Training Course on Image Recognition and Computer Vision for Agri-Applications

Professional Development Training Course Outline

Category	Agriculture	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The agricultural sector is undergoing a technological revolution, powered by Artificial Intelligence (AI) and image recognition tools. Computer vision, a critical component of AI, enables machines to interpret and make decisions based on visual data. In modern agriculture, these technologies are crucial for crop monitoring, pest detection, precision farming, yield estimation, and supply chain optimization. The integration of image recognition and computer vision into agricultural workflows enhances productivity, minimizes resource usage, and ensures sustainable practices. Training Course on Image Recognition and Computer Vision for Agri-Applications is designed to equip participants with in-demand skills in AI-based image analytics tailored for real-time agricultural applications.

Participants will explore the convergence of deep learning, IoT, drone technology, and agricultural imaging, gaining both theoretical knowledge and hands-on experience. Whether working with satellite imagery or smartphone-based crop diagnosis, learners will develop competencies to apply computer vision in various agri-use cases. With the rising global interest in AI in agtech, this course offers timely, practical, and high-impact learning tailored to the future of smart farming.

Programme Curriculum

Training Course on Image Recognition and Computer Vision for Agri-Applications

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Course Objectives

1. Understand core principles of image recognition and computer vision in agri-tech.
2. Apply deep learning algorithms for crop and pest classification.
3. Leverage remote sensing and satellite imagery for field-level analysis.
4. Use drone-based imaging systems for real-time crop monitoring.
5. Integrate machine learning models with precision agriculture workflows.
6. Perform plant disease detection using convolutional neural networks (CNNs).
7. Implement object detection and segmentation in agri-field images.
8. Analyze soil quality and crop health using computer vision.
9. Build custom image datasets for supervised learning models.
10. Develop scalable smart farming applications using Python and OpenCV.
11. Understand edge computing in mobile and IoT devices for agri use.
12. Design solutions for automated harvesting and quality control using AI.
13. Evaluate performance and accuracy of vision-based agri-systems.

Target Audiences

1. Agricultural Engineers
2. Precision Farming Professionals
3. Agri-Tech Entrepreneurs
4. AI & Data Science Enthusiasts
5. Agronomy Researchers
6. Smart Farming Solution Developers
7. Remote Sensing Analysts
8. Students in Agricultural Technology and Computer Science

Course Duration: 10 days

Course Modules

Module 1: Introduction to Computer Vision in Agriculture

- Overview of computer vision fundamentals
- Importance in modern farming
- Types of imaging: RGB, thermal, multispectral
- Basics of AI and ML in agri-context
- Popular tools: OpenCV, TensorFlow, Keras
- **Case Study**: Using OpenCV for real-time weed detection

Module 2: Deep Learning for Image Recognition

- Introduction to deep learning concepts
- Neural networks and CNNs
- Transfer learning techniques
- Training datasets for agriculture
- Accuracy vs. computational cost
- **Case Study**: Identifying plant species using CNN models

Module 3: Data Collection and Image Annotation

- Sources of agricultural image data
- Annotation techniques (bounding box, segmentation)
- Tools: LabelImg, VGG Image Annotator
- Data augmentation methods
- Dataset structuring for model training
- **Case Study**: Building a labeled dataset for pest detection

Module 4: Pest and Disease Detection

- Visual symptoms of common crop diseases
- Feature extraction from infected regions
- CNN architectures for detection
- Evaluating model performance (Precision, Recall, F1)
- Deployment options: mobile vs. cloud
- **Case Study**: Tomato leaf disease detection using CNN

Module 5: Crop Monitoring Using Drones

- Basics of drone hardware and flight planning
- Image stitching and orthomosaics
- NDVI and spectral analysis
- Cloud storage and real-time streaming
- Regulatory aspects of drone use in agriculture
- **Case Study**: Rice field health monitoring via UAV imagery

Module 6: Soil and Water Analysis

- Image-based soil texture classification
- Surface moisture estimation using spectral bands
- IoT sensors + image correlation
- Drought detection systems
- Visualizing data with GIS tools
- **Case Study**: Soil fertility mapping using satellite imagery

Module 7: Yield Estimation Models

- Visual cues for growth stages
- Regression models using image features
- Combining weather and image data
- Real-time dashboard creation
- Model accuracy validation techniques
- **Case Study**: Wheat yield prediction using aerial images

Module 8: Smart Harvesting Systems

- Object detection in fruits/vegetables
- Robotics and vision integration
- Depth sensing for size and ripeness
- Automated harvesting challenges
- Safety protocols and calibration
- **Case Study**: Vision-based robotic apple picker

Module 9: Livestock Monitoring via Vision Systems

- Animal counting and movement tracking

- Health condition detection
- Behavior pattern recognition
- Face recognition for individual animals
- Integration with farm management systems
- **Case Study**: Cattle weight estimation via camera feeds

Module 10: Edge AI for Agriculture

- Understanding edge devices (Jetson Nano, Raspberry Pi)
- Lightweight models for real-time inference
- Model optimization techniques
- On-device data processing
- Offline vs online performance
- **Case Study**: Edge-based pest recognition in field crops

Module 11: Object Detection and Image Segmentation

- Difference between classification, detection, segmentation
- YOLO, SSD, and Mask R-CNN overview
- Use in crop row detection
- Labeling tools for segmentation
- Evaluation metrics
- **Case Study**: Detecting maize ears in field photos

Module 12: Building Mobile Apps for Field Use

- Frontend tools: Flutter, Android Studio
- Backend with TensorFlow Lite
- Offline vs. real-time image analysis
- Integrating camera feeds with models
- User interface for farmers
- **Case Study**: Mobile app for plant health scan

Module 13: Real-Time Crop Health Monitoring

- Setting thresholds for alerts
- Streaming data pipelines
- Use of cloud services (AWS, Azure)
- Predictive analytics for prevention
- Real-time dashboards
- **Case Study**: Crop monitoring and alert system for tea plantations

Module 14: Sustainability & Environmental Monitoring

- Monitoring land degradation
- Forest and vegetation cover classification
- Carbon footprint tracking
- Pollution source detection
- Seasonal change analysis
- **Case Study**: Using Sentinel imagery to track deforestation

Module 15: Capstone Project & Innovation Pitch

- Designing a complete solution from scratch
- Project ideation and team roles
- Building MVPs (minimum viable products)

- Pitch deck creation and presentation skills
- Peer feedback and expert panel review
- **Case Study**: AI-powered disease alert system for banana plantations

Training Methodology

- Interactive Lectures with AI & CV experts
- Hands-on Coding Labs with real agricultural datasets
- Drone & Sensor Demos for field-level insights
- Team-Based Projects simulating real agri-challenges
- Capstone Innovation Showcase evaluated by industry leaders
- Case Study Analysis integrated into each module

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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