**GENERATIVE AI TECHNICAL SKILLS**

**1. Programming Languages**

* **Python: The primary language for implementing generative AI models, with a vast ecosystem of libraries.**
  + **Key Libraries:**
    - **TensorFlow: A comprehensive framework for building deep learning models, including generative models.**
    - **Keras: A high-level API for TensorFlow, simplifying the construction of generative networks.**
    - **PyTorch: A flexible library preferred for research and experimentation in generative models.**
* **R: Useful for statistical analysis and modeling, especially in conjunction with generative techniques.**

**2. Core Generative Models**

* **Generative Adversarial Networks (GANs): Understanding the architecture and implementation of GANs, including variants like:**
  + **DCGAN (Deep Convolutional GANs)**
  + **CycleGAN: For image translation tasks.**
  + **StyleGAN: For generating high-quality images.**
* **Variational Autoencoders (VAEs): Knowledge of VAEs for generating new data instances similar to the training data.**
* **Autoregressive Models: Familiarity with models like PixelCNN, PixelSNAIL for image generation and language models like GPT (Generative Pre-trained Transformer).**
* **Transformers: Understanding the transformer architecture and its application in generative tasks, particularly in natural language processing (NLP).**

**3. Data Preprocessing and Augmentation**

* **Data Augmentation: Techniques for augmenting training datasets to improve the robustness of generative models (e.g., image rotation, flipping, and cropping).**
* **Text Processing: Techniques for preparing textual data, including tokenization, stemming, and using embeddings (Word2Vec, GloVe).**

**4. Model Training and Optimization**

* **Loss Functions: Understanding loss functions specific to generative models, such as Wasserstein loss for GANs.**
* **Optimization Algorithms: Familiarity with optimization techniques like Adam, SGD, and techniques to stabilize GAN training (e.g., using gradient penalty).**

**5. Model Evaluation**

* **Metrics: Knowledge of metrics to evaluate generative models, such as Inception Score (IS) and Fréchet Inception Distance (FID) for GANs.**
* **A/B Testing: For assessing the performance of generative models in real-world applications.**

**6. Deployment and Production**

* **Model Deployment: Skills in deploying generative AI models using platforms like TensorFlow Serving, AWS SageMaker, or Google AI Platform.**
* **APIs: Creating RESTful APIs to serve generative models using frameworks like Flask or FastAPI.**
* **Containerization: Familiarity with Docker and Kubernetes for deploying generative AI applications.**

**7. Version Control and Collaboration**

* **Git: For version control and collaborative work in coding projects.**
* **Jupyter Notebooks: For prototyping and sharing work interactively.**

**8. Cloud Computing**

* **AWS: Utilizing services like EC2 (compute), S3 (storage), and SageMaker (machine learning).**
* **Google Cloud Platform: Using BigQuery, AutoML, and AI Platform for scalable solutions.**
* **Microsoft Azure: Leveraging Azure Machine Learning for model training and deployment.**

**CERTIFICATION FOR GENERATIVE AI**

**1. Deep Learning Specialization (Coursera - Andrew Ng)**

* Covers fundamental concepts in deep learning, including GANs and VAEs, using TensorFlow and Keras.

**2. TensorFlow Developer Certificate**

* Validates proficiency in building and deploying models using TensorFlow, focusing on deep learning and generative models.

**3. Microsoft Certified: Azure AI Engineer Associate**

* Focuses on implementing AI solutions on Azure, including building and deploying generative models.

**4. AWS Certified Machine Learning – Specialty**

* Validates skills in building, training, and deploying machine learning models, including generative models on AWS.

**5. IBM AI Engineering Professional Certificate**

* Covers concepts in machine learning and deep learning, including generative techniques using IBM Watson and TensorFlow.

**6. NVIDIA Deep Learning Institute Certifications**

* Provides specialized training in generative models and deep learning, including hands-on experience.

**7. Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play (Book/Certification)**

* Focused on the principles of generative models, especially GANs and VAEs, with practical implementations.