Artificial Intelligence Frameworks

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1 — ARTIFICIAL INTELLIGENCE (General AI Development)

Rank	Framework/Tool	Description
1	Python	Primary programming language for all AI development.
2	NumPy	Fast numerical computation, arrays, matrices.
3	Pandas	Data manipulation & analysis with DataFrames.
4	SciPy	Scientific computing, optimization, statistics.
5	Scikit-learn	Classical ML algorithms & preprocessing utilities.
6	Jupyter Notebook	Interactive coding environment for AI experiments.
7	ONNX / ONNX Runtime	Standard for model interchange & optimized inference.

8	Ray	Distributed computing for ML & AI workloads.
9	Docker	Containerization for deploying AI models.
10	FastAPI	High-performance API framework to serve AI models.

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2 — DATA SCIENCE

Rank	Framework/Tool	Description
1	Pandas	Data manipulation, wrangling, cleaning.
2	NumPy	Numerical computing backbone of Python DS stack.
3	Matplotlib	Base data visualization library.
4	Seaborn	Statistical visualizations built on Matplotlib.
5	Plotly	Interactive charts, dashboards.
6	Polars	Next-gen ultra-fast DataFrame library.
7	Apache Spark (PySpark)	Distributed processing for big data.
8	Dask	Parallel computing on local or cluster machines.
9	Airflow	Workflow orchestration for data pipelines.
10	SQLAlchemy	ORM & database query interface.

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3 — MACHINE LEARNING (Classical ML)

Rank	Framework/Tool	Description
1	Scikit-learn	Full suite of ML algorithms & preprocessing.
2	XGBoost	High-performance gradient boosting.
3	LightGBM	Fast GPU-optimized gradient boosting.
4	CatBoost	Best boosting library for categorical data.
5	TensorFlow	ML + DL framework for scalable models.
6	PyTorch	Most popular DL framework (also ML support).
7	H2O.ai AutoML	Automated ML pipeline generation.
8	MLflow	Experiment tracking & model registry.

9	Optuna	Hyperparameter optimization library.
10	StatsModels	Statistical & econometric modeling.

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4 — DEEP LEARNING

Rank	Framework/Tool	Description
1	PyTorch	Most-used DL library for research & production.
2	TensorFlow	Enterprise-grade DL framework.
3	Keras	High-level API for building DL models quickly.
4	JAX	High-performance ML with auto-differentiation.
5	HuggingFace Transformers	Pretrained DL models for NLP, CV, audio.
6	FastAI	Simplified high-level DL training.
7	DeepSpeed	Microsoft's large-model training framework.
8	Horovod	Distributed training across clusters.
9	OpenVINO	Optimized inference for Intel hardware.
10	TensorRT	NVIDIA GPU inference acceleration.

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5 — NATURAL LANGUAGE PROCESSING (NLP)

Rank	Framework/Tool	Description
1	HuggingFace Transformers	SOTA models for NLP tasks.
2	spaCy	Industrial NLP for production apps.
3	NLTK	Classic NLP processing toolkit.
4	Gensim	Topic modeling & word embeddings.
5	SentenceTransformers	Embedding generation for semantic tasks.
6	fastText	Facebook's fast text classification.
7	Stanford CoreNLP	Java-based advanced NLP toolkit.
8	AllenNLP	Research-oriented NLP framework.
9	Flair	NLP classification & NER framework.

10	OpenAI GPT API	Advanced NLP via LLM API access.

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6 — LARGE LANGUAGE MODELS (LLMs)

Rank	Framework/Tool	Description
1	HuggingFace Transformers	Core framework for LLM training & inference.
2	OpenAI API	Access to GPT models for LLM applications.
3	LangChain	LLM orchestration & agent framework.
4	LlamaIndex	Document indexing for LLM apps.
5	vLLM	Fastest inference engine for LLMs.
6	TGI (Text Generation Inference)	Production LLM inference server.
7	DeepSpeed	Efficient large model training.
8	PEFT	Parameter-efficient fine-tuning (LoRA/QLoRA).
9	bitsandbytes	Quantization for model size reduction.
10	FlashAttention	Optimized attention computation for LLMs.

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7 — GENERATIVE AI (Image/Video/Audio/Text)

Rank	Framework/Tool	Description
1	Diffusers (HF)	Stable Diffusion pipelines for gen AI.
2	Automatic1111	UI interface for image generation.
3	ComfyUI	Node-based generative AI system.
4	ControlNet	Condition-based image generation.
5	Whisper	SOTA speech-to-text.
6	Tortoise TTS	High-quality text-to-speech.
7	RVC / So-VITS	Voice cloning frameworks.
8	RunwayML	Video generation & editing AI tools.
9	GANs (PyTorch/TensorFlow)	Generative Adversarial Networks.
10	DreamBooth	Personalized fine-tuning for image generation.

8 — AI AGENTS / AGENTIC AI

Rank	Framework/Tool	Description
1	LangChain Agents	Agent framework with tools/actions.
2	LlamaIndex Agents	Document+tool based agent framework.
3	OpenAI Swarm	Multi-agent orchestration by OpenAI.
4	Microsoft Autogen	Multi-agent automation system.
5	CrewAI	Role-based AI agent coordination.
6	Haystack Agents	Production-ready agent pipelines.
7	AgentGPT	Browser-based automatic agents.
8	SuperAGI	Open-source autonomous agent framework.
9	LiteLLM	Multi-LLM orchestration layer.
10	ReAct / Toolformer	Architectures for reasoning-with-tools.

