INFOSOFT IT SOLUTIONS

Training | Projects | Placements

Revathi Apartments, Ameerpet, 1st Floor, Opposite Annapurna Block, Infosoft It solutions, Software Training & Development Institute, +91-9059683947|91-9182540872

Computer Vision

Introduction to Computer Vision

- Definition and goals of computer vision
- Applications in various fields (robotics, medical imaging, autonomous vehicles, etc.)
- History and evolution of computer vision

Image Processing Basics

- Image representation (pixels, color models)
- Image enhancement (filters, transformations)
- Image segmentation (thresholding, region-based methods)
- Noise reduction techniques

Image Transformations

- Geometric transformations (translation, rotation, scaling)
- Image warping and morphing
- Homogeneous coordinates and transformations

Feature Extraction and Selection

- Point features (Harris corner detection, SIFT, SURF)
- Edge detection (Sobel, Canny edge detector)

- Region-based features (Histogram of Oriented Gradients - HOG)

Image Classification and Object Recognition

- Supervised learning basics
- Classification methods (SVM, k-Nearest Neighbors, CNNs)
- Object detection (Haar cascades, R-CNN, YOLO)

Deep Learning for Computer Vision

- Introduction to neural networks
- Convolutional Neural Networks (CNNs)
- Transfer learning and fine-tuning
- Advanced architectures (ResNet, VGG, etc.)

Motion Analysis and Tracking

- Optical flow techniques
- Motion estimation and tracking algorithms (Kalman filters, Mean-shift, etc.)
- Multiple object tracking

3D Computer Vision

- Depth perception methods (stereo vision, structured light, time-of-flight)
- 3D reconstruction techniques (SFM, SLAM)
- Applications in augmented reality and virtual reality

Video Analysis

- Video processing basics (temporal filtering, frame interpolation)
- Action recognition and event detection
- Video summarization and understanding

Applications and Case Studies

- Real-world applications (biometrics, surveillance, image retrieval)
- Case studies in medical imaging, autonomous driving, robotics
- Ethical considerations and challenges in computer vision

Hands-on Projects and Practical Applications

- Implementing algorithms in Python with libraries like OpenCV, TensorFlow, PyTorch
- Building and evaluating models for specific tasks (object detection, image classification)
- Working with real datasets and deploying models in applications

Future Directions and Emerging Trends

- Generative models (GANs)
- Explainable AI in computer vision
- Integration with other AI disciplines (NLP, reinforcement learning)

Additional Topics (Optional)

- Image and video compression
- GPU programming for computer vision
- Mobile and embedded vision applications