

MLOps – Data Science, Machine Learning and Deep Learning with DevOps and Python

Become an expert in the exciting new world of AI & Machine Learning on DevOps and AWS, get trained in cutting edge technologies and work on real-life industry projects with TechSim+ and Get Certified by **E-Cell IIT Kharagpur**.

Data Analytics, Machine Learning and Deep Learning on DevOps with AWS Sagemaker using Python helps you gain expertise in various machine learning algorithms such as regression, classification, clustering, decision trees, random forest, Naïve Bayes K-NN and More. We will cover deep learning algorithms like FNN, CNN, R-CNN, GANs, etc. We also work on Transfer Learning and make different projects. Apart from this, you will work on DevOps tools and install these on AWS Cloud. In This training you will not only work on technologies, but you will also make industry-related projects and deploy these projects on the cloud.

Program Duration: 40 - 45 days

Per Day Session: 3 hours on daily basis (Mon-Sat)

Certification:

1. Internship Certificate from **E-Cell IIT Kharagpur**
2. Project Completion Certificate from **TechSim+**

Projects: 20+ Projects. List of Projects listed below.

Content:

Python with Data Analysis

In this Part You will get a brief idea of what Python is and Why it's Important. You will learn Python basic and Advance for ML. After completing Python we will focus on Data Analysis and Data Visualisation with the help of different libraries like: NumPy, Pandas, Matplotlib, Seaborn and Plotly.

Introduction

- What is Machine Learning.
- What is Deep Learning
- What is DevOps.
- Importance of DevOps and Machine Learning.
- What is Amazon Sagemaker and How it Work.
- Requirements for this course.
- Installing Python and Anaconda (MAC & Windows)

Python for Data Science and AI

- Python Basics – Types, Variables, Strings & Expressions
- Data Structure – List, Tuple, Dict, Set's
- Making Decisions - if - elif – else
- Loops – for, while
- Functions With Multiple Arguments
- File Handling
- Library – Import, Understand, Apply

Introduction to Data Science

- What is Data Science?
- Business Intelligence vs Data Science
- Tools of Data Science.
- Basic of NumPy – arrays.
- Reading and writing arrays on files.
- Pandas - data structures & index operations.
- Reading and Writing data from Excel/CSV/url's

Advanced Data Analysis – Pandas and bamboolib

- Basic Functionalities of a data object
- Merging of Data objects
- Concatenation of data objects
- Types of Joins on data objects
- Exploring a Dataset
- Raw and Processed Data
- Data Wrangling
- Exploratory Data Analysis
- Data Analysis with bamboolib

Data Visualisation with Matplotlib, Plotly and seaborn

- Introduction to Matplotlib and seaborn
- Plot a Line, Legends and Labels
- Plot Different type of Charts and Histograms
- Loading data from files.
- Plot different types of plot with pandas
- Plotting different plot with Seaborn
- Create statistical charts with Plotly

Project'S:

During this Section You will make some Projects:

1. Visualization of PUBG Game Data
2. Movie Recommendation Project.
3. Customer Data Analysis

Machine Learning with Python

After Completing the Data Analytic you will learn Machine Learning. In this part you will understand how ML works. How you can train your machine with your data. We will work on different machine learning algorithms and make different projects.

Closer Look - ML Working

- What Is Machine Learning?
- Types of Machine Learning Systems
- Working with Real Data
- Get the Data
- Discover and Visualize the Data to Gain Insights
- Prepare the Data for Machine Learning Algorithms
- Handling Text and Categorical Attributes

Math for Machine Learning and Deep Learning

- Linear Algebra – Vectors, Matrices, Eigenvalues & eigenvectors, PCA
- Calculus - Differential and Integral

- Probability Rules, Random Variables, Conditional Probability, Bayes' Theorem, etc.
- Some Slandered Algorithms.

Supervised Machine Learning Algorithms – I

- Machine Learning Categories
- Difference b/w Regression and Classification
- Linear Regression, Logistic Regression
- Gradient descent Algorithm.
- What is Naïve Bayes Algorithm?
- Implementing Naïve Bayes Classifier.

Supervised Machine Learning Algorithms – II

- What is Support Vector Machine?
- Illustrate how Support Vector Machine works?
- Implementation of SVM.
- K-Nearest Neighbor Algorithm (K-NN)
- What is Decision Tree?
- Creating a Perfect Decision Tree.
- Confusion Matrix
- Random Forests and Extremely Random Forests?

Un-Supervised Machine Learning Algorithms

- What is Clustering & its Use Cases?
- What is K-means Clustering?
- How K-means algorithm works?
- How to do optimal clustering?
- Implementing K-means Clustering.
- What is Hierarchical Clustering?
- Implementing Hierarchical Clustering
- Why dimension reduction?
- Advantages of PCA
- Calculation of PCA weights
- SVD – Decomposition of matrix data

Project'S:

During this section, you will make some projects with our mentors.

