Institute of Actuaries of India

Unit No. F-206, 2nd Floor, F Wing, Tower II, Seawoods Grand Central, Plot no R-1,
Sector 40, Near Seawoods Railway Station, Navi Mumbai- 400706
☎ + 91 22 62433333 🖷 + 91 22 62433322

20 July 2024

ANNOUNCEMENT

EMPOWERING ACTUARIAL DECISION MAKING:
PREDICTIVE ANALYTICS TECHNIQUES - WEBINAR SERIES 2024

ABOUT THE PROGRAM

In the fast-changing world of actuarial science, using data to predict future trends is sine qua non!. Predictive analytics helps actuaries foresee trends, spot risks, and make smart decisions that benefit businesses.

Join us over a detailed webinar series meticulously curated for students and professionals. The program will take you through the latest techniques and tools in predictive analytics, equipping you to make better decisions and prepare yourself for unforeseen challenges in the actuarial field.

This program will facilitate a credible understanding of predictive analytics and its applicability to actuarial science, preparing you for real-world challenges in the industry. This is as good it gets!

OBJECTIVE

- Dive deep into the fundamentals of predictive analytics.
- Gain proficiency in data preprocessing and feature engineering.
- Explore and apply various predictive modelling techniques.
- Evaluate and select the optimal model.

PROGRAM SCHEDULE & DURATION

The training program will be conducted in hybrid mode, offering live classroom sessions at the IAI office in Mumbai and online attendance options concurrently. This flexibility provides adequate convenience to all participants.

- **Duration:** The entire program will span 24 hours, deftly taught by six expert faculty members.

- **Schedule:** Sessions will be held on weekends only, commencing 10th August 2024.

- **Hands-On Learning:** Engage in practical assignments and real-world applications to reinforce your understanding and skills.

- **Attend in Person:** Classroom attendance is limited to 30 seats, allocated on a first-come, first-served basis.

Take advantage of this opportunity to advance your skills in predictive analytics and make a significant impact in the actuarial field.

Details of the program including topics are available at **ANNEXURE-I**

All recorded videos will be available in the member's login page until **31st October 2024.**

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REGISTRATION:

- ✓ IAI Members : Rupees Twelve thousand (₹12,000.00) only (18% GST extra)
- ✓ Non-Members : Rupees Twenty thousand (₹20,000.00) only (18% GST extra)
- ✓ Registration at : Login to IAI>>Training Program>>Predictive Analytics
- ✓ Registration opens on : 20 July 2024; 6.00PM.
- ✓ Registration closes on : 3 August 2024; 6.00PM.
- ✓ Member Registration : Click here
- ✓ Non-Member Registration: Click here

Bulk registrations from Employers will be accepted with a minimum registration count of 25, where both members and non-members can together register with a lump sum payment of ₹2,00,000.00 (18% GST extra). Any additional count of registrations beyond 25 will be considered with the same average rate.

FACULTY:

1. Dr. Mayank Sharma: Associate Professor at IIM Kashipur, with a Fellow Programme in Management from IIM Lucknow and a degree in Electronics and Communications Engineering from NIT Calicut. He has industry experience at Tech Mahindra and focuses on Management Information Systems, Social Media Analytics, and AI. He regularly conducts Business Analytics and Big Data programs for industry participants.

2. Dr. Venkataraghavan K: Holds a PhD in Information Systems from IIT Madras and has published work in leading IT journals and has eight years of industry experience, including roles as a principal data scientist and ERP consultant. His expertise includes Data Science, Machine Learning, AI, and Neural Networks, and he trains industry participants in machine learning techniques using open-source technologies.

3. Dr. Atul Kumar Malik: Holds a PhD from IIT Madras and has over 20 years of experience in decision support systems development using operations research and predictive techniques. His expertise includes pricing and actuarial work, and currently working on a patent.

4. Dr. Mahesh Naik: Faculty member at NMIMS with a PhD in mathematical modelling, has a strong background in machine learning and data analysis. He has researched and presented on predictive analytics, taught Probability Theory and Statistics, and guided Ph.D. students.

