



Artificial Intelligence & Machine Learning

Condensed Deep-dive Workshop
Blending Theory, Practice, and Applications of AI and ML



In Association with Knowledge Partner **Terra Incognitus Systems Research Alliance (TISRA™)**



A Skill India Partnership Initiative

Breakthrough Learning in Deep Technologies



Under the **Advanced Technology Training Outreach Collaboration** between **ESSCI** and **TISRA™**

Workshop Content

- Rapid and lucid introduction to the broad spectrum of topics in AI and ML including the following topics:
- *Introduction to AI – Definition, history, evolution, early AI programs, the AI Winter, resurrection, current upsurge and market hype*
- *Mathematical background, theoretical computer science background, probability theory and statistical techniques*
- *Models and algorithms for knowledge representation and reasoning, clustering and segmentation, principal component analysis, pattern recognition*
- *Search and optimization, planning and scheduling, decision systems, expert systems, reasoning with uncertainty, fuzzy systems*
- *Genetic algorithms and evolutionary computation*
- *Foundations of Machine Learning – supervised and unsupervised learning, reinforcement learning*
- *Neural networks and systems – biological brains, artificial neural networks (ANNs), perceptron, back-propagation algorithm, advanced neural net models*
- **Deep Learning** – models, algorithms, and applications, platforms, tools, and APIs
- *AI applications – Text processing, NLP, signal processing, speech recognition and synthesis, image processing, object recognition, computer vision, video analytics, face recognition, data analytics, time series analytics, robotics, autonomous vehicles*
- *Tools, APIs, platforms – Machine Learning using Python, Keras, Tensorflow, Theano, Caffe, Chainer*
- *High-performance AI and ML – Use of multi-core CPUs, many-core GPUs, FPGAs, and new generation parallel computing hardware accelerators in AI and ML*
- *Challenges – limitations of AI, ethical AI, explainable AI, dangerous AI, edge AI and IoT, emerging technologies*
- *AI and ML career prospects and job opportunities – AI+ML jobs, broader data sciences and analytics jobs*

Objectives and Take Aways

- To gain broad insight into the AI and ML landscape beyond the market hype
- To gain high level understanding of the architectures, algorithms, platforms, APIs, and tools for AI/ML solution development, and AI/ML applications
- To gain pragmatic understanding of career prospects, current and emerging opportunities in AI/ML, and how to prepare for these opportunities
- To pursue comprehensive project-oriented courses and hands-on training in AI&ML based problem solving in specialized application domains more effectively.

Workshop Structure and Schedule

- **Condensed workshop** – Total of 9 hours of structured lectures presentations and interactions

Session	Content
Session 1 3 hours	Introduction, history, definition, AI winter and resurrection, current market hype, theoretical background, models and techniques in algorithmic AI, search and optimization
Session 2 3 hours	Evolutionary computation, genetic algorithms, complex systems, machine learning, neural networks, deep learning, CNN, RNN, LSTM, RL, other types of neural learning networks
Session 3 3 hours	AI and ML tools, APIs, platforms, and applications, challenges and issues in AI, and careers in AI and ML

Who Should Attend

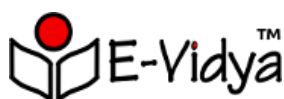
- Students, working professionals, managers of AI/ML related projects, senior managers and business leaders – anyone seeking a rapid and lucid overview of AI&ML and related professional and business opportunities

Certification

- Course certified by **ESSCI** under the **Skill India** mission
- Every participant completing the workshop will receive a personalized **Certificate of Achievement**

Breakthrough Learning in Deep Technologies

E-Vidya™ is a project and registered trademark of



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About The Instructor

- **Dr. Chandan Halder** is an applied computer scientist and an industry leader with over three decades of cutting-edge research, development, and management experience in top academic institutes, global computer corporations, and deep technology start-up ventures
- He is alumni of IIT Kharagpur, IISc Bangalore, and the London Business School, with expertise in Artificial Intelligence & Machine Learning, Parallel & Distributed Computing, Functional Programming, and Embedded and Edge computing
- Dr. Halder is Chief Scientist at **Terra Incognitus Systems Research Alliance (TISRA™)** – an exclusive private research laboratory for deep technologies and breakthrough open systems and software solutions
- As CEO of **Morphing Machines**, Dr. Halder has driven the high-level strategy of the path-breaking **REDEFINE™** reconfigurable power-optimizing massively parallel processor SoC platform and data-flow computing driven accelerator for AI/ML and other HPC algorithms

Follow-through Learning

- Continued access to the online E-Vidya™ community forums, follow-up learning resources, and skill and career evolution resources
- Instructor is available for additional follow-up discussion and mentoring on the E-Vidya™ community forums
- The natural sequel to this Condensed Introductory Workshop in AI & ML is the **Comprehensive E-Vidya™ Intensive Advanced Learning Workshop on Artificial Intelligence and Machine Learning** (40–50 hours total)
- The comprehensive workshop covers these topics in greater depth and includes extensive hands-on sessions on application development in AI/ML using APIs and platforms widely used in the industry globally

Background and Prerequisites

- Knowledge of basic undergraduate level mathematics, familiarity with core computer science subjects, and programming or relevant computing industry experience

About the E-Vidya™ Workshops

- **E-Vidya™ Intensive Advanced Learning Workshops** are exclusively focused upon select deep technologies that are likely to rule the technology world in the 2020s
- Precise and lucid introductions to the **core concepts, models, algorithms, and techniques**, touching all key aspects, connecting the dots across disciplines, supplemented by **hands-on exposure** to the **tools, platforms, and APIs** most widely used in the industry
- **Formats:** Condensed deep-dive workshops (8–10 hours – comprising single day-long session or multiple short daily sessions), comprehensive workshops (40–50 hours including hands-on practical development), and custom workshops of flexible duration
- Offered through **face-to-face classroom sessions, self-paced e-learning courses**, and instructor-led **live online presentations through video conferencing**
- Curated by **authentic expert knowledge** and **deep industry experience** of the **instructors**

Currently Offered E-Vidya™ Workshop Subjects

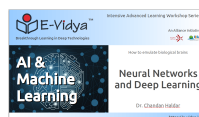
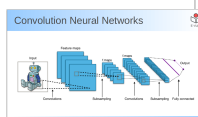
Artificial Intelligence and Machine Learning

Block Chain Technology and Cryptocurrencies

Digital System Design Using High Level Hardware Description Languages

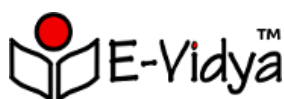
Functional Programming – Theory and Practice

Advanced Programming in Functional Programming Languages {Haskell, OCaml, Rust, Erlang, Go}



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