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Learning for Life

DEEP LEARNING CERTIFICATE PROGRAM

A Walkthrough

What's In Here

INTRODUCTION

We are only about a year into the worldwide Deep Learning explosion, and only about 5 years into its widespread use outside of the research laboratory. But in this very short period of time, a confluence of factors has helped this become the technique of choice for a variety of AI problems.

These factors are - the proliferation of tools (TensorFlow, PyTorch and the like), easy availability of GPUs, and a systematic increase in labeled data (tagged photos, voice interfaces and the likes). And as every company is looking to understand how it can use Deep Learning to get an edge, practitioners in this area have become extremely valuable and sought after.

Roles like Deep Learning Engineer and Computer Vision Engineer have gone mainstream, and the opportunities in this space seem limitless.
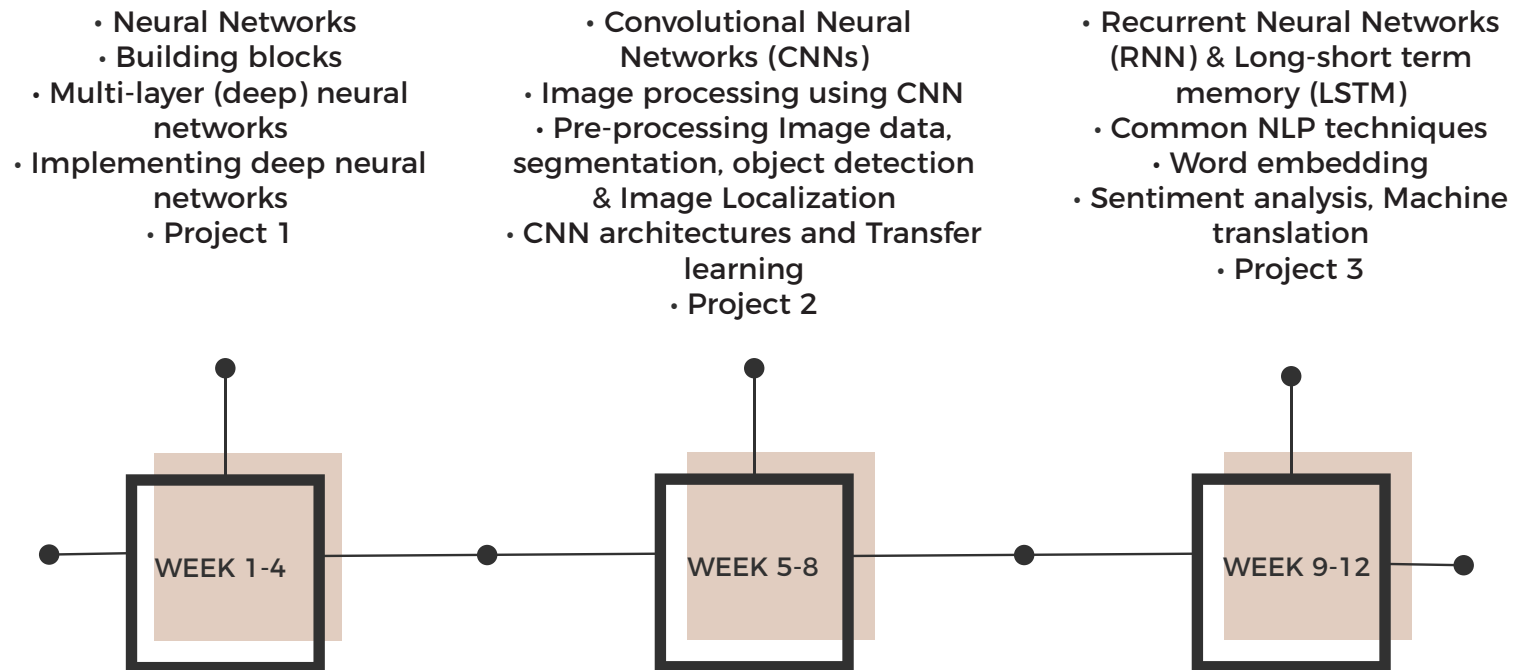
PROGRAM OVERVIEW

In this program, you will first build strong foundations in Neural Networks and deep learning. Then you will use the techniques you learned to solve their most common application areas, namely Computer Vision and Natural Language Processing. In the process, you will have worked on a series of projects in Python, TensorFlow and Keras; and will have used packages such as NLTK, Numpy, Matplotlib and Scikit-Learn.

