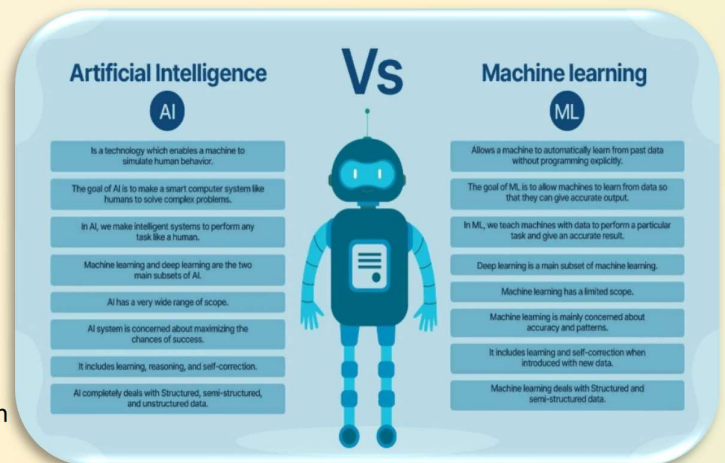
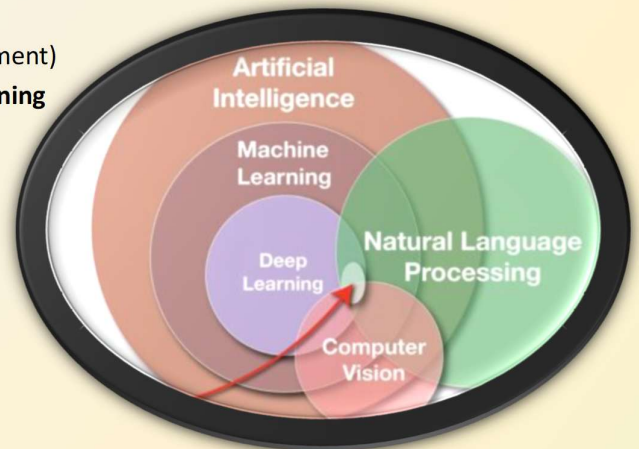


ADVANCE MACHINE LEARNING & ARTIFICIAL INTELLIGENCE COURSE – 12 MONTHS

Python, Math, and Foundations of AI

- **Module 1: Introduction to AI & Machine Learning**
- What is AI?
- History of AI
- AI vs ML vs DL vs Data Science
- Types of ML (Supervised, Unsupervised, Reinforcement)
- **Module 2: Python Programming for Machine Learning**
- Lesson Topics:
- Python basics: variables, loops, conditions
- Functions, OOP basics
- Working with lists, dictionaries, tuples
- File handling
- Virtual environments
- Jupyter Notebook
- Libraries (NumPy, Pandas, Matplotlib, Seaborn)
- Practice Assignments:
- Build a temperature converter
- Create a calculator
- Data cleaning basics in Pandas
- **Module 3: Mathematics for ML**
- Matrix operations
- Vectors
- Determinants, eigenvalues
- Basic probability
- Bayes theorem
- Permutations & combinations
- Mean, median, variance, standard deviation
- Derivatives
- Gradient descent
- Mini Projects:
- Data visualization dashboard
- Basic statistical analysis on dataset
- **Data Handling & Exploratory Data Analysis**
- Module 4: Data Collection
- Data formats: CSV, JSON, XML
- Web scraping (BeautifulSoup, Selenium)
- APIs
- Databases basics (SQL)
- Data pipelines overview
- **Module 5: Data Cleaning & Preprocessing**
- Handling missing values
- Handling categorical data (OneHot, Label Encoding)



JOB ORIENTED COURSES

100% JOB GUARANTEE

EXPERIENCED FACULTY

WEEKLY TEST

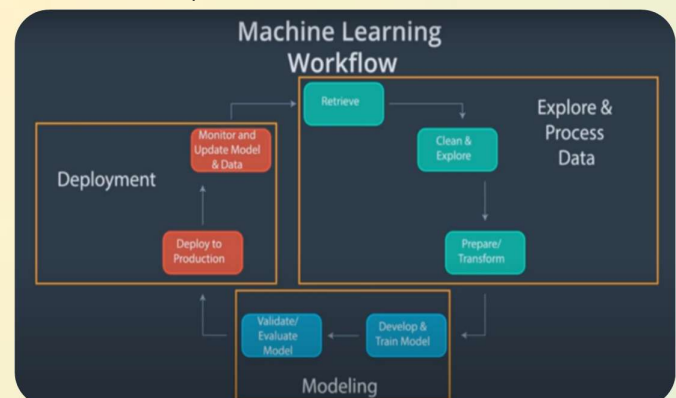
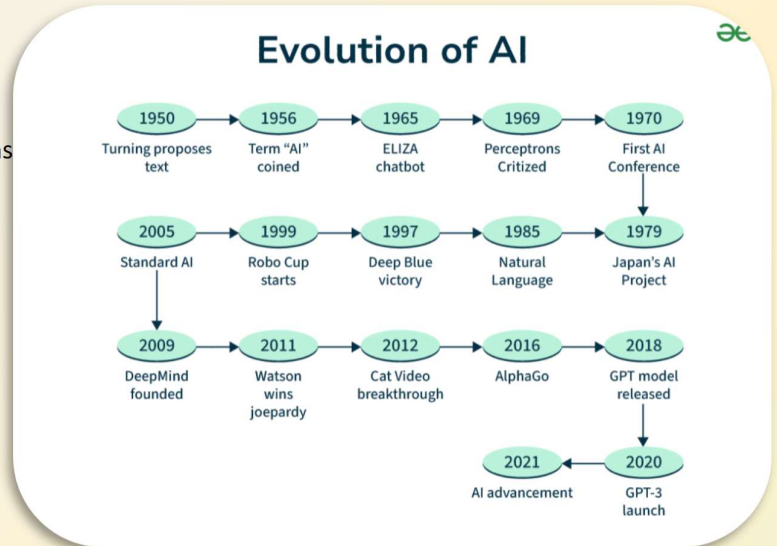
PROJECT & ASSIGNMENT WORK