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9 — COMPUTER VISION (CV)

Rank	Framework/Tool	Description
1	OpenCV	Core CV operations, image processing.
2	torchvision	PyTorch CV toolkit & pretrained models.
3	TensorFlow Vision	TF-based CV components.
4	YOLOv5	High-accuracy object detection.
5	YOLOv8 / YOLO-NAS	Latest ultrafast detection models.
6	Detectron2	Facebook’s advanced CV framework.
7	MMDetection	OpenMMLab’s modular CV library.
8	Mediapipe	Hand, face, body landmark detection.
9	Albumentations	Best image augmentation library.
10	Open3D	3D vision & point-cloud processing.

10 — EVALUATION – Model Testing, Validation & Benchmarking

Rank	Tool / Framework	Description
1	**Scikit-learn Metrics**	Standard metrics (accuracy, F1, RMSE) for ML evaluation.
2	**HuggingFace Evaluate**	Unified evaluation library for NLP, CV, audio.
3	**MLflow Evaluation**	Centralized model performance tracking.
4	**TensorBoard**	Visualize training curves, metrics, embeddings.
5	**Weights & Biases (W&B)**	Experiment tracking and evaluation dashboards.
6	**DeepEval**	LLM & GenAI evaluation (semantic correctness, hallucinations).
7	**OpenAI Evals**	Evaluate LLM outputs against custom test cases.
8	**EleutherAI LM Evaluation Harness**	Standard benchmarking suite for LLMs.
9	**Robustness Gym**	Stress testing ML models under different conditions.
10	**Great Expectations**	Data quality & validation framework.

11 — OPTIMIZATION – Speed, Memory, Quantization, Fine-Tuning

Rank	Tool / Framework	Description
1	**ONNX Runtime**	Optimized inference runtime for CPU/GPU.
2	**TensorRT**	NVIDIA GPU high-speed model optimization.
3	**OpenVINO**	Intel hardware optimization & quantization.
4	**Bitsandbytes**	4-bit & 8-bit quantization for LLMs.
5	**PEFT (LoRA / QLoRA)**	Parameter-efficient fine-tuning.
6	**TorchScript**	JIT compilation for PyTorch models.
7	**XLA (Accelerated Linear Algebra)**	Optimization backend for TensorFlow/JAX.
8	**DeepSpeed**	Large-model optimization & training acceleration.

9	**FlashAttention**	High-performance attention kernel for LLMs.
10	**Graph Optimization (TF Lite)**	Mobile/edge optimization tools.

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12 — DEPLOYMENT – Serving, Hosting, Productionization

Rank	Tool / Framework	Description
1	**FastAPI**	High-performance API serving for ML models.
2	**Docker**	Containerization for scalable deployments.
3	**Kubernetes**	Container orchestration for production ML.
4	**TensorFlow Serving**	High-throughput TF model serving.
5	**TorchServe**	PyTorch native model server.
6	**HuggingFace TGI**	Production inference server for LLMs.
7	**Seldon Core**	Kubernetes-native model serving platform.
8	**BentoML**	Unified serving framework for all ML models.
9	**NVIDIA Triton Inference Server**	High-performance multi-framework serving.
10	**VLLM Server**	Fastest deployment server for large language models.

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13 — MLOps – End-to-End Machine Learning Operations

Rank	Tool / Framework	Description
1	**MLflow**	Experiment tracking, models, and deployments.
2	**Kubeflow**	Kubernetes-native MLOps pipelines.
3	**Airflow**	ML workflow orchestration and scheduling.
4	**DVC (Data Version Control)**	Dataset & model versioning.
5	**Weights & Biases**	Experiment tracking, metrics, MLOps dashboards.
6	**ZenML**	Production-grade MLOps framework.
7	**Prefect**	Modern workflow orchestration for ML pipelines.
8	**Argo Workflows**	Kubernetes-native pipeline automation.

9	**Neptune.ai**	Model registry & monitoring.
10	**AWS SageMaker**	Full ML lifecycle platform (training → deploy).

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14 — HARDWARE ACCELERATION – GPU/TPU/AI Chips

Rank	Hardware / Framework	Description
1	**CUDA**	NVIDIA GPU computing backbone.
2	**cuDNN**	NVIDIA deep neural network acceleration library.
3	**TensorRT**	GPU inference accelerator for NVIDIA devices.
4	**OpenVINO Toolkit**	Intel hardware acceleration & optimization.
5	**ROCm (AMD)**	Open compute platform for AMD GPUs.
6	**Google TPU / XLA**	High-performance tensor processing for training.
7	**Apple CoreML**	On-device ML acceleration for iOS/Mac.
8	**Qualcomm AI Engine**	On-device AI acceleration for mobile chips.
9	**NPU (AI Accelerators)**	Dedicated neural processors on modern devices.
10	**FPGA / VHDL Accelerators**	Custom hardware acceleration for enterprise AI.