



Pro Deep Learning with TensorFlow

A Mathematical Approach to Advanced Artificial Intelligence in Python

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Motivation:- Paper for my internship this summer implementing state of the art deep learning algorithms.
- Gain the skills to do DL research in Berkeley.

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Technical Reviewer: Mandeep Sureshwar. Author of Mastering ML with Python in 6 Steps. BS in Physics, Math, CS and MS in "Project management."

Introduction

- Deep Learning: Modeling the world in terms of a hierarchy of concepts.

↳ Just like the human brain, it allows us to model complex concepts that go unnoticed in traditional modeling techniques. Leverages huge amounts of unstructured data.

↳ Understanding the scientific and mathematical principles behind DL lets us maximize the "black box" power.

- Why TensorFlow?

↳ Flexibility for research purposes and ease of use.

↳ "Capability of loading models with ease in a live production environment using its serving capabilities."

- Goals of this book:

- 1) Learn DL from scratch and deploy meaningful DL solutions.
- 2) Using TensorFlow and optimizing different DL architectures.
- 3) Use demonstrated prototypes to build new DL applications.

- Resources Provided:

↳ Example code is provided in Python notebooks and scripts

Table of Contents

Chapter 1: Mathematical Foundations

- Linear Algebra, Probability, Calculus, Optimization, ML Formulation

Chapter 2: Introduction to Deep-Learning Concepts and TensorFlow

- Evolution of deep learning over the years
- building blocks of neural networks and methods of learning
 - ↳ Perceptron-learning rule, backpropagation methods.
- TensorFlow coding paradigm

Chapter 3: Convolutional Neural Networks

- CNN's for image processing
- Object recognition and detection, object classification, localization, segmentation.
- Convolution in detail. Backpropagation through convolutional and pooling layers.
- Equivariance and Translation Invariance.

Chapter 4: Natural Language Processing Using Recurrent Neural Networks

- Vector space models for text processing
- Word-to-vector models