Summer School on Econometrics and Machine Learning
June 7-11, 2022

OVERVIEW OF THE SUMMER SCHOOL

This Summer School is an initiative under the FLAIR 4BD Project that seeks to **F**oster **L**earning, **A**nalysis, **I**nsights and **R**esearch **4 B**ig **D**ata. The initiative is supported by a grant from the Bill and Melinda Gates Foundation. The Summer School consists of a series of twenty two lectures which will provide a theoretical and empirical foundation in the field of Econometrics and Machine Learning.

RESOURCE PERSONS

Jayatu Sen Chaudhury has more than 20 years of experience in developing data science and big data solutions to business problems in marketing and risk. He is currently the Head of Enterprise Digital and Analytics (EDA) at a leading MNC in Gurgaon. He has been a key voting member of the Institutional Risk Committee and the BASEL & CCAR Modeling Strategy Committee. He is a visiting faculty at IIM Bangalore and an alumnus of IGIDR.

Surabhi Singhal is a data science professional with six years of experience in developing business solutions for major healthcare, insurance and financial services organisations using a blend of econometrics, data science algorithms and statistics. She was chosen as a doctoral candidate at Stony Brook University, New York. She is currently working in data science division of a major financial services organisation. She is an alumnus and visiting faculty of Shiv Nadar University.

Subrata Sarkar is a faculty at the Indira Gandhi Institute of Development Research, Mumbai, India. He has been in the Institute for the last thirty years. His specialisation is in econometrics and he works on applied problems on corporate governance, corporate finance and risk modelling. He is an alumnus of Presidency College Calcutta and University of Southern California.

SUMMER SCHOOL OUTLINE

Topic 1: What is Big in BIG Data
- Primer to BIG data
- Econometrics and ML: What They Do and Don't
- The Foot Soldiers of Econometrics
- The Missiles of ML
- Harnessing Images, Text and Voice
- Expectations from The Summer School

Topic 2: The Workhorse of Econometrics
- Ordinary Least Square Regression
- Probit and Logit: Modelling Binary Classification
- Cumulative Logit: Modelling Multiple Classification
- Multinomial Logit: Modelling Unordered Classification
- Datasets and Hands on Session

Topic 3: How Do You Define Default in India?
- How challenging it is to define default of companies in India
- Develop a default model
- Stress test the model
- Key learning

Topic 4: Develop a Model with Real World Data
- Develop a logical model
- Understand how to interpret the model - use it for business
- Discussion of the results.

Topic 5: Brief introduction to the ML Techniques
- Develop a model using the ML techniques - RF, KNN, GBM, XGBOOST
- Compare the results
- Key insights

Topic 6: Use of Stock Market Data to Infer about the Prospect of the Company
- Value at Risk of Stocks
- Value at Risk of the Portfolio

Topic 7: Construct an Optimal Portfolio Minimizing the Losses Given a Certain Return
- Markowitz Portfolio theory - actual use case

Topic 8: How do You Choose Stocks for Your Portfolio
- Framework using Credit and Market Risk

Topic 9: Unstructured Data Evolution
- Data science things you can include in research
- Types of data sets to include in research
- Where can you use DS and where can you not

Topic 10: Advanced Visualisation
- Economic applications and recognition from representation
- Importance of visuals, advanced visualisation techniques
- Hands on - Sankey diagram, bubble chart

Topic 11: NLP for Economic Problems
- Using NLP in Economic issues
- Text data analysis
- Different methods of vectorisation
- Live project: Twitter sentiments

Topic 12: AI for Economic Problems
- Where can AI be used in economics
- What is image processing
- Live project – Covid identification using chest X ray

Closing

What Lies Ahead?

The IGIDR - FLAIR 4BD team will be creating an Econometrics and Machine Learning Network (EMLN) soon. Details will be provided on the IGIDR website. Please make sure to update your Email ID with us.