



Artificial Intelligence

Free Python

Data Science

Machine Learning

Artificial Intelligence

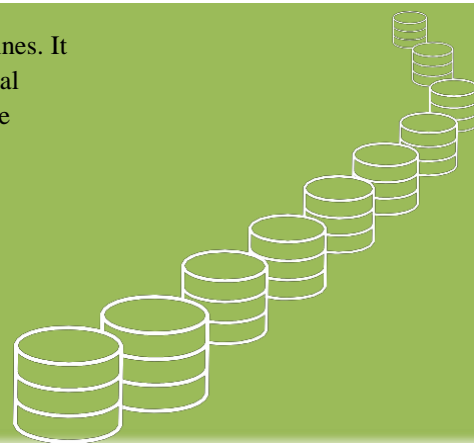


EAGLEFLY SOLUTIONS

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Artificial intelligence is a branch of computer science that aims to create intelligent machines. It has become an essential part of the technology industry. Research associated with artificial intelligence is highly technical and specialized. The core problems of artificial intelligence include programming computers for certain traits such as:

- Knowledge
- Reasoning
- Problem solving
- Perception
- Learning
- Planning
- Ability to manipulate and move objects.



Python

1. An introduction to python:

- Brief History
- Why Python
- Where to use

2. Beginning python basics:

- The print statement
- Comments
- Python Data Structures & Data Types
- String Operations in Python
- Simple Input & Output
- Simple Output Formatting

3. Python program flow:

- Indentation
- The If statement and its' related statement
- An example with if and it's related statement
- The while loop
- The for loop
- The range statement
- Break & Continue
- Assert
- Examples for looping

4. Functions & modules:

- Create your own functions
- Functions Parameters
- Variable Arguments
- Scope of a Function
- Function Documentation/Doc strings
- Lambda Functions & map
- An Exercise with functions
- Create a Module
- Standard Modules

5. Exceptions:

- Errors
- Exception handling with try
- Handling Multiple Exceptions
- Writing your own Exceptions

6. File handling:

- File Handling Modes
- Reading Files
- Writing & Appending to Files
- Handling File Exceptions
- The with statement

7. Class:

- New Style Classes
- Variable Type
- Static Variable in class
- Creating Classes
- Instance Methods
- Inheritance
- Polymorphism
- Encapsulation
- Scope and Visibility of Variables
- Exception Classes & Custom Exceptions

8. Regular expressions:

- Simple Character Matches
- Special Characters
- Character Classes
- Quantifiers
- The Dot Character
- Greedy Matches
- Grouping
- Matching at Beginning or End
- Match Objects
- Substituting
- Splitting a String
- Compiling Regular Expressions
- Flags

9. Data structures:

- List Comprehensions
- Nested List Comprehensions
- Dictionary Comprehensions
- Functions
- Default Parameters
- Variable Arguments
- Specialized Sorts
- Integrators
- Generators
- The Functions any and all
- The with Statement
- Data Compression
- Closer
- Decorator

10. Database and Operations:

- Install postgres server on windows
- Install postgres server on linux
- Install postgres-Python connector
- Creating database
- Creating tables
- Insert data into database
- Inserting images
- Retrieving data
- Update data
- Delete data
- Practice, Questions and exercise

11. OOPs

- What are classes and objects?
- Defining classes and attributes
- Constructor
- Instance Methods
- Inheritance
- Abstraction and Encapsulation
- Polymorphism
- Method hiding
- private, public and protected variables
- Implementing stack, queue, deque and linked list
- Class and static methods decorators
- Special methods
- Practice, Questions and exercise

Data Science

1. Numpy Basics:

- What is Numpy ?
- Creating arrays from python objects
- Printing arrays
- Universal functions
- Indexing, slicing and selection
- Fancy indexing
- Broadcasting arrays
- arrays from python functions
- Mathematics operations
- Indexing a 2D array
- Practicals
- Finding patterns

2. Importing and Exporting Data using Pandas:

- Importing Data from various sources (Csv, txt, excel, access etc)
- Database Input (Connecting to database)
- Viewing Data objects - subsetting, methods
- Exporting Data to various formats
- Important python functions: Pandas

3. Data Visualization-matplotlib:

- Introduction to Matplotlib
- Matplotlib Part 1 Set up
- Matplotlib Part 2 Plot
- Matplotlib Part 3 Next steps
- Matplotlib Exercises Overview
- Matplotlib Exercises – Solutions

Machine Learning

1. Machine Learning:

- Motivation of machine learning
- Use cases of machine learning
- Future scope of machine learning
- Real world domain using ML
- Types of machine learning
- Different tools/framework available for ML
- Limitation of machine learning

2. Basics of Machine Learning:

- Understanding supervised & unsupervised learning.
- Understanding Parametric and non Parametric Algorithm.
- Regression and Classification.
- Clustering techniques.
- TF-IDF and vectorization techniques.