Deep Learning is the most sought after skill in the Data Science and AI community, and it requires an experienced hand to guide you in your learning journey. In this program, you will learn from the best in the world - faculty from IIT Bombay, who have worked with the inventors and pioneers of Deep Learning, and seasoned practitioners who will give you a flavour of 'on-the-ground' realities.

LEARNING JOURNEY

Prior to the start of the program: Refresher on Python, Linear Algebra, Statistics, Probability and Differential Calculus

• Neural Networks
• Building blocks
• Multi-layer (deep) neural networks
• Implementing deep neural networks
• Project 1

• Convolutional Neural Networks (CNNs)
• Image processing using CNN
• Pre-processing Image data, segmentation, object detection & Image Localization
• CNN architectures and Transfer learning
• Project 2

• Recurrent Neural Networks (RNN) & Long-short term memory (LSTM)
• Common NLP techniques
• Word embedding
• Sentiment analysis, Machine translation
• Project 3

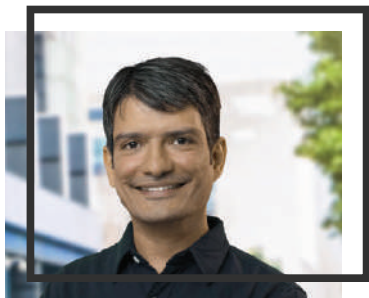WEEK 1-4   WEEK 5-8   WEEK 9-12

PEDAGOGY

DLCP is a 3-month structured, online program with hands-on projects and learning support, all designed to help you become proficient in Deep Learning. You will learn through a combination of world-class online content, a series of projects, and exposure to industry practitioners' accounts of practical considerations. Weekly support sessions guide your learning journey, and focus on your projects. You will work on a cloud-based accelerated computing platform with GPUs and all the requisite software tools that you will need to build and test computationally intensive Deep Learning models.

This is a program for practitioners, and those who want to be practitioners. So, we focus intensely on your ability to build real applications using Deep Learning. The projects you work on involving both vision and NLP will give you a taste of what it's like to grapple with real world issues that you will face, and get you comfortable dealing with different types of data from text to images and beyond. You will leave with a verified portfolio of projects that will showcase your newly acquired skills to the world. If you are looking for a job in AI after this program, you will also be able to answer basic interview questions.

FACULTY

Dr. Jain is the co-founder of Perceptive Code, a Silicon Valley AI startup that builds intelligence into automobiles using Deep Learning. He is part of the Theano development team and a contributor to Torch - both of which are widely used libraries for Deep Learning. Dr. Jain received his PhD from the Max Planck Institute in Germany and his post-doc from NYU where he worked with Yann LeCun.

Dr. Arjun Jain
Adjunct Faculty for Deep Learning
and Computer Vision, IIT Bombay

Prof. Sethi is currently a faculty member at IIT Bombay where his research is focused on applying Deep Learning methodologies to digital pathology for analysis of cancer tissues. He was previously a faculty member at IIT Guwahati and spent many years at ZS Associates, a leading management consulting firm, at their offices in Chicago. Prof. Sethi holds MS and PhD degrees from University of Illinois at Urbana-Champaign, and BTech from IIT Delhi.

Dr. Amit Sethi
Faculty for Image Processing and
Machine Learning, IIT Bombay

FACULTY

Prof. Mukesh Rao
Faculty Machine Learning
Great Learning

Prof. Mukesh Rao has almost 3 decades of experience in the Analytics and Machine Learning industry. He has designed and implemented Machine Learning algorithms for abuse detection, social media analysis and report generation using MapReduce. Prior to this, Prof. Rao was with Wipro for over 12 years where he was the Head of PM Academy.

