

ARTIFICIAL INTELLIGENCE



Module 01 - Introduction to Machine Learning

Basic Concept

- Train, Test & Validation Distribution
- ML Strategy
- Computation Graph
- Evaluation Metric
- Human-Level Performance

Module 02 - Machine Learning

Supervised

- Linear Regression
- Logistic Regression
- Gradient Descent
- Decision Tree
- Random Forest
- Bagging & Boosting
- KNN

Unsupervised

- K-Means
- Hierarchical Clustering

Module 03 - Python Programming

Python

- Basic Programming
- NLP Libraries
- OpenCV



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Module 04 - Mathematics Foundation

Basic Statistics

- Sampling & Sampling Statistics
- Hypothesis Testing

Calculus

- Derivatives
- Optimization

Linear Algebra

- Function
- Scalar-Vector-Matrix
- Vector Operation

Probability

- Space
- Probability
- Distribution

Module 05 - Intro to Neural Network & Deep Learning

Introduction

- Intro
- Deep Learning Importance [Strength & Limitation]
- SP | MLP

Feed Forward & Backward Propagation

- Neural Network Overview
- Neural Network Representation
- Activation Function
- Loss Function



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- Importance of Non-linear Activation Function
- Gradient Descent for Neural Network

Module 06 - Parameter & Hyperparameter

Practical Aspect

- Train, Test & Validation Set
- Vanishing & Exploding Gradient
- Dropout
- Regularization

Optimization

- Bias Correction
- RMS Prop
- Adam, Ada, AdaBoost
- Learning Rate
- Tuning
- SoftMax

Module 07 - Data Processing

Environment

- Scikit Learn
- NLTK
- Spacy & Genism
- OpenCV
- Tensor Flow
- Kera's

Text Processing

- Representation



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- Data Cleaning
- Data Preprocessing
- Similarity

Image Processing

- Image
- Image Transformation
- Filters
- Noise Removal
- Correlation & Convolution
- Edge Detection
- Non-Maximum Suppression & Hysteresis
- Fourier Domain
- Video Processing

Speech Data Analytics

Feature Extraction

- Image Feature
- Descriptors

Object Detection

- Detection & Classification

Module 08 - CNN

CNN

- Computer Vision
- Padding
- Convolution
- Pooling
- Why Convolution



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Deep Convolution Model

- Case Studies
- Classic Networks
- Inception
- Open-Source Implementation
- Transfer Learning

Detection Algorithm

- Object Localization
- Landmark Detection
- Object Detection
- Bounding Box Prediction
- Yolo

Face Recognition

- What is Face Recognition
- One Shot Learning
- Siamese Network
- Triplet Loss
- Face Verification
- Neural Style Transfer
- Deep Conv Net Learning

Module 09 - RNN

- Why Sequence Model
- RNN Model
- Backpropagation through time
- Different Types of RNNs
- GRU



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- LSTM
- Bidirectional LSTM
- Deep RNN
- Word Embedding
- Debiasing
- Negative Sampling
- Elmo & Bert
- Beam Search
- Attention Model

Module 10 - Generative Adversarial Network

- Autoencoders & Decoders
- Adversarial Network
- Active Learning

Module 11 - Reinforcement Learning

- Q Learning
- Exploration & Exploitation



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