An Introduction to Deep Learning with Biometric and Environmetric Applications

Date: Monday, 2 December 2019

Time: 9am – 5pm

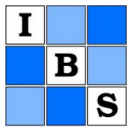
Location: University of Adelaide, Waite Campus, Plant Genomics Centre Room 1.27

Cost: AU$200 (IBS Member), AU$250 (Non-member), AU$100 (Concession)

URL: https://ausbiometric2019.org/workshops/

Deep learning is a type of machine learning (ML) that exploits a connected hierarchical set of models to predict or classify elements of complex data sets. The ML deep learning revolution is relatively recent and primarily associated with neural models such as feedforward neural networks (FNNs), convolutional neural networks (CNNs), recurrent neural networks (RNNs), generative adversarial networks (GANs), or some combination of these neural architectures. There are remarkable success stories associated with these approaches, such as models that can defeat experts in Go, Chess, or Shogi, and of course, there are failures as well. Statisticians should not be surprised by the success (and failure) of these deep ML methods as we have been using deep hierarchical models (HMs) for years. Indeed, many of the reasons for success and failure of deep ML and deep HMs are the same.

This course will present an introduction to deep models in ML from a statistician's perspective. Topics will include an introduction to stochastic gradient optimization and concepts in regularization and dimension reduction, followed by discussion of deep FNNs, CNNs, and RNNs. We will also touch upon some recent developments that may be of particular interest to statisticians. The course will focus on concepts and modeling intuition, and will include hands-on implementation using the R interface to Keras, with examples from biomedical, ecological, and environmental statistics.



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Christopher K. Wikle is Curators' Distinguished Professor and Chair of Statistics at the University of Missouri (MU), with additional appointments in Soil, Environmental and Atmospheric Sciences and the Truman School of Public Affairs. A more detailed biography from his distinguished career may be found at https://ausbiometric2019.org/speakers/.

Dan Pagendam is a senior research scientist at CSIRO Data61 where he works on problems at the interface of the environmental sciences and statistics. Dan holds a BEnvirSci in (Ecology), an MSc (Statistics) and PhD (Mathematics and Statistics). His main research interests are in stochastic modelling, Bayesian statistics and the use of machine learning methods for model emulation. In recent years, Dan has been part of multidisciplinary teams winning CSIRO Impact from Science medal (2017) and the CSIRO Chairman's Award (2018)