



Xerxez Solutions
Cooperate Training Road Map
On
Full Stack AI/ML Deployment using Cloud Native and
DevSecOps Platform
(Discriminative and Generative Model)

This document provides the curriculum outline of the Knowledge, Skills, and Abilities that a **AI Consultant, Architect and Developer, DevOps and DevSecOps** can be expected to demonstrate on Microservice Platform.

Total Number of Hours: 48 Hour (6 Days)

- Discriminative Model (Regression Technique) : 15 Hours
- Discriminative Model (Deep Learning) : 15 Hours
- Generative AI – MultiModal : 10 Hours
- DevSecOps – Cloud Security Poster Management – 8 Hours

Prerequisite:

- Understanding of Python Programming, Git and GitHub.
- Basic understanding of Machine Learning and EDA.
- Learn about Generative Adversarial Networks (GANs).
- A solid foundation in mathematics, particularly linear algebra, and calculus, is Beneficial.

Out Come:

This program is crafted for individuals enthusiastic about delving into the realm of Discriminative and Generative AI (GenAI) and leveraging its revolutionary capabilities. Meticulously designed, the course combines essential principles, practical applications in various industries, and interactive learning experiences. It caters to aspiring AI enthusiasts, professionals, and those intrigued by this state-of-the-art technology. Moreover, we offer ongoing query support throughout your learning journey, ensuring you have assistance for any uncertainties, making the experience even more valuable.

Why Learning Discriminative and Generative AI is Important:

- **Career Advancement:** Discriminative and Generative AI skills are increasingly in demand across various industries. Mastering Artificial Intelligence can open doors to new career opportunities and advancements in tech, marketing, retail, and more.
- **Innovation at Your Fingertips:** Understanding AI Models empowers you to create innovative solutions, from chatbots to personalized customer experiences, driving efficiency and creativity in your projects or workplace.
- **Stay Ahead in a Tech-Driven World:** As AI continues to shape our future, possessing knowledge in Generative AI ensures you stay ahead of the curve, understanding and leveraging the latest advancements.
- **Solve Complex Problems:** Generative AI offers unique approaches to problem-solving, enabling you to tackle complex challenges with AI-driven solutions, enhancing both personal and professional growth.

Local setup (Physical Mode)	General Requirement	Cloud Account
Laptop/Desktop with high-speed internet connection, Windows 10 and above	64-bit kernel and CPU support for virtualization.	Amazon Web Service (AWS), ChatGPT API Token (Optional)
Memory: 4 GB RAM	Graphics Card	
CPU: 1 CPU Cores	Visual Studio, PgAdmin4	
Storage: 20 GB	Git/GitHub Account	

Pilot Project – MLOPS Using MLFlow

1. Regression Technique
2. Deep Learning & Transfer Learning
3. MultiModal Generative AI

Topics Covered:

1. Introduction to MLOps using MLFlow:

- What is MLOps?
- Why do we need MLOps and business impact?
- Machine learning industrialization challenges

- How does it relate to DevOps, AIOps, ModelOps, GitOps?

2. Introduction to MLOps stages:

- What are the various stages in ML lifecycle?
- Detailed MLOps Principles and stages
 - Versioning
 - Testing/Monitoring
 - Automation (CI/CD)
 - Reproducibility
 - Deployment
- MLOps Architectures:
 - Architectures - Open-Source tools
 - Architectures - cloud Native tools – Amazon Web Services
 - Comparison among cloud native tools
 - Cost-benefit approach of each architecture and MLOps maturity

3. Model Management and DevSecOps

- What is Model Management?
- What are the various activities in Model Management?
- High-level overview of below Model Management tools
 - MLFlow
 - DVC
 - DagsHub

4. MLFlow Services

- What is MLFlow.
- Various components of MLFlow Services.
- Benefits of using MLFlow Services.

Hands-on:

1. Data Set from Kaggle is considered to demonstrate the real time Machine Learning Regression Model Design and Development. (Optional)
2. ML Model Retraining with an industry use case using CI/CD, ML Model using DVC.
3. Model Testing using PyTest and Linter Dependencies.

5. Introduction to Git/GitHub Action/Enterprises:

- Overview of Git/GitHub Action.
- Configure the Organization/ Repository/Team
- Understanding branching strategies, mergers and pull requests.
- Standard GIT branching strategies (development, feature, bug, release, UAT)
- Practicing important Git commands along with pilot project.
- End to End Secured Platform to Design, Develop and Deploy ML Model.
- Security:
 - Code Quality and Analysis using linters tool.
 - Analyzing code coverage and reporting.
 - Security Scanning: Incorporating security scanning tools into your workflows, Ensuring secure dependencies and code.
 - Cross-Platform Workflows: Setting up workflows for multi-platform support.
 - Connecting GitHub Actions with other services (Slack, email, etc.).
 - Managing Workflow Secrets: Best practices for handling secrets securely, Rotating and updating secrets.

Hands - on:

- Configure Organization, Team, and Repository.
- Building and Deploy ML pipeline in Github Action.
- Monitoring Model Performance using Nagios.

6. Introduction to Generative AI

- Overview of Generative AI
- Large Language Models and Conversation AI (GAN, VAEs, etc).
- Prompt Engineering – Prompt for Generative AI.
- Generative Vs Discriminative Models.
- Real World Applications of Generative AI in various fields (art, image synthesis, text generation, etc.).
- Major Players in the Domain, Future Trends and Opportunity.

