



COMPUTER VISION

IMAGE PROCESSING . OPENCV
DETECTION . TRACKING . SE
O . FACE RECOGNITION . OCR

DURATION

50 Hours

LEVEL

**Intermediate to
Advanced**

MODULES

8

MODE

**Classroom ·
Online · Hybrid**

01 COURSE OVERVIEW

An applied computer vision course from pixel operations to deployed detection systems.

The course begins with classical image processing in OpenCV, then moves to convolutional models for classification, detection, tracking and segmentation, with optical character recognition and face recognition treated as complete build exercises.

Projects are deployment-shaped: number plate recognition, vehicle counting and an attendance system.

WHO IT IS FOR

AI and ML practitioners

Embedded and robotics engineers

Security and surveillance product teams

Engineering students in final year

PREREQUISITES

Python and basic machine learning. Deep learning exposure is helpful.

02 LEARNING OUTCOMES

01 Process and transform images with OpenCV.

03 Run and tune object detection with YOLO.

05 Perform semantic and instance segmentation.

07 Extract text from documents and plates with OCR.

02 Train image classifiers with transfer learning.

04 Track objects across video frames.

06 Build face detection and recognition pipelines.

03 MODULE STRUCTURE

8 MODULES

01 IMAGE FUNDAMENTALS

Digital images

Histograms

Edge detection

Colour spaces

Filtering

Morphological operations

TOOLS

OPENCV

NUMPY

02 FEATURE EXTRACTION

Corners and keypoints

Template matching

Image stitching

SIFT and ORB

Contours

LAB

FEATURE MATCHING

03 CLASSIFICATION WITH CNNs

Datasets and augmentation

Fine-tuning

Confusion analysis

Transfer learning

Evaluation

LAB

PRODUCT IMAGE CLASSIFIER

04 OBJECT DETECTION

Detection metrics

YOLO family

Annotation workflow

Anchor boxes

Training on custom data

LAB

VEHICLE DETECTION

05 TRACKING

Centroid tracking

SORT and DeepSORT

Multi-camera basics

Kalman filter

Counting and zones

LAB

VEHICLE COUNTING

06 SEGMENTATION

Semantic segmentation

U-Net

Post-processing masks

Instance segmentation

Mask R-CNN

LAB

DEFECT SEGMENTATION

07 FACES AND OCR

Face detection

Liveness basics

Document parsing

Embeddings and recognition

Tesseract OCR

Number plate pipelines

LAB

ATTENDANCE SYSTEM

08 DEPLOYMENT

Video pipelines

Model optimisation

Alerts and logging

Edge devices

Streaming

PROJECT

END-TO-END VISION SYSTEM

04 ASSESSMENT & CERTIFICATION

Module assignments and labs	25%
Mini projects	20%
Internal assessments	15%
Final project and review	40%

CERTIFICATION

Learners who complete all modules, submit the final project and clear the review receive a course completion certificate from Kaizen Infinities Private Limited. Project work is documented for the learner's portfolio, and interview preparation is included in the closing sessions.

05 CAREER OUTCOMES

ROLES THIS PROGRAMME PREPARES FOR

COMPUTER VISION ENGINEER

AI ENGINEER

ROBOTICS SOFTWARE ENGINEER

EDGE AI DEVELOPER

VIDEO ANALYTICS DEVELOPER

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