5. Mr. Sagar Kar: Holds a Masters in Statistics from the University of Madras and is associated with Ascensus India as a Senior Actuarial Analyst in their US Healthcare Actuarial Team. He has experience in teaching and research on Statistics, having previously worked with the Indian Statistical Institute, Kolkata. He has experience in implementing statistical modelling for organisations as a part of their Data Analytics team and has been involved in teaching Analytics.

6. Ms. Jasika Singh: Deputy Head of Actuarial Analytics for Life & Health at Munich Re, with a focus on data and analytics. She is pursuing a Doctorate in Business Administration in Emerging Technologies with a specialization in Generative AI. With over six years of experience, she has developed and implemented risk management solutions and previously worked on predictive analytics for US-based clients.

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CONTACT:

Point of contact for all related queries: Mr. Ravindra Mastekar at: 022 62433348 or
ravindra@actuariesindia.org

ANNEXURE-I

PROGRAM SCHEDULE

Date	Day	Sr. No	Hours	Topics	Faculty Name
10/8/2024	Saturday	1	10:00 AM – 11.00 AM	Introduction to Predictive Analytics	Dr. Mahesh Naik
			11.00 AM – 11.15 AM	**Tea Break**	
		2	11:15 AM – 01:15 PM	Data Cleaning	
			01.15 PM – 02.15 PM	**Lunch Break**	
		3	02:15 PM – 03:15 PM	Exploratory Data Analysis_1	Dr. Mahesh Naik
			03.15 PM – 03.30 PM	**Tea Break**	
		4	03:30 PM – 04:30 PM	Exploratory Data Analysis_1	
11/8/2024	Sunday	1	10:00 AM – 11.00 AM	Data Pre-Processing_1	Dr. Atul Kumar Malik
			11.00 AM – 11.15 AM	**Tea Break**	
		2	11:15 AM – 12:15 PM	Data Pre-Processing_2	
			12.15 PM – 01.15 PM	**Lunch Break**	
		3	01:15 PM – 02:15 PM	Feature Engineering_1	Dr. Atul Kumar Malik
			02.15 PM – 02.30 PM	**Tea Break**	
		4	02:30 PM – 03:30 PM	Feature Engineering_2	
24/08/2024	Saturday	1	09:00 AM – 10.00 AM	Regression Task - An Introduction	Dr. Mayank Sharma
		2	10:00 AM – 11:00 PM	Build and Evaluate a Linear Regression Model_1	
			11.00 AM – 11.15 AM	**Tea Break**	
		3	11:15 AM – 01:15 PM	Build and Evaluate a Linear Regression Model_2	
			01.15 PM – 02.00 PM	**Lunch Break**	
		4	02:00 PM – 04:00 PM	Classification Task - An Introduction	Dr. Venkataraghavan K
			04.00 PM – 04.15 PM	**Tea Break**	
		5	04:15 PM – 06:15 PM	Build and Evaluate a Logistic Regression Model	
25/08/2024	Sunday	1	09:00 AM – 11.00 AM	Decision Trees	Ms. Jasika Singh
			11.00 AM – 11.15 AM	**Tea Break**	
		2	11:15 AM – 01:15 PM	Ensemble Learning	
			01.15 PM – 02.00 PM	**Lunch Break**	
		3	02:00 PM – 03:00 PM	Unsupervised Learning	Mr. Sagar Kar
			03.15 PM – 03.30 PM	**Tea Break**	
		4	03:30 PM – 05:30 PM	Time Series and Forecasting	

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LEARNING OBJECTIVE

Course Overview:

This course provides a comprehensive introduction to predictive analytics, focusing on practical applications and hands-on learning. Students will explore various predictive modelling techniques and apply them to real-world datasets. The course will cover data preprocessing, model building, and evaluation.

Course Objectives:
1. Understand the fundamentals of predictive analytics.
2. Gain proficiency in data preprocessing and feature engineering.
3. Explore and apply various predictive modelling techniques.
4. Evaluate and select the optimal model.

