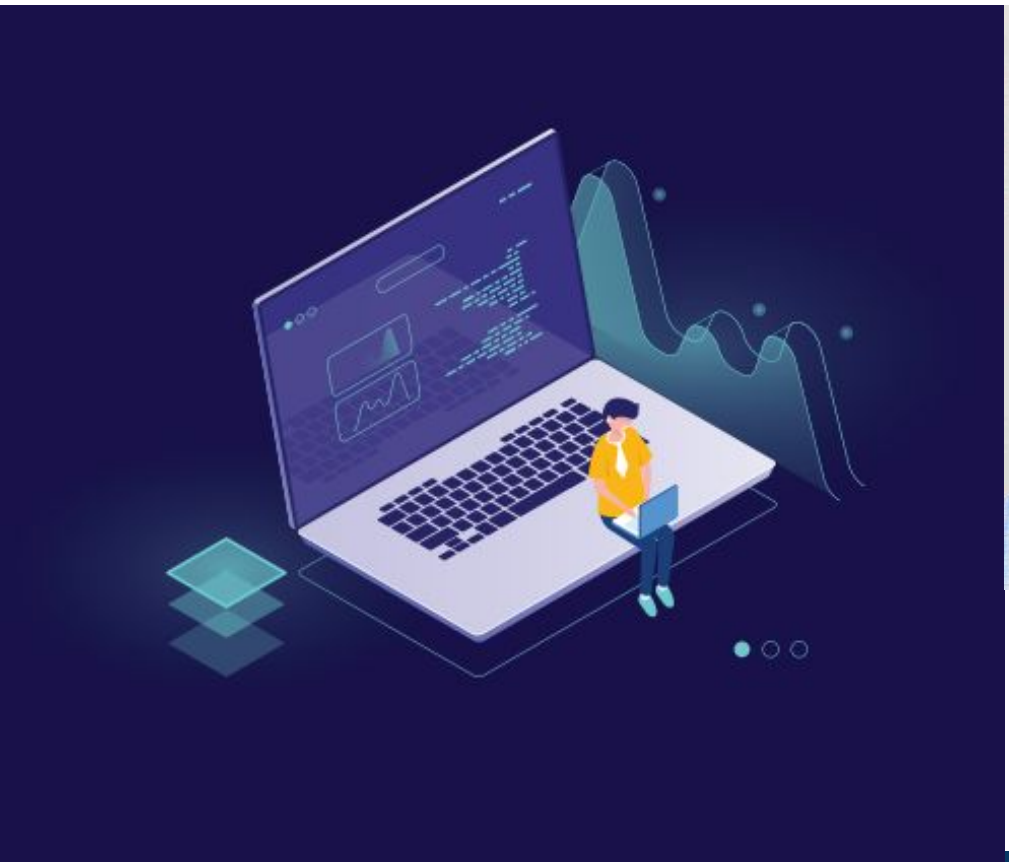
CERTIFICATE PROGRAM

Artificial Intelligence and Deep Learning

Self Paced Program | 180 Lab Days | Certificate by IIT Roorkee

About IIT Roorkee

IIT Roorkee has been ranked the best among IITs, as per the QS World Best Universities Ranking 2019. Established in 1847, it's the oldest technical institution in Asia and fosters a very strong entrepreneurial culture. Some of their alumni are highly successful as entrepreneurs in the new age digital economy. We are excited to partner with CloudxLab to offer a one-of-its-kind, academically rigorous and industrially relevant certification course in Deep Learning. Faculty of IIT-Roorkee will be discussing each and every concept of deep learning thoroughly. Course also includes industry relevant case studies and projects introduced by industry leaders from CloudxLab network. Further, our strong network, industry mentorship and the credibility of certification will provide you with just the right push to accelerate your career in the field of Deep Learning. We invite you to take this opportunity and join us and make use of the excellent pedagogy and industry collaborations. You will truly be getting the best of both worlds, which will help you achieve success.



