



**AI Vision Your Future**  
**Technical and Training Services**

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# **Artificial Intelligence Diploma**

## **Advanced Level**

### **Diploma Courses:**

1. Computer Vision (80 hour)
2. Natural Language Processing (80 hour)
3. Projects

### **■ Prerequisites:**

- Artificial Intelligence Diploma Intermediate Level

# Artificial Intelligence Diploma Level 2 (160 H)

## Course 1 “Computer Vision” :(80 hour)

- **Module 1: Introduction to Computer Vision**
  - Definition of Computer Vision
  - Applications of Computer Vision (e.g., image recognition, object detection, segmentation, tracking, motion analysis, 3D reconstruction, face recognition, robotics, autonomous vehicles, medical imaging, security and surveillance, augmented and virtual reality, etc.)
  - History of Computer Vision (e.g., early image processing techniques, development of machine learning and deep learning algorithms, etc.)
  - Image and Video Basics (e.g., color spaces, image representation, pixel operations, interpolation, image and video file formats, etc.)
- **Module 2: Image Processing**
  - Image Filtering and Enhancement
  - Image Segmentation
    - Feature Detection and Extraction
- **Module 3: Deep Learning for Computer Vision**
  - Deep Learning (e.g., artificial neural networks).
  - Convolutional Neural Networks (CNNs) (e.g., architecture of CNNs, convolutional layers, pooling layers, activation functions, loss functions, training and optimization, etc.)
  - Transfer Learning (e.g., using pre-trained models, fine-tuning, transfer learning in CNNs, etc.)
  - Object Detection and Recognition
- **Module 4: Video Analysis and Tracking**
  - Optical Flow (e.g., motion estimation, Lucas-Kanade method, Horn-Schunck method, etc.)
  - Motion Estimation (e.g., background subtraction, optical flow, feature tracking, etc.)
  - Tracking and Surveillance (e.g., object tracking, multi-object tracking, Kalman filter, particle filter, etc.)
  - Pose Estimation
- **Module 5: 3D Vision**



## Course 2 “NLP” :(80 hour)

- **Module 1: Introduction to NLP**

- Definition of NLP.
- Applications of NLP.
- Challenges of NLP.
- NLP tools and resources.

- **Module 2: Text Processing Pipeline**

- Text Preprocessing
  - Tokenization
  - Stop word removal.
  - Stemming and lemmatization.
  - Part-of-speech tagging.
  - Named entity recognition.
- Text Representation
  - Bag of words model.
  - TF-IDF model: TF-IDF (Term Frequency-Inverse Document Frequency).
  - Word embeddings.

- **Module 3: Text Classification**

- Supervised learning
  - Logistic Regression
  - Naive Bayes: Naive Bayes is a probabilistic classifier that is based on Bayes' theorem. It is simple and efficient and can work well for text classification tasks.

- **Module 4: Text Clustering and Topic Modeling**

- Unsupervised learning: Unsupervised learning is a machine learning approach that involves finding patterns and structure in unlabeled data.
  - Latent Dirichlet Allocation (LDA): LDA is a popular topic modeling algorithm that extracts topics from a collection of documents based.

- **Module 5: Recommendation system**
  - Content-based recommendation
  - Collaborative filtering
- **Module 6: Sequence models**
  - Statistical language models
  - Neural language models
  - Recurrent neural network
  - Long short-term memory
  - Gated recurrent unit.
- **Module 7: Sequence-to-sequence models**
  - Statistical machine translation
  - Neural machine translation
  - Attention mechanism.
- **Module 7: Transformers**
  - Self-attention
  - Multi head attention
  - BERT
  - GPT

## Projects:

- Lane line detection
- Object Detection in Images using yolo
- Gesture Recognition for Human-Computer Interaction
- Document Text Extraction and Recognition
- Vehicle License Plate Recognition
- Emotion Recognition from Facial Expressions
- Object Tracking
- Traffic Light detection
- Optical character recognition.
- Text Summarization
- Sentiment Analysis
- Question Answering
- Text Similarity and Clustering
- Text Anomaly Detection
- 3D face Reconstruction
- Document understanding