Training Course on Big Data Analytics and Machine Learning for Agri-Decision Making

Professional Development Training Course Outline

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

Course Introduction

In the era of digital agriculture, Big Data Analytics and Machine Learning (ML) have emerged as transformative tools to revolutionize agri-decision making. These advanced technologies offer data-driven insights that empower farmers, agronomists, policymakers, and agribusiness professionals to make precision-oriented, sustainable, and profitable decisions. Training Course on Big Data Analytics and Machine Learning for Agri-Decision Making equips participants with the ability to harness structured and unstructured agricultural data effectively from forecasting crop yields and analyzing soil health to optimizing irrigation and pest control.

This intensive, hands-on training bridges the gap between technology and traditional farming by focusing on the real-world application of AI-powered analytics, predictive modeling, and decision-support systems. Designed for agriculture professionals, data scientists, and development agencies, this course empowers stakeholders across the value chain with actionable intelligence to enhance productivity, sustainability, and climate resilience.

Programme Curriculum

Training Course on Big Data Analytics and Machine Learning for Agri-Decision Making

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Course Objectives

1. Understand the fundamentals of big data in agriculture.
2. Explore key machine learning techniques for crop and livestock management.
3. Apply predictive analytics to improve agricultural forecasting.
4. Utilize data visualization tools for actionable insights.
5. Integrate IoT data and sensor-based monitoring in agri-decision models.
6. Develop AI-powered dashboards for real-time agri-data interpretation.
7. Implement climate-smart decision frameworks using ML.
8. Learn image recognition for disease and pest detection using AI.
9. Use geospatial analytics for land use and soil management.
10. Design data-driven agribusiness strategies.
11. Conduct agronomic modeling for optimized resource use.
12. Strengthen data governance and ethical AI use in agriculture.
13. Evaluate real-life case studies for smart farming systems.

Target Audiences

1. Agricultural extension officers
2. Agribusiness entrepreneurs
3. Data scientists in agri-tech
4. Government policymakers in agriculture
5. University researchers and faculty
6. ICT experts working in rural innovation
7. NGO staff focused on food security
8. Agronomy and crop production specialists

Course Duration: 10 days

Course Modules

Module 1: Introduction to Big Data and Digital Agriculture

- Overview of big data landscape in agriculture
- Characteristics of agri-data (volume, velocity, variety)
- Types of agricultural datasets
- Benefits of big data in agri-decision making
- Key stakeholders in the digital agri-ecosystem
- **Case Study:** Using mobile-based agri-platforms in Kenya

Module 2: Fundamentals of Machine Learning in Agriculture

- Supervised vs. unsupervised learning
- Algorithms used in agri-analysis
- Regression and classification models
- Feature engineering with farm data
- Model evaluation and performance metrics
- **Case Study:** Predicting crop yield using Random Forest in India

Module 3: IoT and Smart Farming Technologies

- IoT sensors for data collection
- Cloud platforms for data storage
- Integrating IoT with ML models
- Smart irrigation and fertigation systems
- Benefits and risks of IoT deployment
- **Case Study:** Sensor-based irrigation in Israel’s Negev desert

Module 4: Predictive Analytics in Crop Management

- Forecasting techniques for agriculture
- Seasonal climate prediction
- Time-series analysis of crop cycles
- Early warning systems for pest outbreaks
- Tools and platforms for forecasting
- **Case Study:** Drought prediction system in Sub-Saharan Africa

Module 5: Geospatial and Remote Sensing Analytics

- Role of GIS in agriculture
- Satellite and drone image analysis
- NDVI and vegetation index applications
- Mapping soil fertility zones
- Tools: QGIS, Google Earth Engine
- **Case Study:** Remote sensing for land use in Brazil

Module 6: Climate-Smart Agriculture and ML Applications

- Climate resilience through analytics
- Adapting models to extreme weather
- Monitoring greenhouse gas emissions
- Decision trees for cropping systems
- Sustainable farming practices using AI
- **Case Study:** Climate-smart maize systems in Malawi

Module 7: Data Management and Governance

- Ethical considerations in agri-data use
- Data privacy and ownership in farming communities
- Open vs. proprietary datasets
- Data sharing protocols
- Policy frameworks for data management
- **Case Study:** Data governance for EU farmers' cooperatives

Module 8: Decision Support Systems (DSS) in Agriculture

- Role of DSS in farm-level decisions
- Building rule-based and AI-powered DSS
- Case-based reasoning systems
- Mobile apps and SMS alerts for farmers
- Real-time dashboards and analytics
- **Case Study:** Agro-advisory system in Uganda (mFarms)

Module 9: Image Recognition in Pest and Disease Management

- ML algorithms for image processing
- Identifying pests/diseases through image data

- Annotating agricultural images
- Deploying CNNs for object detection
- Field-level implementation of recognition tools
- **Case Study:** PlantVillage Nuru in Tanzania

Module 10: Agribusiness Optimization Using Big Data

- Supply chain optimization
- Market price prediction
- Risk assessment and insurance modeling
- Input-output ratio analysis
- Profitability forecasting
- **Case Study:** Big Data in dairy value chains in Rwanda

Module 11: Integrating AI into Livestock Management

- Monitoring animal health through sensors
- Predicting milk production and breeding cycles
- Behavior monitoring and pattern recognition
- Feed optimization using AI
- Traceability systems for meat quality
- **Case Study:** Smart cattle monitoring in the Netherlands

Module 12: Data Visualization and Reporting Tools

- Principles of effective data visualization
- Dashboards and storytelling with data
- Tools: Tableau, Power BI, Python (Matplotlib)
- Interactive web-based reporting
- Real-time reporting systems
- **Case Study:** Tableau-based crop advisory dashboards in India

Module 13: Mobile Applications and Digital Platforms

- Role of mobile tech in farmer outreach
- SMS-based analytics reports
- Data collection apps for extension agents
- Integrating ML in agri-apps
- Enhancing digital literacy
- **Case Study:** E-extension platforms in Ghana

Module 14: AI and Blockchain for Agricultural Transparency

- Role of blockchain in agri-traceability
- Smart contracts for supply chain
- Linking ML predictions to blockchain records
- Decentralized data validation
- Future outlook: Web3 in agri-tech
- **Case Study:** Blockchain coffee traceability in Ethiopia

Module 15: Capstone Project and Practical Application

- Designing an agri-ML use case
- Group project with real-world dataset
- Data cleaning and model training
- Performance evaluation and deployment

- Presentation and peer feedback
- **Case Study:** End-to-end agri-analytics solution from India's Fasal

Training Methodology

- Interactive expert-led lectures and practical labs
- Hands-on exercises using real-world agricultural datasets
- Group projects and peer learning through collaboration
- Live coding workshops using Python and cloud platforms
- Field-based virtual simulations and technology demos
- Evaluation through quizzes, case study analysis, and final project

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
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
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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