Prerequisites:
1. Basic knowledge of R or Python
2. Familiarity with key concepts in statistics and probability theory

Detailed Objectives:

Chapter 1 – Introduction to Predictive Analytics (1 hour)
- ✓ Setting the Context- Understanding the terminologies (Artificial Intelligence, Machine Learning, Deep Learning, Predictive Analytics)
- ✓ Definition and importance of Predictive Analytics
- ✓ Applications of Predictive Analytics in insurance industry

Chapter 2 – Data Cleaning (2 hour)
- ✓ Establishing Data Quality
- ✓ Basic Data Cleaning Techniques

Chapter 3 – Exploratory Data Analysis (EDA) (2 hours)
- ✓ Descriptive and Inferential Statistics – Univariate/Multivariate Analysis
- ✓ Probability Distributions
- ✓ Identifying Patterns and Outliers
- ✓ Data Visualization- Techniques and Summary Statistics

Chapter 4 – Data Pre-processing (2 hours)
- ✓ Missing Value treatment (covered in Data Cleaning)
- ✓ Data Normalization, Standardization and Transformation
- ✓ Feature Encoding
- ✓ Outlier / Anomaly Detection
- ✓ Dimensionality Reduction

Chapter 5 – Feature Engineering (2 hour)
- ✓ Feature Engineering
- ✓ Feature Selection

Chapter 6 – Regression Task and Build and Evaluate a Linear Regression Model (4 hrs)
- ✓ Introduction to Regression Task
- ✓ Regression Task Applications
- ✓ Regression Task using Machine Learning
- ✓ Need for Linear and Non-Linear Regression
- ✓ Model Evaluation Measures – RMSE, MAE, MAPE
- ✓ Linear Regression Basics
- ✓ Simple Linear Regression

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- ✓ Multiple Linear Regression
- ✓ Assumptions in Linear Regression
- ✓ Practical Demonstration of Simple Linear Regression – Case Study
- ✓ Data Understanding, Data Preparation, Model Building, Model Evaluation and Model Interpretation
- ✓ Practical Demonstration of Multiple Linear Regression – Case Study
- ✓ Data Understanding, Data Preparation, Model Building, Model Evaluation and Model Interpretation

Chapter 7 – Classification Task and Build and Evaluate a Logistic Regression Model (4 hours)
- ✓ Introduction to Classification Task
- ✓ Applications of Classification Task
- ✓ Popular Classification Techniques
- ✓ Classification Models and Evaluation Measures
- ✓ Hold-Out and K-Fold Cross Validation
- ✓ RoC and AUC
- ✓ Confusion Matrix and Performance Measures
- ✓ Introduction to Logistic Regression
- ✓ Case Introduction
- ✓ Case Data Understanding
- ✓ Case Data Preparation
- ✓ Practical Demonstration of Regression Model Building
- ✓ Interpreting Logistic Regression Model
- ✓ Model Evaluation
- ✓ Plotting and Interpreting Gain and Lift Charts

Chapter 8 – Decision Trees (2 hours)
- ✓ Classification and Regression Decision Trees
- ✓ Gini / Entropy / Pruning
- ✓ Decision Trees Explained — Entropy, Information Gain, Gini Index, CCP Pruning | by Shailey Dash | Towards Data Science
- ✓ Model Interpretation and Evaluation
- ✓ Practical Demonstration of Decision Tree Model Building

Chapter 9 – Ensemble Learning (2 hours)
- ✓ Introduction to Ensemble Learning
- ✓ Bagging and Boosting Algorithms with real world Applications
- ✓ Model Selection and hyperparameter tuning
- ✓ Model Interpretation and Evaluation
- ✓ Practical Demonstration of Ensemble Model Building

Chapter 10 – Unsupervised Learning (1 hour)
- ✓ Clustering – Hierarchical / K-means
- ✓ Distance Measures
- ✓ Practical Demonstration of Clustering and interpretation

Chapter 11– Time Series and Forecasting (2 hour)
- ✓ Overview – Trends, Seasonality, Stationarity
- ✓ Autocorrelation / PACF
- ✓ ARIMA / ARCH / GARCH Models
- ✓ Practical Demonstration of building a Time Series Model
- ✓ Forecasting measures