3. Machine Learning with Tensorflow:

- Motivation for deep learning
- Case studies of deep learning
- Revolution of Artificial Intelligence
- Advantages of deep learning over machine learning
- Real-life use cases of Deep Learning
- Required linear algebra and statistics

4. Artificial Neural Networks:

- Deep learning: A revolution in Artificial Intelligence
- What is Neural Networks and historical background?
- Neural networks vs. conventional computers
- Basic structure of ANNs
- How neural networks works?

5. Tensorflow

Basics:

- What is Tensorflow?
- Tensorflow in deep learning
- Installation of Tensorflow
- Tensorflow code-basics
- Constants, Placeholders, Variables, Scope, Graph,
- Creating and saving a model
- Re-Store a model
- Running a simple ML algorithm on Tensorflow
- Tensor Board: Graph visualization
- Tensor Projector: Training pipe line visualization
- MLP digit-Classifier using Tensorflow

6. Optimizers:

- What are optimization algorithms?
- Derivatives of optimization algorithms
- Gradient Descent
- Stochastic gradient descent
- Mini Batch Gradient Descent
- Momentum
- Adagrad
- Adam

7. Activation Functions:

- What are activation functions?
- Derivatives of activation functions
- Step Activation Function
- Sigmoid Activation function
- Hyperbolic Tangent function-Tanh
- ReLu- Rectified Linear units
- Softmax Regression

8. Keras: A High Level API:

- Introduction to Keras
- Keras vs TFLearn
- Compose models in Keras
- Sequential and functional composition
- Predefined neural network layers
- Using inception v3 predefined model
- Batch normalization: Keras
- Saving and Loading a model with Keras
- Customizing the training process
- Tensor-board: With Keras
- Use-Case implementation with Keras

9. Tuning of Hyperparameters:

- Train, Dev & Test sets
- Bias & Variance
- Regularization & Overfitting
- Why regularization reduces overfitting?
- L1/L2 & Dropout Regularization
- Vanishing / Exploding gradients
- Weight Initialization for Deep Networks
- Numerical approximation of gradients
- Normalizing activations in a network
- Why does Batch Norm work?

10. Miscellaneous

- What are computation graph?
- derivatives with a computation graph
- Broadcasting in Numpy/Tensorflow
- Neural Network Representation
- Computing a Neural Network's Output
- Explanation for Vectorized Implementation
- Parameters vs Hyperparameters
- Forward and Backward Propagation

Machine Learning Algorithms

1. Linear regression:

- Linear Regression Theory
- Model selection Updates for SciKit Learn
- Linear Regression with Python
- Linear Regression Project Overview and Project Solution

2. Logistic regression:

- Logistic Regression Theory – Introduction
- Logistic Regression with Python – Part 1 – Logistics
- Logistic Regression with Python – Part 2 – Regression
- Logistic Regression with Python – Part 3 – Conclusion
- Logistic Regression Project Overview and Project Solutions

3. K nearest neighbors:

- KNN Theory
- KNN with Python
- KNN Project Overview and Project Solutions

4. Decision trees and random forests:

- Introduction to Tree Methods
- Decision Trees and Random Forest with Python
- Decision Trees and Random Forest Project Overview
- Decision Trees and Random Forest Solutions Part 1
- Decision Trees and Random Forest Solutions Part 2

5. Support vector machines:

- SVM Theory
- Support Vector Machines with Python
- SVM Project Overview
- SVM Project Solutions

6. K means clustering:

- K mean Theory
- K means with Python
- K means Project Overview and Project Solutions

Deep Learning:

1. Image: Convolutional Neural Networks

- What is computer vision?
- Why Convolutions (CNN)?
- Introduction to CNN
- Train a simple convolutional neural net
- Explore the design space for convolutional nets
- Pooling layer motivation in CNN
- Design a convolutional layer application
- Understanding and visualizing a CNN
- Transfer learning and fine-tuning CNN

2. Detection & Recognition

- Padding & Edge Detection
- Strided Convolutions
- Networks in Networks and 1x1 Convolutions
- Inception Network Motivation
- Object Detection
- YOLO Algorithm

3. Recurrent Neural Networks

- Why use sequence models?
- Recurrent Neural Network Model
- Notation
- Back-propagation through time (BTT)
- Different types of RNNs
- Language model and sequence generation
- Sampling novel sequences
- Vanishing gradients with RNNs
- Gated Recurrent Unit (GRU)
- Long Short Term Memory (LSTM)
- Bidirectional RNN
- Deep RNNs

4. Models of Recurrent Neural Networks

- Sequence models & Attention mechanism
- Basic Models
- Picking the most likely sentence
- Attention Model Intuition
- Trigger Word Detection

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