Principle of Entrepreneurship

UNIT-I
Entrepreneurial perspective: Foundation, Nature and development ofentrepreneurship, importance of
entrepreneurs,Entrepreneurial Mind, Individual entrepreneur Typesof entrepreneurs, Entrepreneurship in India

UNIT-II
Beginning Considerations: Creativity and developing business ideas; Creatingand starting the venture; Building
a competitiveadvantage; Opportunity recognition, Opportunityassessment; Legal issues

UNIT-III
Developing Financial Plans: Sources of Funds,Managing Cash Flow,Creating a successful Financial PlanDeveloping a business plan

UNIT - IV
Developing Marketing Plans: Developing a powerful Marketing Plan, E-commerce,Integrated Marketing Communications
Leading Considerations: Developing Team, Inviting candidates to join team,Leadership model

DSCC

UNIT-I
Introduction to Distributed Systems: Characteristics of Distributed Systems-Introduction, Examples of Distributed systems (Client server, peer to peer, grid and cloud computing), Advantages of distributed systems, System models -Introduction, Architectural and Fundamental models, Networking and Internetworking, Interposes Communication (message passing and shared memory), Distributed objects and Remote Method Invocation, RPC, Events and notifications, Case study-Java RMI.

UNIT-II
Synchronization: Time and Global States-Introduction, Logical Clocks, Synchronizing physical clocks events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging, Coordination and Agreement: Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT-III
Distributed File Systems:

UNIT – IV
Cloud Computing, Roots of Cloud Computing, Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service, Hardware as a service, platform as a Service, Software as a service, Challenges and Risks. Migrating into a Cloud:-Introduction, Broad

Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud

Textbook(s):
1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson

2. R. Buyya, CLOUD COMPUTING Principles and Paradigms, Willey

3. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

References:
1. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.

2. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Singhal,
Cambridge, rp 2010.

3. Gerard Tel, "Introduction to Distributed algorithms", Cambridge University Press, USA, 2000.

IPR
UNIT-I
Understanding & Overview of IPR Regime & Patents: Introduction, Need of Intellectual Property Rights, Types of Intellectual property, Rationale for protection of IPR, International Organizations, Agencies and Treaties, Importance of Intellectual Property Rights, IPR in India: Genesis and development, Impact of IPR on development, health agriculture and genetic resources in India.
Patents: Definition of TRIPS, Kind of inventions protected by Patent, Process and Product Patent, Double Patent, Legal requirements for patents, Patent Application process, Searching a patent, Drafting and Filling of a Patent, Type of patent applications, Patent Specification and Claim, Management of IP Assets and IP Portfolio, Layers of International Patent System: National, Regional and International options
UNIT-II
Trademarks & Copyrights: Rights of Trademark, Purpose and Function of Trademark, Trademark registration, Trademark Acquisition, Trademark protection, Trademark Registration process.
Law of Copy Rights, Rights and Protection covered by Copyright, Infringement of Copyright under Copyright Act, Distinction between related rights and copyright, Celebrity rights, Academic integrity or Plagiarism
UNIT-III

Geographical Indications of Goods & Traditional Knowledge: Types of Geographical Indications of Goods, Why Geographical Indications of Goods needs protection, How Geographical Indications of Goods gets protection, GI Laws, GI Act in India, Case Study: Three Recent famous registered GIs of India. Examples of medicinal, bioprospecting and Indigenous knowledge Need for their Protection, Positive protection, Defensive protection and legal aspects.

UNIT – IV

Recent Developments & Institutional Capacity: New Development in Trademark Law, Copyright Law, Patent Law, Intellectual Property Audits, Protection of Computer Programs, Protection of Communication Technologies, Protection of Biotechnology, Reprography and Intellectual Property. International Trademark law, international copyright law, International Patent law, International Development in Trade Secret Law.

IP Policy making and legislation, Examination and Registration Systems, International Standard Setting: WIPO & WTO.

