DEEP LEARNING TECHNICAL SKILLS

1. Programming Languages

- **Python: The primary language used for deep learning projects.**
    - **Libraries:**
        - **TensorFlow: Open-source library for deep learning.**
        - **Keras: High-level API for building and training deep learning models.**
        - **PyTorch: A flexible and powerful library for deep learning with dynamic computation graphs.**

2. Deep Learning Frameworks

- **TensorFlow: Comprehensive library for deep learning; includes tools for production deployment.**
- **Keras: High-level interface for TensorFlow, making it easier to build and train neural networks.**
- **PyTorch: Preferred for research and applications that require flexibility in building models.**
- **MXNet: An efficient deep learning framework often used for cloud-based applications.**
- **Caffe: A deep learning framework focusing on speed and modularity.**

3. Core Deep Learning Concepts

- **Neural Networks: Understanding architectures like:**
    - **Feedforward Neural Networks**
    - **Convolutional Neural Networks (CNNs): Used for image processing tasks.**
    - **Recurrent Neural Networks (RNNs): For sequence data, including LSTMs and GRUs.**
    - **Generative Adversarial Networks (GANs): For generating new data samples.**
    - **Transformers: Architecture for NLP tasks and more recently, vision tasks.**
- **Optimization Algorithms: Knowledge of techniques like SGD, Adam, RMSprop for training models.**
- **Loss Functions: Familiarity with loss functions such as Mean Squared Error, Cross-Entropy, and custom loss functions.**

4. Data Preprocessing

- **Image Preprocessing: Techniques like normalization, augmentation (flipping, rotation), and resizing.**

- **Text Preprocessing: Tokenization, stemming, lemmatization, and embedding techniques (Word2Vec, GloVe, BERT).**
- **Feature Engineering: Creating meaningful features to improve model performance.**

5. Model Evaluation

- **Metrics: Understanding of evaluation metrics for regression (MAE, RMSE) and classification (accuracy, precision, recall, F1-score, AUC-ROC).**
- **Hyperparameter Tuning: Techniques such as Grid Search, Random Search, and Bayesian optimization.**

6. Deployment and Production

- **Model Deployment: Tools and platforms for deploying models into production (AWS SageMaker, Google AI Platform, TensorFlow Serving).**
- **APIs: Creating RESTful APIs to serve models using frameworks like Flask or FastAPI.**
- **Docker/Kubernetes: For containerizing applications and orchestrating deployments.**

7. Version Control and Collaboration

- **Git: For version control and collaboration in coding projects.**
- **Jupyter Notebooks: For prototyping and sharing work in an interactive format.**

8. Cloud Computing

- **AWS: Using services like EC2, S3, and SageMaker for training and deploying models.**
- **Google Cloud Platform: BigQuery, AutoML, and AI Platform for scalable solutions.**
- **Microsoft Azure: Azure Machine Learning for model training and deployment.**

CERTIFICATION FOR DEEP LEARNING

1. Deep Learning Specialization (Coursera - Andrew Ng)

- A comprehensive series covering neural networks, CNNs, RNNs, and more using TensorFlow and Keras.

2. TensorFlow Developer Certificate

- Validates proficiency in building and training models using TensorFlow, covering foundational concepts and practical applications.

3. Microsoft Certified: Azure AI Engineer Associate

- Focuses on implementing AI solutions on Azure, including building and deploying models using Azure Machine Learning.

4. AWS Certified Machine Learning – Specialty

- Validates skills in building, training, and deploying machine learning models on AWS.

5. IBM AI Engineering Professional Certificate

- Covers machine learning and deep learning concepts and practical applications using IBM Watson and TensorFlow.

6. NVIDIA Deep Learning Institute Certifications

- Provides specialized training in deep learning, including frameworks like TensorFlow and PyTorch, and focuses on GPU programming.

7. Cloudera Certified Professional Data Engineer

- Focuses on designing and building robust data pipelines and includes elements of machine learning and deep learning.