ANALYTICS - MACHINE LEARNING

MBA BATCH: 2016-18 / TRIMESTER - VI

DEPARTMENT OF MANAGEMENT, BANGALORE CAMPUS

AMRITA VISHWA VIDYAPEETHAM

INSTRUCTOR AND CONTACT INFORMATION

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COURSE OBJECTIVE

To provide a strong foundation in machine learning, following a probabilistic approach. It covers a thorough discussion of the fundamental concepts, models and widely used tools and their demonstration using industry based data sets.

LEARNING OUTCOMES

The course covers a standard curriculum in machine learning
At the end of the course the student should be able to

1. Use methods that can automatically detect patterns in data, and then to use the uncovered patterns to predict future data or other outcomes of interest.
2. Use pattern-recognition rules, statistical rules, as well as rules drawn from machine learning for extracting valuable information from data bases
3. Use the most powerful and sophisticated routines in R and Python for machine learning.

COURSE DESCRIPTION

With the ever increasing amounts of data in electronic form, the need for automated methods for data analysis continues to grow. The goal of machine learning is to develop methods that can automatically detect patterns in data, and then to use the uncovered patterns to predict future data or other outcomes of interest. This course provides a detailed introduction to the field, and includes worked examples drawn from various application domains. Various capabilities of R and Python environments and computational routines in R and Python for machine learning will be introduced in a comprehensive manner.

REQUIRED COURSE MATERIALS AND READINGS

Prescribed Text Book for the course

Murphy, Kevin P.(2012) Machine learning : a probabilistic perspective, The MIT Press, Cambridge, ISBN 978-0-262-01802-9

OPTIONAL COURSE MATERIALS & READINGS (CASES, ARTICLES, REPORTS ETC)

Raschka Sebastian (2015) Python Machine Learning, Packt Publishing Ltd, ISBN- 1783555149

Langley Pa t(1996) Elements of Machine Learning, Morgan Kaufmann, ISBN- 1558603018

Alpaydin Ethem (2016) Machine Learning: The New AI, MIT Press, ISBN- 0262529513

Lantz Brett (2013) Machine Learning with R, Packt Publishing Ltd, ISBN- 1782162151

Ramasubramanian Karthik and Abhishek Singh (2016) Machine Learning Using R, ISBN- 1484223349

Ghatak Abhijit (2017) Machine Learning with R, Springer, ISBN- 9811068089

Ledolter, Johannes (2013), Data mining and business analytics with R, Wiley , ISBN 978-1-118-44714-7

Zhao Yanchang (2012), "R and Data Mining: Examples and Case Studies", Academic Press, ISBN- 012397271X

EVALUATION CRITERIA

Assignments & final Project, Mid term and End term examinations

Components and Weights (faculty can Decide on components

Components	Weightage (%)
Assignments and final projects	30%
Midterm Exam	30%

End term	40%
Total	**100%**

DETAILS OF SESSION: TENTATIVE COURSE SCHEDULE

WEEK	SESSION NO.	TOPICS TO BE COVERED	ASSIGNED READING, CASE DISCUSSION, ASSIGNMENTS
Week 1	1 to 2	Chapter-1 Introduction:- Machine learning: what and why?, Types of machine learning, Supervised learning, Unsupervised learning, Some basic concepts in machine learning	
2 to 3	3 to 8	Chapter-2 Revising Some Basic Topics for Making a Probabilistic Approach to Machine Learning:- Probability, Generative models for discrete data, Gaussian models, Bayesian statistics, Frequentist statistics	
4to 8	9 to 18	Chapter-3 Class of Models:- Linear regression, Logistic regression, Generalized linear models and the exponential family, Directed graphical models, Mixture models and the EM algorithm, Latent linear models, Sparse linear models, Kernels, Gaussian processes, Adaptive basis function models, Markov and hidden Markov models, State space models, Undirected graphical models, Exact inference for graphical models	
9 to 12	19 to 22	Chapter-4 Topics on Inference:- Variational inference, Monte Carlo inference, Markov chain Monte Carlo inference	

13 to 15	23 to 30	Chapter-5 Additional Topics on Modelling:- Clustering, Graphical model structure learning, Latent variable models for discrete data, Deep learning	

ANY OTHER SPECIFIC RULES

Students have to bring their laptops installed with R and R Studio. Download R from http://cran.r-project.org/ and R Studio from http://www.rstudio.com/products/rstudio/download/

Sharing computers are not allowed. They should make their own arrangement for charging the laptops.