1. Real estate market housing predictions with Regression.
2. Loan Approval System.
3. MNIST Hand Written Digits Classification with KNN and SVM.
4. IRIS Flower Classification with Naïve Bayes.
5. Cupcake and Muffin classification with SVM.
6. Traffic Prediction with Decision Tree and Random Forest Classifier.
7. Customer Segmentation with K-Mean

Deep Learning and Image Processing with TensorFlow and Keras

This is the Advanced part of Machine Learning called Deep Learning. In this part we will work on neural Networks. We will use different libraries for creating smart systems, like TensorFlow and Keras. You will work on different DL Algorithms like FNN, CNN, R-CNN, RNN and others.

Neural Network Basics and Deep Learning

- From Biological to Artificial Neurons
- Implementing MLPs with Keras
- Installing TensorFlow 2
- The Perceptron Algorithm

- Back propagation and Multi-layer Networks
- Multi-layer Networks with Keras
- Weight and Constant Initialization
- Uniform and Normal Distributions
- Building an Image Classifier Using the Sequential API
- Saving and Restoring a Model
- Visualization Using TensorBoard
- Fine-Tuning Neural Network Hyperparameters
- Number of Hidden Layers
- Number of Neurons per Hidden Layer

Advanced Deep Learning Algorithms

- Feed forward neural networks (FNN)
- Introduction to Convolutional Neural Networks
- Forward Propagation & Backpropagation for CNNs
- CNN architectures: AlexNet, VGGNet, InceptionNet & ResNet

Advanced Transfer Learning with Image Processing

- Object Detection with SSD
- What Is ImageNet?
- Preparing and Understanding the ImageNet Dataset.
- Training AlexNet on ImageNet
- Training VGGNet on ImageNet
- Training GoogleNew on ImageNet
- Training ResNet on ImageNet.
- Facial Recognition with VGGFace.

Project'S

During this section, you will make your different projects with our mentors.

1. Create a Multi-Layer Perceptron from Scratch.
2. Create a Deep Neural Network with TensorFlow and Keras.
3. Wine Quality Classification with Deep Neural Network
4. Dog and Cat Classifier with CNN.
5. Rock Paper Scissors game with Live Camera.
6. Smile Detection on Live Camera.
7. Emotion Recognition.
8. Age and Gender Detection with Caffe Model.
9. Advanced Image Classification with Transfer Learning.
10. Object Detection in Images.
11. Live Object Detection with your Mobile Camera.
12. Social Distance Monitoring for COVID-19

DevOps on AWS

In this module you will be introduced to DevOps environment. you will learn about the different actions performed through git and will be introduced to Jenkins, maven, Dockers and others. You will learn about AWS Services and Install DevOps tool on AWS cloud. You will deploy machine learning on DevOps cloud.

Introduction to DevOps.

- What is Software Development.
- Software Development Life Cycle.
- Traditional Models for SDLC
- Why DevOps?
- What is DevOps?
- DevOps Lifecycle.

Infrastructure Setup on AWS – EC2

- EC2 Walkthrough
- Installation of DevOps Tools on cloud
- Git
- Docker
- Selenium
- Jenkins

Continuous Deployment: Containerization with Docker

- Shipping Transportation Challenges
- Introducing Docker
- Understanding images and containers
- Introduction to Container Preview
- Container Life Cycle
- Docker File
- Working with containers
- Publishing Image on Docker Hub
- Creating Services

Project'S:

In this section, you will make your own project with our mentors.

1. Connect your Project with Git - GitHub.
2. Create a Task on Jenkins.
3. Connect Jenkins with GitHub.
4. Automate Our Machine Learning Training with Jenkins and Git-GitHub.
5. Run Our Jenkins on AWS Cloud.
6. Deploy your ML Model on AWS Cloud and Make Prediction from any Device.

AWS: Sagemaker, Machine Learning and Deep Learning

This is again very important part of our Training. Here you will learn about AWS Sagemaker service. In Sagemaker you can built your machine learning and Deep Learning model very easily and deploy on AWS.

Introduction and Setup

- AWS Account Setup, Free Tier Offers
- Configure IAM Users
- Setup Command Line Interface
- AWS Global Infrastructure Overview
- S3 Bucket Setup
- Setup Sagemaker Notebook Instance

Amazon Sagemaker Algorithms

- Sagemaker/ML Terminology and Algorithms
- Hyperparameter Tuning
- k-means Algorithm
- XGBoost Algorithm
- Integrating Amazon Sagemaker with your Applications

Project'S:

In This Section, you will make some projects.

1. Working on Amazon Sagemaker.
2. Run the Autopilot Service of AWS Sagemaker.
3. Run Jupyter Notebook on AWS Cloud.
4. Deploy Your Trained Model on S3 Cloud.
5. One Bonus Project.....@