Hands-on:

Lab No. 1: Generative AI – No Code Software as a Service Platforms – Multimodality

7. Google Gemini Pro

- Google Gemini API Vs. Google Vertex Gemini API
- Gemini Ultra Vs. Gemini Pro Performance
- Working with Pro Vision – Structure Prompt with Images.

- Chat Prompt with Images, Multiple Images in Prompt.
- Gemini Parameters – Temperature, Max Tokens, Stop Sequence, Safety Settings, Top K and Top P.
- Multimodal Application Development.

Hands-on:

Lab 2: Design and Develop Calories App – Calorie Detection, Healthier Alternatives, and Ingredient Suggestions

Lab 3: Application for text-to-text, text-to-image, image-to-audio, image-to-video.

8. Integrating Generative AI with Docker and Docker-Compose

- Containerizing Generative AI applications
- Deploying Generative AI models using Docker
- Scaling and managing Generative AI applications with Kubernetes or AWS EKS.
- Troubleshooting and optimizing containerized Generative AI applications
- Case studies and practical examples.

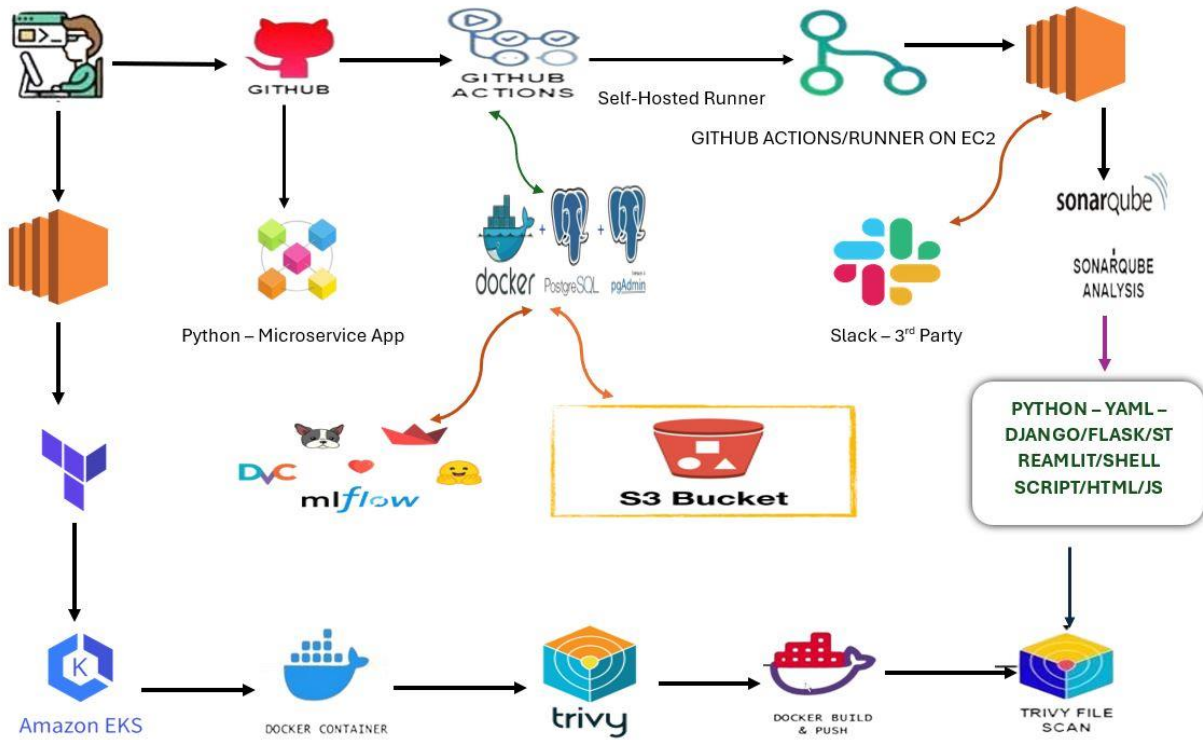
Hands-on:

Lab 4: Dockize Gen AI Application designed using Python, Streamlit, and Database.

9. Security Expects – Cloud Native Application Protection using DevSecOps

- Docker Image Scanning using Trivy – Installation and Implementation
- SonarQube – Vulnerability Scanning and Code Validation
 - Server Installation and Setup
 - Analyzing Source code
 - DevOps Platform Integration
 - Project Administration
- Slack – Third Party Alert Notification
 - Channels
 - Slack Connect
 - Messaging
- Trivy – Docker Image Scanning
 - Installation
 - Scanning – Container Images, File System and Git Repository
 - Modes
 - Integration
 - Vulnerability Detection

10 . Discriminative and Generative AI Full Stack Development using Multiple Platform – A Complete Product Design



FRAMEWORK AND TECHNOLOGIES

Google Gemini/OpenAI
SaaS Based Gen AI App
Python, Yaml
PostgreSQL/PgAdmin4
Docker/Kubernetes

Amazon Web Service
MLFlow / DagsHub
SonarQube
Trivy – Image Scanner
Slack - Notification

Django/Flask/Streamlit
Microservice Application
LangSmith/LangServe
Git/Github/Github Action

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