

ICME Summer Workshops 2019

August 12 – 17, 2019

Stanford University

Introduction to Deep Learning – Thursday, August 15

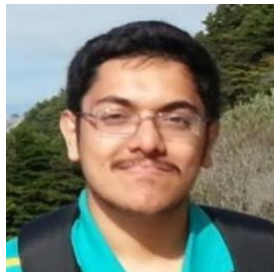
Deep Learning is a rapidly expanding field with new applications found everyday. In this workshop we will cover the fundamentals of deep learning for the beginner. We will introduce the math behind training deep learning models: the backpropagation algorithm. Building conceptual understanding of the fundamentals of deep learning will be the focus of the first part of the workshop. We will then cover some of the popular architectures used in deep learning, such as Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), LSTMs, autoencoders and GANs. There will be a hands-on computing tutorial using Jupyter notebooks to build a basic image classification model via transfer learning. By the end of the workshop, participants will have a firm understanding of the basic terminology and jargon of deep learning and will be prepared to dive into the plethora of online resources and literature available for each specific application area.

Prerequisites: Familiarity of basic concepts from linear algebra, such as vectors and matrices, as well as calculus concepts, such as differentiation. Familiarity with the python programming language and an ability to use Jupyter notebooks will be helpful for the hands-on sessions.



About the Instructor: Alexander Ioannidis earned his Ph.D. in Computational and Mathematical Engineering and Masters in Management Science and Engineering both at Stanford University. He is a postdoctoral fellow working on developing novel machine learning techniques for medical and genomic applications together with Carlos Bustamante, Chair of the Department of Biomedical Data Science at Stanford Medical School. Prior to Stanford he earned his bachelors in Chemistry and Physics from Harvard and a M.Phil from the University of Cambridge. He conducted

research for several years on novel superconducting and quantum computing architectures at Northrop Grumman's Advanced Technologies research center. In his free time he enjoys sailing.



About the Instructor: Anjan Dwaraknath is 5th year PhD student in the Institute for Computational and Mathematical Engineering. He is currently pursuing his research under Prof. Gunnar Carlsson on the potential of combining Deep Learning algorithms with Topological Data Analysis. Prior to Stanford he worked on derivative pricing models as an analyst in Goldman Sachs. He obtained his undergraduate degree in Engineering Physics from the Indian Institute of Technology, Madras.