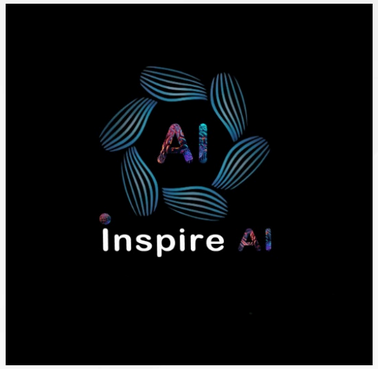


MACHINE LEARNING

PROGRAM HIGHLIGHITS

- **Basic-Advanced Level Training**
  By Experienced Mentors
- **Live & Recorded Lectures**
  At Your Flexible Schedule
- **Real Time Projects**
  Minor & Major Projects
- **Accredited certificates**
  Program approved ISO Certificate
- **Internships**
  Opportunities will be provided
- **Placement Guidance**
  Assistance from industrial EXPERTS

OUR MOTIVE

UPSKILL

Empowering Minds For Tomorrow

ENHANCE

Discover Your Next Ambition

MOTIVATE

Empowering Minds, Igniting Futures

ABOUT US

Inspire AI is a leading EdTech company dedicated to empowering engineering students with the skills and knowledge necessary to excel in today’s competitive job market. Our mission is to bridge the gap between theoretical learning and practical application, enabling students to develop a strong foundation and enhance their employability.

Machine Learning (ML) is a subset of artificial intelligence that focuses on building systems that can learn from data and improve their performance over time without being explicitly programmed. Here are several key reasons why Machine Learning is important

WHY DS ?

- **Automation and Efficiency**
- **Data-Driven Decision Making**
- **Personalization**
- **Enhanced Products and Services**
- **Improved Accuracy and Precision**
- **Scalability**
- **Real-Time Processing**
- **Economic and Competitive Advantage**
- **Application Across Various Domains**
- **Enhanced Security**
- **Scientific and Research Advancements**
- **Future Potential**

LEARNING PATH

- Introduction to Machine Learning
- Python for Machine Learning
- Data Handling and Preprocessing
- Supervised Learning - Regression
- Supervised Learning - Classification
- Advanced Supervised Learning
- Unsupervised Learning
- Feature Selection and Engineering
- Time Series Analysis
- Model Evaluation and Improvement
- Deep Learning
- Natural Language Processing (NLP)
- Reinforcement Learning
- Big Data and Machine Learning
- Deployment and Production

Module 1: Introduction to Machine Learning

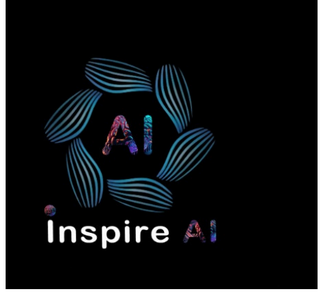
- **Overview of Machine Learning**: Definition, History, and Applications
- **Types of Machine Learning**: Supervised, Unsupervised, and Reinforcement Learning
- **Machine Learning Workflow**: Data Collection, Data Preparation, Model Training, Model Evaluation, Model Deployment

Module 2: Python for Machine Learning

- **Introduction to Python Programming**
- **Python Libraries for ML**: NumPy, Pandas, Matplotlib, Scikit-learn
- **Basic Python Programming**: Variables, Data Types, Control Structures, Functions

Module 3: Data Handling and Preprocessing

- **Data Collection and Cleaning**
- **Handling Missing Data**
- **Data Transformation and Scaling**
- **Feature Engineering**
- **Data Visualization**



Module 4: Supervised Learning - Regression

- **Introduction to Regression Analysis**
- **Linear Regression** : Simple and Multiple Linear Regression
- **Polynomial Regression**
- **Evaluation Metrics** : Mean Absolute Error (MAE), Mean Squared Error (MSE), R-squared

Module 5: Supervised Learning - Classification

- **Introduction to Classification**
- **Logistic Regression**
- **K-Nearest Neighbors (KNN)**
- **Support Vector Machines (SVM)**
- **Decision Trees**
- **Evaluation Metrics** : Accuracy, Precision, Recall, F1 Score, ROC-AUC

Module 6: Advanced Supervised Learning

- **Ensemble Methods** : Bagging, Boosting, Random Forest, Gradient Boosting Machines (GBM)
- **Hyperparameter Tuning** : Grid Search, Random Search, Cross-Validation
- **Model Selection and Evaluation**

Module 7: Unsupervised Learning

- **Introduction to Unsupervised Learning**
- **Clustering**: K-Means, Hierarchical Clustering, DBSCAN
- **Dimensionality Reduction**: Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA)
- **Association Rules**: Apriori Algorithm, FP-Growth

Module 8: Feature Selection and Engineering

- **Importance of Feature Selection**
- **Techniques**: Filter Methods, Wrapper Methods, Embedded Methods
- **Feature Engineering Best Practices**

Module 9: Time Series Analysis

- **Introduction to Time Series Data**
- **Time Series Decomposition**
- **Moving Averages and Smoothing Techniques**
- **ARIMA and Seasonal ARIMA (SARIMA) Models**
- **Forecasting and Predictive Modeling**

Module 10: Model Evaluation and Improvement

- **Bias-Variance Tradeoff**
- **Model Validation Techniques**
- **Overfitting and Underfitting**
- **Regularization Techniques** : Lasso, Ridge, Elastic Net

Module 11: Deep Learning

- **Feedforward Neural Networks**
- **Backpropagation and Gradient Descent**
- **Convolutional Neural Networks (CNNs)**
- **Recurrent Neural Networks** (RNNs) and Long Short-Term Memory (LSTM)
- **Deep Learning Frameworks** : TensorFlow, Keras, PyTorch

Module 12: Natural Language Processing (NLP)

- **Introduction to NLP**
- **Text Preprocessing** : Tokenization, Stemming, Lemmatization
- **Bag of Words and TF-IDF**
- **Word Embeddings** : Word2Vec, GloVe
- **Advanced NLP Techniques** : Transformers, BERT, GPT

Module 13: Reinforcement Learning

- **Introduction to Reinforcement Learning**
- **Markov Decision Processes (MDP)**
- **Q-Learning**
- **Deep Q-Networks (DQN)**
- **Applications of Reinforcement Learning**

Module 14: Big Data and Machine Learning

- **Introduction to Big Data Technologies**
- **Hadoop Ecosystem**
- **Spark and PySpark for Big Data Processing**
- **Machine Learning with Spark MLlib**

Module 15: Deployment and Production

- **Model Deployment** : REST APIs, Flask, FastAPI
- **Model Monitoring and Maintenance**
- **Introduction to MLOps**
- **Tools for MLOps** : MLflow, Kubeflow, Docker, Kubernetes

Assignments & Assessments

- Weekly assignments based on module topics
- **Mid-term project:** Wireframing and prototyping a small application
- **Final project:** Comprehensive Machine Learning project
- Participation in class discussions and activities

Recommended Reading

- "Introduction to Machine Learning with Python" by Andreas C. Müller and Sarah Guido
- "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron
- "Python Data Science Handbook" by Jake VanderPlas

FRAME WORKS

XGBoost

TOOLS USED

DASK

AIRFLOW

*In case of additional tools used, It will be discussed in live class

CERTIFICATIONS

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THANK YOU

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