Prof. Sanjeev Manhas
Coordinator E-Learning Centre
IIT Roorkee

CloudxLab & Course

CloudxLab (CxL) has been a pioneer in the edtech space for the past few years. Founded in 2015 by Sandeep Giri, an alumnus of IIT Roorkee, At Cloudxlab, we are building one of the best gamified learning environments to make technology learning fun and for life. More than 100,000 users across the world have been benefited by our signature courses on Machine Learning and Big Data. Our vision is to upskill people on high-end technologies like Deep Learning, Machine Learning, Big Data and make them employable. We are a highly motivated team of developers, researchers, and engineers who build fresh and lasting learning experiences for our users. This Courses is designed for those who want to gain hands-on experience in solving real-life problems using deep learning. After finishing this specialization, you will find creative ways to apply your learning to your work like building a robot which can recognize faces or change the path after discovering obstacles on the path. .

Sandeep Giri

Founder at CloudxLab

Why CloudxLab & IIT Roorkee

Earn a certificate from IIT Roorkee.

Learn Deep Learning from IIT Roorkee professor and industry experts and become expert in Deep Learning domain

Online cloud lab for hands-on for real-world experience

Best-in-class support Throughout your learning journey

Lifetime course access

Work on real-world projects.

Interact with the international community of peers via the discussion forum.

Mentors / Faculties

Raksha Sharma
Faculty CSE Dept,
IIT Roorkee

Course Instructor
Know More

Gaurav Dixit
Faculty DoMS Dept,
IIT Roorkee

Course Instructor
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Sandeep Giri
Founder at CloudxLab
Past: Amazon, InMobi, D.E.Shaw

Course Developer
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Abhinav Singh
Co-Founder at CloudxLab
Past: Byjus

Course Developer
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Praveen Pavithran
Co-Founder at Yatis
Past: YourCabs, Cypress Semiconductor

Course Developer
Know More

Course Curriculum

- **Foundations**
  - Linux for Data Science/ Machine Learning
  - Getting Started with Git
  - Python Foundations
  - Machine Learning Prerequisites(Including Numpy, Pandas and Linear Algebra)
  - Getting Started with SQL
  - Statistics Foundations
- **Introduction to Machine Learning and Deep Learning**
  - In this topic, we will cover concepts like different types of Machine Learning algorithms (Supervised, Unsupervised, Reinforcement) and challenges in Machine Learning. We will see examples of solving the problems using the traditional approach and why Machine Learning algorithms give far better accuracy than the traditional approach. This topic will give you a brief introduction to both Machine Learning and Deep Learning world.
- **Data Preprocessing, Regression - Build end-to-end Machine Learning Project**
  - We will start the course by learning concepts in Machine Learning. In this topic, we will build a machine learning model to predict housing pricing in California. By the end of this project, you will understand how to build machine learning pipelines to build a model. We will also cover concepts like data cleaning, preparing data for machine learning algorithms, exploring many different models, short-list the best one and fine-tuning the selected model
- **Classification**
  - In this topic, we will train a model on the MNIST dataset to recognize handwritten digits. We will also learn various performance measures in classification like Confusion Matrix, Precision and Recall, and ROC Curve.

Course Curriculum

- **Machine Learning Algorithms**
  - In this topic, we will learn various Machine Learning algorithms and concepts like Unsupervised Learning, Ensemble Learning, and Dimensionality Reduction
- **Introduction to Artificial Neural Networks with Keras**
  - We will start the Deep Learning course with Artificial Neural Networks. We will learn about biological neurons, multilayer perceptrons, and back-propagation. We will implement a multilayer perceptron using Keras and visualize the runs and graphs using Tensorboard
- **Training Deep Neural Networks**
  - In this topic, we will learn various challenges deep neural networks face while training like vanishing and exploding gradients. We will learn various techniques to solve these problems like reusing pre-trained layers, using faster optimizers and avoiding overfitting by regularization.
- **Custom Models and Training with TensorFlow**
  - In this topic, we will dive deeper into TensorFlow and its lower level Python API. These lower-level Python APIs are useful when we need extra control like writing custom loss function, layers and many more.
- **Loading and Preprocessing Data with TensorFlow**
  - Deep Learning systems are usually trained on very large datasets that may not fit in the RAM. In this topic, we will learn TensorFlow's Data API which helps in ingesting dataset and preprocessing it efficiently.

