

ANL307 Predictive Modelling

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JAN

Synopsis:

The course covers selective predictive modeling techniques in the fields of statistics, artificial intelligence and machine learning. These include logistic regression (Logit), artificial neural network (ANN), and decision trees (e.g., CHAID, C&RT, C5.0 and QUEST). Assessment methods to evaluate and compare prediction models will also be discussed (e.g., accuracy rates, hit rates, response charts and lift charts). The course will look at developing and deploying predictive modeling applications. Data-mining software will be used intensively in the course, both for solving problems and for enhancing students' understanding of the theoretical aspects of the course.

Topics:

- Introduction to Predictive Modelling
- Model Evaluations and Applications
- Logit-Model Estimation
- Logit-Model Inference
- Decision Tree - Chi-Squared and Interaction Detection
- Decision Tree - Classification & Regression Tree
- Decision Tree - Quick, Unbiased, Efficient and Statistical Tree
- Decision Tree - C4.5 and 5.0
- Artificial Neural Network – algorithm
- Artificial Neural Network - Model prediction
- Ensemble Models
- Bagging and Boosting

Textbooks:

Max Kuhn (Author), Kjell Johnson (Author): Applied Predictive Modeling 1st ed. 2013, Corr. 2nd printing 2016 Edition by Max Kuhn (Author), Kjell Johnson (Author) Springer
ISBN-13: 9781461468486

Learning Outcome:

- Distinguish various aspects of predictive modelling, including concepts, model evaluation, techniques, applications, advantages and limitations.
- Appraise the concepts and applications of Logistic Regression, decision trees, and Artificial Neural Network (ANN).
- Compare and contrast decision tree techniques.
- Compare and contrast ANN with other predictive modelling techniques.
- Illustrate the underlying concepts of ensemble learning.
- Evaluate predictive models using different performance measures and evaluation methods.
- Apply Logistic Regression for predictive modelling, interpret and discuss the results.
- Construct a decision tree for the purpose of predictive modelling.
- Evaluate the use of an appropriate decision tree technique for a given problem.
- Design an ANN solution for predictive modelling.
- Apply ensemble learning in predictive modelling and analysis.
- Assess the effectiveness of proposed predictive modelling solutions.

Assessment Strategies:

Continuous Assessment Component	Weightage (%)
PARTICIPATION	6
PRE-COURSE QUIZ	2
TUTOR-MARKED ASSIGNMENT	18
PRE-CLASS QUIZ	2
PRE-CLASS QUIZ	2
GROUP BASED ASSIGNMENT	20
Sub-Total	50

Examinable Component	Weightage (%)
Written Exam	50
Sub-Total	50

Weightage Total **100**