windows
Installing PyTorch



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Deep Learning

Introduction
Artificial Intelligence vs. Machine Learning vs. Deep Learning
Objectives of Deep Learning
Google Tensorflow
What are Tensors?
Introduction to Tensorflow
Computational Graph
Creating a graph
Gradient Descent
Tensorboard
Introduction to Keras
Keras datatypes
Perceptron
Introduction to Perceptron
McCulloch-Pitts Model
Rosenblatt's Perceptron Algorithm
Artificial Neural Networks
XOR Gat
Activation Function
Introduction to Activation Functions
Sigmoid Function
ReLU Function, Leaky ReLU
Softmax Function
Gradient Descent and Optimization
Stochastic Gradient Descent
Backpropagation
Drawbacks of ANN
Optimization and Regularization
Feature Selection
Overfitting
Regularization
Hyperparameters
Convolutional Neural Neytworks
Introduction
Steps to create a CNN
Applications of CNN
Recurrent Neural Neytworks
Sequence to Sequence Networks
LSTM
Applications of RNN
Applications of Deep Learning



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AutoEncoders

- AutoEncoders: An Overview
- AutoEncoders Intuition
- Plan of Attack
- Training an AutoEncoder
- Overcomplete hidden layers
- Sparse Autoencoders
- Denoising Autoencoders
- Contractive Autoencoders
- Stacked Autoencoders
- Deep Autoencoders

PCA, LDA, and Dimensionality Reduction

- Dimensionality Reduction
- Principal Component Analysis (PCA)
- PCA in Python
- PCA in R
- Linear Discriminant Analysis (LDA)
- LDA in Python
- LDA in R
- Kernel PCA
- Kernel PCA in Python
- Kernel PCA in R

Model Selection and Boosting

- K-Fold Cross Validation in Python
- Grid Search in Python
- K-Fold Cross Validation in R
- Grid Search in R
- XGBoost
- XGBoost in Python
- XGBoost in R



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