

Computer Vision

1. Fundamentals of Computer Vision

- 1.1 Introduction to Computer Vision
- 1.2 Image Processing Techniques
- 1.3 Image Representation and Formats
- 1.4 Color Spaces and Transformations
- 1.5 Filtering and Edge Detection

2. Real-Time Image Acquisition and Processing

- 2.1 Image Acquisition Devices and Sensors
- 2.2 Hardware Acceleration with GPUs and FPGAs
- 2.3 Techniques for Reducing Latency
- 2.4 Synchronization and Timing in Real-Time Systems

3. Fundamentals of Computer Vision

- 3.1 Key Detection and Description (SIFT, SRUF, ORB)
- 3.2 Corner Detection and Harris Detector
- 3.3 Edge Detection and Canny Edge Detector
- 3.4 Real-Time Feature Matching and Tracking
- 3.5 Applications of Augmented Reality

4. Real-Time Object Detection and Recognition

- 4.1 Real-Time Object Detection and Recognition
- 4.2 YOLO (You Only Look Once) and Its Variants
- 4.3 Single Shot MultiBox Detector (SSD)
- 4.4 Faster R-CNN (Region-Based Convolutional Neural Networks)
- 4.5 Implementing Real-Time Object Detecting Systems

5. Advanced Techniques for Real-Time Computer Vision

- 5.1 Deep Learning for Computer Vision
- 5.2 Convolution Neural Network
- 5.3 Generative Adversarial Network (GAN)
- 5.4 Real-Time Semantic and Instance Segmentation Image Segmentation
- 5.5 Transfer Learning and Model Optimization

6. Applications of Real-Time Computer Vision

- 6.1 Autonomous Vehicles and Navigation
- 6.2 Real-Time Surveillance and Security Systems
- 6.3 Industrial Automation and Robotics