High End Workshop

On

MULTIVARIATE STATISTICAL MACHINE LEARNING METHODS FOR MODELLING AGRICULTURAL DATA

(Under the KARYASHALA Scheme – a SERB Initiative)

24 JULY - 4 AUGUST, 2023

Funded by

Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India

Patron

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Event Organizer

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ORGANIZED BY

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About KARYASHALA

'KARYASHALA' is aimed to improve research productivity of promising PG and PhD students from universities/colleges through high-end workshops on specific themes. This program aims to provide opportunities to acquire specialized research skills and provide hands-on experience to the students primarily from universities, colleges, private academic institutions, and newly established institutes in handling/troubleshooting of high-end scientific instruments and such skill development on themes required for research work. The program is meant to support motivated PG and Ph.D. level students, who are having a strong willingness to get excellence in their scientific and engineering research pursuits

About ICAR-IIRR

The ICAR-Indian Institute of Rice Research (ICAR-IIRR) was established as the All India Coordinated Rice Improvement Project (AICRIP) by the Indian Council of Agricultural Research (ICAR) in 1965 at Hyderabad. AICRIP was elevated to Directorate of Rice Research (DRR) in 1983 and ICAR–Indian Institute of Rice Research (IIRR) in 2014. IIRR (https://www.icar-iirr.org/) is involved in basic and strategic research for enhancing rice productivity under irrigated ecosystem; coordination of multi-location testing to develop location specific varieties and technologies for various ecosystems; and dissemination of technologies, capacity building and establishing linkages.

About the Workshop

Statistical modeling plays a crucial role in decision making within agricultural and allied research, particularly when analyzing large volumes of data sets obtained from field experiments, laboratory experiments, surveys, and published reports. Given the increasing intricacy of agricultural and climatological phenomena, it is essential to have data on multiple variables in order to derive valid conclusions from statistical models. Since the data often exhibits nonlinearity and unknown distributional assumptions, classical statistical models may not provide accurate inferences. In such cases, multivariate machine learning models play a pivotal role in robustly modeling complex and chaotic data sets.

As computational open-source tools and techniques continue to advance, statistical modelling has become increasingly important to address present-day requirements. Hence, this training program aims to cover both the theoretical and practical aspects of statistical and machine learning techniques with hands on experience in open source software's such as R, Python etc. The proposed workshop aims at educating the participants about various advanced multivariate statistical, Machine Learning, Deep Learning tools and techniques for agricultural data analysis with hands-on experience in open source softwares.

Course Content

The course has been structured in a series of modules with classroom lectures and practical hands-on demonstrations in open source software packages.

Module 1: Software packages

- Introduction to R
- Introduction to Python
- Overview of QGIS
- Basic Statistics in R
- Data Visualization through ggplot2
- Thematic Maps in R

Module 2: Regression and Multivariate Analysis

- Regression Analysis
- Nonlinear Growth Models
- Regression for Categorical Data
- LASSO and Elastic Net Regression
- Quantile Regression Analysis
- Data Classification and Reduction Techniques

Module 3: Design of Experiments and Biometrical Data Analysis

- Analysis of Complete Block Design of Experiments
- Analysis of Incomplete Block Design of Experiments
- Analysis of Multi-Environmental Experimental Data
- Response Surface Design
- QTL & GWAS Analysis
- Stability and GEI/AMMI Analysis
- Statistical Models for Genomic Selection in Breeding

Module 4: Machine Learning Techniques

- Artificial Neural Network
- Support Vector Machines
- Classification and Regression Tree
- Random Forest Model
- Deep Learning Models
- LSTM for Time Series Data

Module 5: Time Series Data analysis

- Trend Analysis
- Introduction to Time Series Analysis
- Spatiotemporal Time Series Modeling
- ARCH Family of Models
- Count Time Series Models
- Hybrid Time Series Modeling
- Ensemble Modeling

Module 6: Other Useful Topics

- Meta-Analysis
- Crop Simulation Modeling
- Non Parametric Tests
- Spatial Regression Techniques
- ML & DL Techniques for RS Data Analysis
- GREY Forecasting Model

Nominations

Interested candidates fulfilling the eligibility conditions may apply through proper channel with the approval of competent authority. 25 students will be selected based on the merits/ suitability of the candidates

Eligibility

- Students pursuing Master's Degree / Ph.D. in any discipline of Agricultural sciences/Animal sciences/Fishery sciences/ Statistics/ Computer Application or P.G/Ph.D. with research specialization in agriculture and allied sciences.
- Working knowledge of Statistics and R/ Python/ other software packages

Important Dates

- **Last Date for Receipt of Applications:** 26th June, 2023
- **Information to Selected Candidate:** 28th June, 2023
- **Workshop Date:** 24th July to 4th August, 2023

Registration

- Interested eligible candidates can register through google form link **https://forms.gle/S3HWrdMv32RdDTjh8** by uploading application form duly signed by head of the Recommending Authority / Head of the Institute.

Travel and Accommodation

- The participants will receive reimbursement for their travel expenses, including the journey to and from the event location. However, it is important to note that the travel expenses for participants will be limited to the sleeper class in trains or buses.
- The participants will be provided travel, lodging and boarding as per SERB guidelines.

Certificates

- On successful completion of workshop, certificates will be issued by the organizing institute.

APPLICATION FORM
DST-SERB Sponsored High End Workshop "KARYASHALA"
On
Multivariate Statistical Machine Learning Methods for Modelling Agricultural Data
(24th July – 4th August, 2023)

1.	Full Name (in BLOCK letters)				
2.	Highest degree pursuing with specialization				
3.	Present Institute Name				
4.	Address for Correspondence				
5.	E-mail address *Telephone Number Mob / O / R:*				
6.	Date of Birth				
7.	Sex (Male/Female/other)				
8.	Education Qualification:				
	Degree	Subject	Year of passing	Class/Division/ Equivalent	University/Institute
	Bachelors Masters Ph.D. Any Other				
9.	Level of Knowledge in Statistical Modeling				
10.	Level of Knowledge in R/ Python/ other software's				
11.	Area of present research work				
12.	Expectations from the workshop				

Signature of the Applicant with date

CERTIFICATE

It is certified that information furnished above is correct and the candidature is being sponsored. Travel, Boarding and Lodging allowances will not be paid by this office

Signature of the Recommending Authority/
Institute along with Seal

For any registration related queries contact

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