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| --- | --- | --- | --- | --- | --- |
| **CSAI 3006** | **Application of Machine Learning in Industries** | L | T | P | C |
| **Version 1.0** |  | 2 | 0 | 0 | 2 |
| **Pre-requisites/Exposure** | Machine Learning & Intelligent Systems | | | | |
| **Co-requisites** | -- | | | | |

**Course Objectives**

1. To understand the scope of machine learning in various public and private service industries
2. To study and explore various ways of machine learning usage for achieving organizational demands

**Course Outcomes**

On completion of this course, the students will be able to

CO1. Explain the need and necessity of machine learning for industrial use cases

CO2. Demonstrate how machine learning can provide a task-specific solution for industrial purpose

CO3. Discuss the application of machine learning concepts in industrial growth and optimization

**Catalog Description**

The course aims to provide a landscape overview of machine learning and its computational scope in various private and public applicative domains. The course should explore the possible dimensions in which the need and usage of machine learning can be used to achieve computational and business needs of profitable and non-profitable organizations.

**Course Content**

**Unit 1: Machine Learning in Banking, Securities, Insurance and Healthcare & Life Sciences**

Introduction, Analytics and Machine Learning Applications in Banking and Securities, Fraud Detection, Effective Application Screening, More Customer Acquisition and Retention, Better Knowledge of Customer Buying Habits, Efficient Cross-Selling, Improved Collections, Marketing Optimization, Increased Customer Lifetime Value, Effective Feedback Management.

Role of Machine Learning in Insurance, Sales and Channel Management - Channel Strategy Optimization, Sales Reporting, Channel Management, Channel Analysis, Channel Profitability,  Operations Management - New Business Processing, New Business Leakages, Customer Retention/Persistency, Attrition Analysis, Predicting Customer Behavior - Social Media Analytics, Use of GPS-Enabled Devices and CCTV Footage, Claims Management - Claims Payment Management, Claims Analysis, Marketing Management in Insurance Industry - Customer Segmentation, Product Management, Campaign Analysis, Profitability Management in Insurance Industry - Premium Analysis, Financial Analysis, Product Profitability Analysis, Underwriting Loss Analysis, Risk Management in Insurance - Reinsurance, Underwriting

An Overview of Provider, Payer and Life Sciences Analytics, Business Value of Health Analytics - Value Life Cycle, Healthcare Analytics Framework- Key Drivers, Security, Privacy, and Risk Analytics in Healthcare, Meaningful Use and Role of Analytics - Complying with Regulatory Imperatives and Measuring the Impact of Social Media in Healthcare

**Unit 2: Machine Learning in Retail, Supply Chain and Transportation and Logistics**

Introduction, Merchandising Analysis - Assortment Planning, Product Placement, Space Allocation, Product Adjacency, Market Basket Analysis, Marketing Analytics - Promotions, Pricing, Personalization, Campaigns, Store Operations Analytics - Workforce Effectiveness, Shrinkage, Inventory, Store Performance, Supply Chain Analytics - Logistics, Inventory, Supplier Performance, Demand Forecasting, Bull-Whip Effect

Applications for Government - Traffic Control, Route Planning, Intelligent Transport Systems, Congestion Management, Applications for Private Sector - Revenue Management, Technological Enhancements, Logistics and for Competitive Advantage by Consolidating Shipments and Optimizing Freight Movement, Applications for Individuals - Route Planning for Saving Fuel and Time, Travel Arrangements in Tourism

**Unit 3: Machine Learning in Energy and Utilities**

Introduction, Smart Grids, Demand Response, Revenue Management, Fraud and Loss Prevention, Energy Efficiency, Compliance, Asset Maintenance and Management, Customer Care and Management, Forecasting and Load Management

**Unit 4: Machine Learning in Communication, Media and Entertainment**

Introduction, Change in Landscape with the Advent of Smartphone and Social Media, The Benefactors of Big Data in Media and Entertainment Industry - Video Publishers, Media Owners, Gaming Companies, Television Channels, Analytics and Machine Learning Applications in Communication, Media and Entertainment Industries, Prediction of Audience Interests, Deriving Insights into Customer Churn, Optimizing Media Program Schedules, Content Monetization, Effective Targeting of Advertisements

**Unit 5: Machine Learning in Education**

Introduction, Current Challenges in the Education Sector - Multiple Modes of Education, Rapidly Changing Education Trends, Targeting the Right Population, Curbing the Dropout Rate, Planning and Budgeting for Sustainable Expansion, Effective Development of Instructor and Curriculum, The Consequences of these Challenges - High Dropout Rate, Higher Debt Pressure on Dropouts, Increasing Loan Defaults, Failure of the Education System, Universities Lose Revenues, How Analytics Can Help? - What-if Scenarios Creation for Planning, Budgeting and Forecasting, Analytics for Educators, Analytics for Pupils, Smart Governance and Management of Education Programs, Career Prediction and Assisting Students in Choosing their Career Paths

**Unit 6: Machine Learning in Government**

Introduction, Machine Learning and Analytics for Government - An Overview, Emerging Technologies for the Public Sector - Preparing for Big Data, Innovative Use Cases, Government Applications of the Internet of Things - Smart Cities, Motivations and Challenges for Government Use of the Internet of Things, Government Sponsored Healthcare and Life Sciences Projects - Genomics, Neuroscience, Government Use of Big Data for Cybersecurity - Illustrative Cybersecurity Solutions, Illustrative Case Studies - Dubai's Smart City Initiative, San Diego Supercomputer Center, National Center for Supercomputing Applications, Translational Genomics Research Institute, The Food and Drug Administration (FDA)'s Initiative to Detect and Study Patterns of Food Related Illness and Diseases

**Text Book - Application of machine learning in industries** (IBM ICE Publications)

**Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination**

**Examination Scheme:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **MSE** | **Presentation/Assignment/ etc** | **ESE** |
| **Weightage (%)** | **20 %** | **30 %** | **50 %** |

**Relationship between the Program Outcomes (POs), Course Outcomes (COs) and Program Specific Outcomes(PSOs)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Outcomes** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 |  |  | 1 |  |  | 2 |  |  |  |  |  |  |  |  | 3 |
| CO2 |  |  | 1 |  |  | 2 |  |  |  |  |  |  |  |  | 3 |
| CO3 |  |  | 1 |  |  | 2 |  |  |  |  |  |  |  |  | 3 |
| **Average** |  |  | **1** |  |  | **2** |  |  |  |  |  |  |  |  | **3** |

1=weak                         2= moderate                          3=strong