Industrial Computer Vision System Design Training Course



19 - 23 Oct 2026

Cape town

4600 € (Per Person)

Ref: #AI1888_263674

Course Introduction / Overview:

This training course is designed to equip professionals with the knowledge and skills needed to design, develop, and deploy computer vision systems in industrial environments. Computer vision is becoming a critical technology for enhancing efficiency, safety, and quality control in manufacturing and other industrial sectors. This program provides a comprehensive look at how to use computer vision for applications like automated inspection, robotic guidance, and predictive maintenance. Drawing on the foundational concepts from texts like "Computer Vision: A Modern Approach" by David Forsyth and Jean Ponce, the course covers everything from camera selection and image processing to the integration of machine learning models. Participants will learn how to overcome common industrial challenges, like variable lighting and complex textures, by creating robust and reliable vision systems. BIG BEN Training Center has developed this curriculum with a strong focus on practical, real-world applications. It includes case studies and hands-on projects that allow participants to apply what they learn to real industrial scenarios, preparing them to lead their organizations' digital transformation initiatives. This course is a must-have for anyone looking to use the power of computer vision to drive innovation and improve operational performance.

Target Audience / This training course is suitable for:

- Manufacturing and production engineers.
- Robotics and automation specialists.
- Quality control and assurance managers.
- R&D and innovation engineers.
- Systems integrators.
- Electrical and mechanical engineers.
- Technical project managers.

Target Sectors and Industries:

- Manufacturing and industrial automation.
- Automotive and aerospace.
- Electronics and semiconductors.
- Food and beverage production.
- Pharmaceutical and medical devices.
- Oil and gas.
- Government defense and logistics.

Target Organizations Departments:

- Quality control and inspection.
- Research and development.
- Production and operations.
- Process and reliability engineering.
- Robotics and automation.
- Industrial safety.
- Supply chain management.

Course Offerings:

By the end of this course, the participants will have able to:

- Select and configure appropriate hardware, like cameras and lenses, for specific industrial tasks.
- Apply image processing techniques to enhance image quality and extract relevant data.
- Design and train machine learning models for defect detection and quality inspection.
- Implement computer vision systems for robotic guidance and assembly line automation.
- Develop solutions for object tracking, classification, and measurement in real time.
- Integrate computer vision with other industrial systems and PLCs.
- Troubleshoot and optimize existing vision systems for better performance.

Course Methodology:

The training methodology at BIG BEN Training Center for this course is built around practical, hands-on learning. We believe that mastering industrial computer vision requires more than just theoretical knowledge; it requires practical experience. The course uses a project-based approach, where participants work on real-world industrial case studies from start to finish. These projects include tasks like designing an automated inspection system for manufacturing defects or developing a vision-guided robotics application. We use live demonstrations and interactive workshops to show key concepts and tools in action. Participants will have the chance to work with industry-standard hardware simulators and software platforms, gaining valuable, tangible skills. The course also includes group problem-solving sessions and peer feedback, fostering a collaborative learning environment. This practical and immersive methodology gives participants the confidence to apply their new skills immediately in a professional setting and to lead their organizations in the next phase of industrial automation.

Course Agenda (Course Units):

Unit One: Fundamentals of Industrial Computer Vision

- Introduction to computer vision in manufacturing.
- Key components of a vision system.
- Camera and lens selection for industrial environments.
- Lighting techniques and their importance.
- Image acquisition and digital image representation.
- Image processing fundamentals.
- System design and project planning.

Unit Two: Image Processing and Feature Extraction

- Image filtering and noise reduction.
- Edge and contour detection.
- Feature extraction and descriptor algorithms.
- Segmentation techniques for object isolation.
- Calibration and geometric transformations.
- Template matching and object recognition.
- Practical session on image processing.

Unit Three: Machine Learning for Industrial Inspection

- Introduction to machine learning for computer vision.
- Supervised and unsupervised learning.
- Training models for defect classification.
- Anomaly detection and quality control.
- Deep learning and neural networks for vision.
- Data labeling and preparation.
- Practical machine learning project.

Unit Four: Advanced Applications and System Integration

- Vision-guided robotics and pick-and-place applications.
- Assembly verification and part counting.
- Optical character recognition (OCR) for product tracking.
- AI-powered predictive maintenance.
- Integrating vision systems with PLCs and automation platforms.
- Real-time processing and performance optimization.
- Practical project on system integration.

Unit Five: System Deployment, Ethics, and The Future

- Hardware and software deployment strategies.
- Troubleshooting common industrial vision problems.
- Safety and security considerations.
- Ethical implications of automated inspection.
- Case studies of successful industrial vision projects.
- The future of AI and computer vision in industry.
- Final project presentation and review.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

How can the implementation of AI-driven computer vision systems in industrial settings be managed to improve productivity without negatively impacting on employment or human oversight?

What unique qualities does this course offer compared to other courses?

This training course is designed to be a complete, industry-focused program that stands out from others by bridging the gap between theoretical knowledge and practical application. While many academic courses may focus on the algorithms and research behind computer vision, this program is designed for real-world industrial needs. It focuses on the full system design lifecycle, from selecting the right camera and lighting to integrating the final solution with factory automation systems. The curriculum's emphasis on hands-on, project-based learning means that participants will not just study concepts; they will build working models that solve actual manufacturing and quality control problems. This is an indispensable advantage for professionals seeking to apply their skills immediately. We also address the specific challenges of industrial environments, such as dealing with dirt, vibration, and complex production lines, which are often overlooked in more general courses. This unique, problem-solving approach makes this program a vital resource for any organization looking to leverage the power of computer vision to improve their operations and competitive edge.