Textbook(s):

1. Fundamentals of IP for Engineers, K. Bansal & P. Bansal, BS/BSP Books Publications, 2013
2. Intellectual Property Rights, Deborah. E. Bouchoux, 5th Edition, Delmar Cengage Learing, 2017.

References:

1. Intellectual Property Rights– Unleashmy The Knowledge Economy, Prabuddha Ganguli, Tate Mc-Graw Hill Publishing Company Ltd, 2001.

MACHINE LEARNING

UNIT-I

Introduction: Machine learning, terminologies in machine learning, Perspectives and issues in machine learning, application of Machine learning, Types of machine learning: supervised, unsupervised, semi- supervised learning. Review of probability, Basic Linear Algebra in Machine Learning Techniques, Dataset and its types,Data preprocessing, Bias and Variance in Machine learning , Function approximation, Overfitting

UNIT-II

Regression Analysis in Machine Learning: Introduction to regression and its terminologies,Types of regression,Logistic Regression

Simple Linear regression: Introduction to Simple Linear Regression and its assumption, Simple Linear Regression Model Building,Ordinary Least square estimation, Properties of the least-squares estimators and the fitted regression model, Interval estimation in simple linear regression , Residuals

Multiple Linear Regression:Multiple linear regression model and its assumption, **Interpret Multiple Linear Regression Output(**

R-Square, Standard error, F, Significance F, Cofficient P values), Access the fit of multiple

linear regression model (

R squared, Standard error)

Feature Selection and Dimensionality Reduction: PCA, LDA, ICA
UNIT-III
Introduction to Classification and Classification Algorithms: What is Classification? General Approach to Classification, k-Nearest Neighbor Algorithm, Random Forests, Fuzzy Set Approaches
Support Vector Machine: Introduction, Types of support vector kernel – (Linear kernel, polynomial kernel, and Gaussiankernel), Hyperplane – (Decision surface), Properties of SVM, and Issues in SVM.
Decision Trees: Decision tree learning algorithm,ID-3algorithm, Inductive bias, Entropy and information theory, Information gain,Issues in Decision tree learning.
Bayesian Learning - Bayes theorem, Concept learning, Bayes Optimal Classifier, Naïve Bayes classifier, Bayesian belief networks, EM algorithm
Ensemble Methods: Bagging, Boosting and AdaBoost and XBoost,
Classification Model Evaluation and Selection: Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Lift Curves and Gain Curves, ROC Curves, Misclassification Cost Adjustment to Reflect Real- World Concerns, Decision Cost/Benefit Analysis
UNIT – IV
Introduction to Cluster Analysis and Clustering Methods: The Clustering Task and the Requirements for Cluster Analysis , Overview of Some Basic Clustering Methods:-k-Means Clustering, k-Medoids Clustering, Density-Based Clustering: DBSCAN - Density-Based Clustering Based on Connected Regions with High Density, Gaussian Mixture Model algorithm , , Affinity Propagation clustering algorithm,Mean-Shift clustering algorithm,
Clustering Structure (OPTICS) algorithm, Agglomerative Hierarchy clustering algorithm, Measuring Clustering Goodness

Textbook(s):
Balance Iterative Reducing and Clustering using Hierarchies (BIRCH)
1. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education (India) Private Limited, 2013. 2. M. Gopal, "Applied Machine Learning", McGraw Hill Education
References:
1. C. M. BISHOP (2006), "Pattern Recognition and Machine Learning", Springer-Verlag New York, 1st Edition 2. R. O. Duda, P. E. Hart, D. G. Stork (2000), Pattern Classification, Wiley-Blackwell, 2nd Edition

Reinforcement Learning and deep learning
UNIT-I
Reinforcement Learning Foundation: Introduction to Reinforcement learning and its terms,Features and elements of RL, Defining RL Framework and Markov Decision Process , Polices, Value Functions and Bellman Equations, Exploration vs. Exploitation, Code Standards and Libraries used in RL (Python/Keras/

