SYLLABUS
MTM COLLEGE OF ARTS, SCIENCE AND COMMERCE, VELIYANCODE
(Affiliated to University of Calicut)

Department of Computer Science

Certificate Course : MTMMDL Deep Learning Methods

Objectives:

Upon completion of this course, the students will be able to
1 .Understand the fundamentals of Deep Learning
2. Familiarize with Neural Networks aspects
3. Appreciate the concept behind Convolution Neural Networks
4. Identify the Generative Deep learning models
5 Recognize the tangible applications of ML and Neural Networks.

Unit I - Machine Learning Methods: Introduction to Machine learning Methods, Supervised methods, unsupervised methods, reinforced methods, applications of specific machine learning methods for cyber attack detection.

Unit II - Deep Learning networks: Introduction to Deep Learning, Classic Neural networks, Convolution Neural Networks, Recurrent neural networks, Deep neural networks, Deep belief network, Back propagation neural networks, Restricted Boltzmann machines and other types of networks.

Unit III – Probabilistic and Stochastic optimization and learning algorithms: Probabilistic models and Deep learning, Advance optimization algorithm: Adagrad, Adam, Nadam, RMSprop. Stochastic optimization algorithms: Simulated Annealing, Genetic algorithm, Particle swam optimization, Stochastic learning algorithms: Stochastic gradient descent, Stochastic gradient boosting.

Course Outcomes:

At the end of the course, the learners will be able to

i. Examine and suitability of specific machine learning methods for designing intrusion detection and prevention systems
ii. Research on the suitability of deep learning networks for designing intelligent intrusion detection and prevention systems
iii. Design and develop intelligent security solutions for recent cyber threats and challenges

References:

1. Introduction to Linguistics and Natural Language Processing (IBM ICE Publications).
2. Judith Hurwitz and Daniel Kirsch, **Machine Learning for Dummies**, IBM Limited Edition, Published by John Wiley & Sons, Inc, 2018.
3. **Deep Learning Tutorial**, LISA lab, University of Montreal, 2015.
4. Li Deng and Dong Yu, **Deep Learning Methods and Applications, Foundations and Trends in Signal Processing**, Volume 7 Issues 3-4, ISSN: 1932-8346, 2014.

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