

Digital Power and Efficiency

Energy Savings and Process Optimisation in the Industrial and Energy Sector using Data Mining and Artificial Intelligence

Introduction

Professionals and businesses who wish to use prescriptive and predictive analytics and software for energy generation, storage, distribution, and overall system optimisation are intended to enrol in this Course N Carry Digital Power and Efficiency training course. The world will require 30% more energy to be produced by 2050 than it already does, and network level optimisation is the key to preserving and increasing energy savings, which will also save money and improve stakeholder and customer satisfaction. As unbelievable as it may seem, if the world improved its consumption, energy could be saved by almost 20%. Energy could be delivered only when and where it is needed, and predictions of energy use patterns made possible by Big Data, Data Mining, and Artificial Intelligence (AI) should help answer questions about energy conservation and resource optimisation.

The creation of virtual twins of energy and industry systems through AI and digitization techniques aids organisations and communities in achieving high levels of energy savings and process optimisation in the industry. These virtual twins also offer opportunities for experimentation, innovation, simulation, and forecasting. This training course is intended to assist you in staying up to date with business 4.0 and its energy production and consumption requirements, since the digital energy transition is predicted to yield trillions of dollars for the energy business.

This instruction programme will include:

- Principles and methods of data mining
- Artificial Intelligence models and algorithms
- Networks of neurons
- Digital twin production and simulation
- Utilising Artificial Intelligence and Data Mining for Energy Efficiency and Preservation

Objectives

This training course's goal is to get the participants ready for the digital age and Industry 4.0's requirements, which are becoming more and more prevalent across all industries and present unique prospects in the fields of Digital Power and Efficiency.

Upon completion of this training programme, you will be able to:

- Utilise data mining techniques to identify trends in energy consumption.
- Employ artificial intelligence algorithms to optimise in real time.
- Determine the main applications for artificial intelligence and data mining.
- Recognise the advantages by looking at the sample cases.
- Utilise artificial intelligence and data mining techniques to optimise spinning reserves.

Training Methodology

A range of established adult learning strategies will be employed in this training programme to guarantee that the material is understood, comprehended, and retained to the greatest extent possible. Although the topics will be theoretically presented, the focus will be on the exercises that the delegates do under the instructor's guidance.

Because the training session revolves around the concept of creating a new product for the digital world, the delegates will be "learning by doing." Presentations, group syndicate exercises, training e-manuals, and group discussions on the exercise results will all be used to deliver the material.

Organizational impacts

Energy consumption has multiplied and is still one of the most significant issues facing the modern world, if not the most significant one. Energy is simply necessary for the modern world to run, and shortages or wastes of it cause massive disruptions and harms. As a result, energy optimisation and conservation are crucial for the success of any business, industry, or organisation. By enrolling their staff in this training programme, companies can anticipate the following benefits:

- Obtaining workers who realise the value of optimisation
- The ability to build digital twins of a system, business, or unit
- Determine the chances for optimisation.
- Recognise how simulation and artificial intelligence are used in the energy and industrial sectors.
- Acquire knowledge of data mining methods.

Personal Impact

Participants will gain knowledge on data mining techniques, identifying AI algorithms that are advantageous to their individual sectors, and utilising technology appropriately. More precisely, attendees will learn:

- The methodical approach to data mining in their respective fields
- Understanding how to separate reliable data from biased and noise-filled data
- The ability to recognise hidden patterns in the data

- Procedure for creating digital twins in detail
- How to steer clear of frequent Industry 4.0 pitfalls

Who should attend?

A wide range of professionals can benefit from this Course N Carry training course, but the following are particularly noteworthy:

- Professionals interested in learning Artificial Intelligence and Data Mining approaches
- Managers, Section Heads, Supervisors, and Team Leaders
- Professionals with a passion for data science
- Professionals in technical fields, such as engineering, production, and maintenance
- Supervisors of Projects
- Anyone with an interest in efficiency and lowering energy use

Course Outline

Day 1

Pattern Recognition and Data Mining

- Method of Data Mining
- Preparing Data
- Recognition of Associations and Patterns
- The Energy Industry's Use of Data Mining
- Outliers and clusters in data mining

Day 2

Algorithms for artificial intelligence

- Development of Artificial Intelligence
- The Linear Regression
- Regression using Logistic Regression
- Choice Tree
- Vector Machine Support
- Additional Artificial Intelligence (AI) Algorithms

Day 3

Planning and Optimisation for Energy Distribution

- Planning for Energy Storage
- Handling Mishaps and Instrument Breakdowns
- Grid Management for Energy
- Forecasting Energy Consumption

Day 4

Constructing Digital Twins

- Energy and Industry Digitization
- Formulating the Optimal Power Flow Problem
- Application of Neural Networks to Optimal Power Flow
- Optimising Particle Swarms for Ideal Power Flow
- Enhancement of Total Transfer Capability by Evolutionary Algorithm

Day 5

Smart contracts, Machine Learning, and Simulation

- Dynamic Industry System Simulation
- Unit Commitment Problem Simulation
- Artificial Intelligence for Sustainable Energy
- Predicting the Production of Renewable Energy
- Intelligent Contracts in the Energy Sector