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COURSE MODULES

Neural Networks & Deep Learning

Neural Networks Building blocks (feedforward, backpropagation, activation functions, hyperparameters, gradient descent, softmax, cross entropy loss etc.)
Multi-layer (deep) Neural Networks
Implementing deep neural networks (learning rate, hyperparameter selection, weight initialization etc.)

Computer Vision

Convolutional Neural Networks (CNN)
Image processing using CNN
Pre-processing, semantic segmentation, localization and detection
CNN architectures and Transfer Learning

Natural Language Processing

Recurrent Neural Networks (RNN) & Long-short term memory (LSTM)
Common NLP techniques (Bag-of-words, POS tagging, tokenization, stop words etc.)
Word embedding (word2vec, GloVe)
Sentiment analysis, Machine translation

COURSE MODULES

In the process, you will also build your foundations, and develop proficiency in a series of important tools.

Foundations

Python for Data Science
Linear Algebra - Vectors, Matrices, Tensors
Optimization techniques like Gradient Descent
Necessary statistics, probability and differential calculus

Tools and Technologies

Python & libraries such as Numpy, Matplotlib, Scikit-learn
Deep Learning frameworks such as TensorFlow and Keras
Natural Language Processing libraries such as NLTK
Visualization tools like TensorBoard
Github repositories

PROJECTS

As part of this program, you will use these tools to work on three projects spread across:
• Neural Networks
• Computer Vision
• Natural Language Processing

You will work on these projects using our GPU-enabled lab that will help you learn and solve problems without buying or installing the computing infrastructure yourself.

Here are the kinds of projects you will be working on as part of this program:

1

Face Recognition Algorithm (Computer Vision)

Recognize, identify and classify faces within images using CNN and image recognition algorithms.

Explore how sequential models in Deep Learning can be used to distinguish between reliable and unreliable news stories.
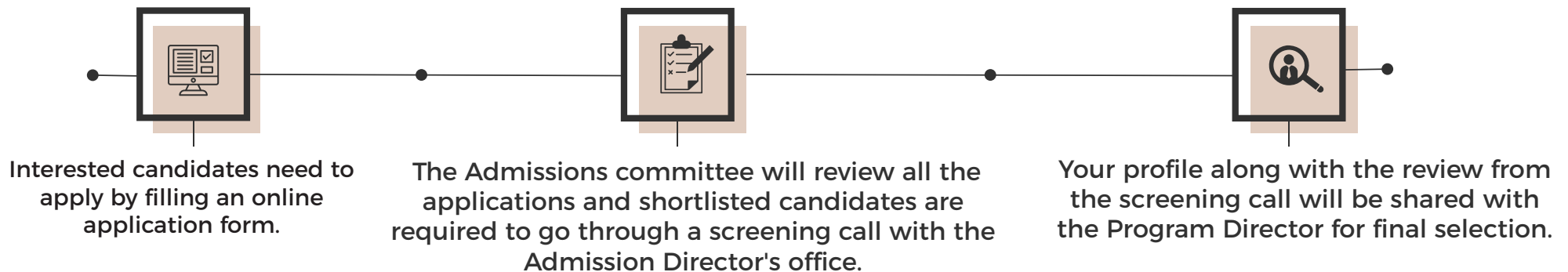
2

Fake News Detection (Natural Language Processing)

ADMISSION DETAILS

ELIGIBILITY

• We recommend applicants to have at least 2 years of programming experience.
• Familiarity with statistics, algebra, probability and exposure to data analysis is preferred.

SELECTION PROCESS

Interested candidates need to apply by filling an online application form.

The Admissions committee will review all the applications and shortlisted candidates are required to go through a screening call with the Admission Director's office.

Your profile along with the review from the screening call will be shared with the Program Director for final selection.

*Admissions will be closed once the requisite number of candidates have admitted into the program

PROGRAM FEE

The course fee is **INR 75,000 + GST**

(includes 80+ hours of learning, live support and industry sessions, and GPU Lab access for projects)

PAYMENTS

Candidates can pay the program fee through Net Banking, Credit Cards or Debit Cards.

FINANCIAL AID

Candidates can pay the program fee in 2 equal parts. We also have tie up with various banks that provide an EMI option to candidates.

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CONTACT US

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