- Numerical transformations
- Outliers detection
- Data balancing techniques

दिल्ली सरकार द्वारा मान्यता प्राप्त

- Standardization vs normalization
- **Module 6: Exploratory Data Analysis (EDA)**
- Understanding distributions
- Correlation heatmaps
- Feature relationships
- Dimensionality understanding
- Using Seaborn & Plotly for visualizations
- Core Machine Learning
- **Module 7: Supervised Learning**
- Algorithms: Linear Regression
- Logistic Regression
- KNN / Decision Trees / Random Forest
- Support Vector Machines
- Naive Bayes
- Training vs testing
- Loss functions
- Bias-variance trade-off
- Overfitting & underfitting
- **Module 8: Unsupervised Learning**
- Clustering (K-Means, Hierarchical, DBSCAN)
- Dimensionality Reduction (PCA, t-SNE)
- Association rule mining (Apriori, Eclat)
- Model Optimization & ML Pipelines
- **Module 9: Feature Engineering**
- Feature creation
- Polynomial features
- Encoding techniques
- Feature selection methods (Chi-square, ANOVA)
- **Module 10: Model Optimization**
- Hyperparameter tuning (GridSearchCV, Random Search CV)
- Cross-validation
- Regularization (L1, L2, ElasticNet)
- **Module 11: ML Pipelines**
- Scikit-learn pipelines
- Automated ML workflows
- Saving models (Pickle, Joblib)
- Debugging ML models
- Deep Learning Foundations
- **Module 12: Neural Networks Basics**
- Perceptron

- Forward & backward propagation

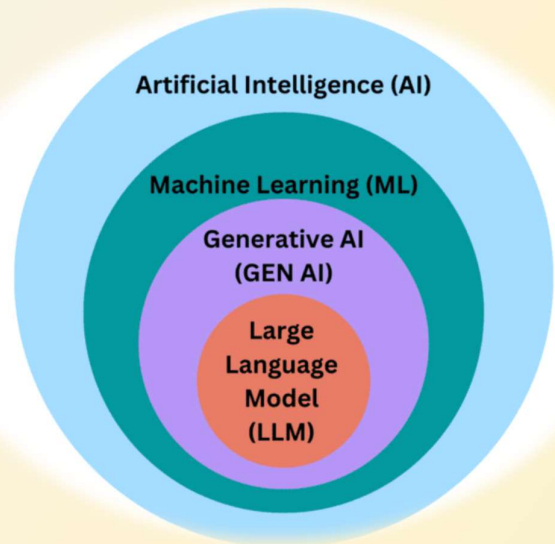


- Activation functions
- Loss functions
- Optimizers (SGD, Adam)

An ISO 9001:2015 Certified Organization
दिल्ली सरकार द्वारा मान्यता प्राप्त

- **Module 13: Deep Learning Frameworks**
- TensorFlow / Keras
- PyTorch
- **Module 14: Building Neural Network Models**
- Feedforward networks
- Weight initialization
- Regularization in DL
- Batch Normalization
- Dropout
- Convolutional Neural Networks (CNNs)
- **Module 15: Computer Vision Concepts**
- Images as arrays
- Kernels & filters
- Convolutions
- Pooling
- Padding
- **Module 16: CNN Architectures**
- LeNet
- AlexNet
- VGG
- ResNet
- Inception
- **Module 17: Advanced Vision**
- Transfer Learning
- Fine-tuning
- Data augmentation
- Object detection basics
- Segmentation basics
- Natural Language Processing (NLP)
- **Module 18: NLP Foundations**
- Text preprocessing
- Tokenization
- Stopwords
- Stemming, Lemmatization
- N-grams
- **Module 19: NLP Models**
- Bag of Words
- TF-IDF
- Word Embeddings (Word2Vec, GloVe)
- **Module 20: Sequence Models**