Course Curriculum

- **Deep Computer Vision using Convolutional Neural Network**
  - In this topic, we will learn how Convolutional Neural Networks - CNNs achieve superhuman performance on complex visual tasks. Today CNNs power image search services, self-driving cars, automatic video classification systems and more. We will learn CNNs basic building blocks and how to implement them using TensorFlow and Keras
- **Processing Sequences Using RNNs and CNNs**
  - Predicting the future is something we do all the time like predicting stock prices. In this topic, we will learn how Recurrent Neural Networks - RNN predict the future, the problem they face like limited short-term memory and solutions to these problems - LSTM (Long Short-Term Memory) and GRU cells
- **Natural Language Processing Concepts and RNNs**
  - Using Natural Language Processing we build systems that can read and write natural language. In this topic, we will learn different NLP techniques and generate Shakespearean text using a Character RNN.
- **Representation Learning & Generative Learning Using autoencoders and GANs**
  - Autoencoders are artificial neural networks capable of learning dense representations of input data without any supervision. For example, we could train an autoencoder on pictures of faces and it can then generate new faces. In this topic, we will learn different types of autoencoders and generative models.

Course Curriculum

- **Reinforcement Learning**
  - Reinforcement Learning is one of the most exciting fields of Machine Learning. Using Reinforcement Learning AlphaGo(system) defeated the world champion at the game of Go. Reinforcement Learning is an area of Machine Learning aimed at creating agents capable of taking actions in an environment in a way that maximizes rewards over time. In this topic, we will learn various concepts in Reinforcement Learning and experiment with OpenAI Gym.

Projects

- **Analyze Emails**
  - Churn the mail activity from various individuals in an open source project development team.
- **Build an Image Classifier in Fashion MNIST dataset**
  - Classify images from the Fashion MNIST dataset using Tensorflow 2, Matplotlib, and Python.
- **Training from Scratch vs Transfer Learning**
  - Learn how to train a neural network from scratch to classify data using TensorFlow 2, and how to use the weights of an already trained model to achieve classification to another set of data.
- **Working with Custom Loss Function**
  - Create a custom loss function in Keras with TensorFlow 2 backend.
- **Image Classification with Pre-trained Keras models**
  - Learn how to access the pre-trained models(here we get pre-trained ResNet model) from Keras of TensorFlow 2 to classify images.
- **Build cats classifier using transfer learning**
  - In this project, you will build a basic neural network to classify if a given image is of cat or not using transfer learning technique with Python and Keras.
- **Mask R-CNN with OpenCV for Object Detection**
  - Learn how to read a pre-trained TensorFlow model for object detection using OpenCV.
- **Art Generation Project**
  - Use TensorFlow 2 to generate an image that is an artistic blend of a content image and style image using Neural Style Transfer

Projects

- **NYSE Stock Closing Price Prediction using TensorFlow 2 & Keras**
  - Predict stock market closing prices for a firm using GRU, a state-of-art deep learning algorithm for sequential data, with Keras and Python.
- **Sentiment Analysis using IMDB dataset**
  - Create a sentiment analysis model with the IMDB dataset using TensorFlow 2.
- **Autoencoders for Fashion MNIST**
  - Learn how to practically implement the autoencoder, stacking an encoder and decoder using TensorFlow 2, and depict reconstructed output images by the autoencoder model using the Fashion MNIST dataset.
- **Deploy Image Classification Pre-trained Keras model using Flask**
  - Learn how to deploy a deep learning model as a web application using the Flask framework.

Course Details and Fees

Please find more information about the course and fees here:
https://cloudxlab.com/course/84/certificate-course-artificial-intelligence-deep-learning-iit-roorkee

Our Esteemed Customers

For Further Details

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