Tensorflow) **Tabular Methods and Q-networks:** Planning through the use of Dynamic Programming and Monte Carlo, Temporal-Difference learning methods (TD(0), SARSA, Q-Learning), Deep Q-networks (DQN, DDQN, Dueling DQN, Prioritised Experience Replay)

UNIT-II

Policy Optimization: Introduction to policy-based methods, Vanilla Policy Gradient, REINFORCE algorithm and stochastic policy search, Actor-critic methods (A2C, A3C) ,Advanced policy gradient (PPO, TRPO, DDPG), **Model-Based RL**: Model-based RL approach

Recent Advances and Applications: Meta-learning. Multi-Agent Reinforcement Learning, Partially Observable Markov Decision Process, Applying RL for real-world problems

UNIT-III

Introduction to Deep learning: Introduction to deep learning and its application,Examples of deep learning **Introduction to Neural Network:** Introduction to Neural Network its types and application,Introduction to keras,Introduction to ANN Perceptron and its uses,Multilayer perceptron and deep neural network,Activation function and its working TanH function,sigma ,relu etc ,Feed forward network, Cost function, Backpropagation, Gradient Descent, Regulariztion and dropout technique, Batch normalization.

Types of Neural Network: Convolutional Neural network,CNN Pooling,CNN Layers,Flattening and Full connection,Preparing a fully connected neural network,Introduction to RNN, Deep RNN, Long Short Term Memory, GRU, Transfer Learning,

UNIT – IV

Deep Learning for Natural Language Processing: Introduction to NLP and Vector Space Model of Semantics Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-of-Words model (CBOW), Glove, Evaluations and Applications in word similarity, analogy reasoning

Deep Learning for Computer Vision: Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models. Attention models for computer vision tasks.

Textbook(s):
1.Richard S. Sutton and Andrew G. Barto, "Reinforcement learning: An introduction", 2nd Edition, MIT Press, 2019
2. Goodfellow, Ian, Yoshua Bengio, and Aaron Courville. "Deep learning." MIT press, 2016. 3. Antonio Gulli and Sujit Pal,"Deep learning with Keras"
References:
1. Wiering, Marco, and Martijn Van Otterlo. "Reinforcement learning: Adaptation, Learning, and Optimization" (2012)
2. Daniel Slater, Gianmario Spacagna and Peter Roelants, "Python Deep Learning", Packt Publication.

Pattern Recognition and Computer vision
UNIT-I
Induction Algorithms. Rule Induction. Decision Trees. Bayesian Methods. Overview. Naïve Bayes. The Basic Naıve Bayes Classifier. Naive Bayes Induction for Numeric Attributes. Correction to the Probability Estimation. Laplace Correction. No Match. Other Bayesian Methods. Other Induction Methods. Neural Networks. Genetic Algorithms. Instance-based Learning. Support Vector Machines.

UNIT-II
About Statistical Pattern Recognition. Classification and regression. Features, Feature Vectors, and Classifiers. Pre-processing and feature extraction. The curse of dimensionality. Polynomial curve fitting. Model complexity. Multivariate non-linear functions. Bayes' theorem. Decision boundaries. Parametric methods. Sequential parameter estimation. Linear discriminant functions. Fisher's linear discriminant. Feed-forward network mappings.

UNIT-III
Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture.

UNIT – IV
Binary shape analysis – connectedness – object labelling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors – moments.

Textbook(s):
1. Pattern Classification, Richard O. Duda, Peter E. Hart, and David G. Stork. Wiley, 2000, 2nd Edition
2. D. L. Baggio et al., Mastering OpenCV with Practical Computer Vision Projects, Packt Publishing, 2012.

References:
1. Pattern Recognition, Jürgen Beyerer, Matthias Richter, and Matthias Nagel. 2018 2. E. R. Davies, Computer & Machine Vision, Fourth Edition, Academic Press, 2012