- RNN / LSTM / GRU



**JOB ORIENTED
COURSES**

**100% JOB
GUARANTEE**

**EXPERIENCED
FACULTY**

WEEKLY TEST

**PROJECT &
ASSIGNMENT
WORK**

- **Module 21: Transformers**
- Self-attention
- Multi-head attention
- Positional encoding
- Encoder-decoder architecture
- **Module 22: Modern NLP Models**

- BERT
- GPT family
- T5
- LLaMA

- Sentence Transformers

- **Module 23: Generative Models**

- Autoencoders
- Variational Autoencoders (VAE)
- Generative Adversarial Networks (GANs)
- Diffusion Models

- **Module 24: Text-to-Image Models**

- Stable Diffusion
- DALL-E
- ControlNet

- **Module 25: Audio & Video Generation**

- Text-to-speech
- AI music generators
- Video synthesis basics

- **Module 26: Deep Reinforcement Learning**

- Deep Q-Networks
- Policy Gradient
- Actor-Critic methods

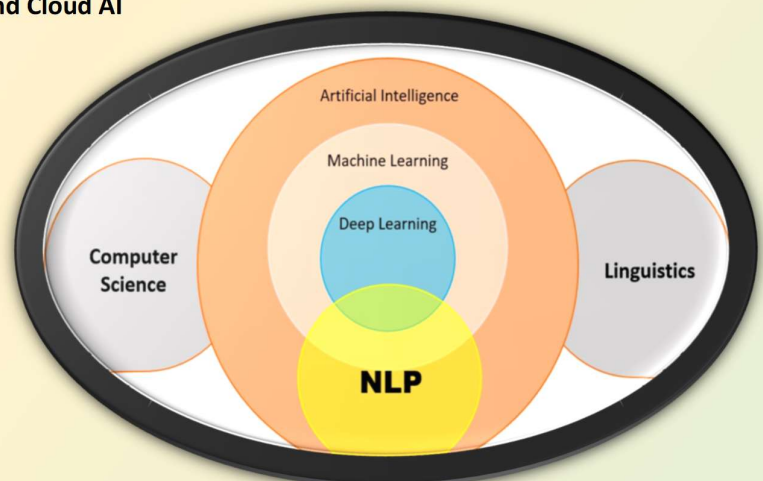
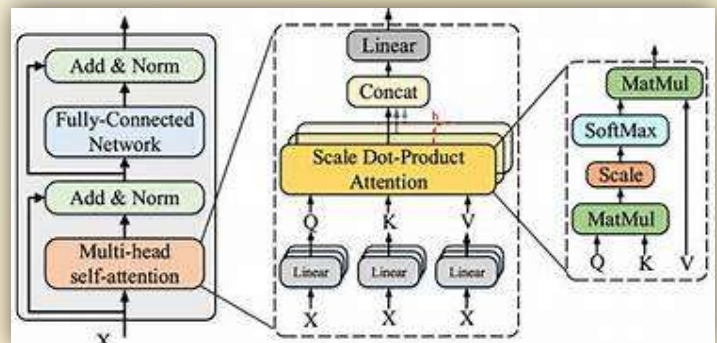
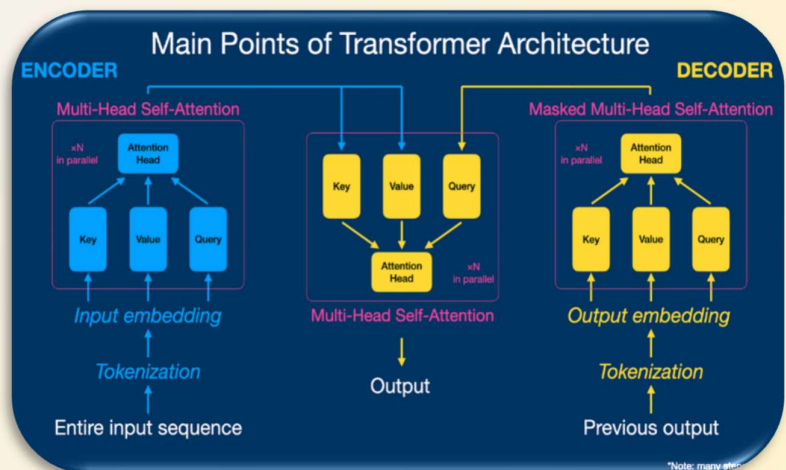
- **Module 30: Deployment, MLOps, and Cloud AI**

- Saving/exporting models
- Flask & FastAPI
- Model inference APIs
- Frontend integration basics

- **Module 31: Cloud Services**

- AWS AI services
- Google AI/Vertex
- Azure ML
- AutoML tools
- Module 32: MLOps

- Version control
- CI/CD



- Docker containers
- Monitoring & retraining
- MLflow
- **Module 33 Capstone Project & Portfolio**
- Choose ONE large-scale system:
- AI chatbot
- Healthcare prediction system
- Face recognition
- Recommendation engine
- Fraud detection system
- NLP question-answer bot
- Autonomous driving simulation model
- **Module 34: Portfolio Development**
- GitHub setup
- Professional documentation
- Resume for ML Engineer
- LinkedIn optimization

