特別講演のご案内

講演タイトル：Learning with Function Approximators
http://www.cs.berkeley.edu/~eiji/TMP/talk_at_TMU_June04.txt

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日時：2004年6月21日（月）～23日（水），4:20 - 5:50

場所：6月21日（月）大学院講義室（27-470）
6月22日（火）大学院演習室（27-469）
6月23日（水）大学院講義室（27-470）
参加費：無料　　（講演は，日本語です）

講演内容：
6月21日（月）
On derivation of MLP-backpropagation from the Kelley-Bryson optimal-control gradient formula
6月22日（火）
Introduction to neuro-dynamic programming and reinforcement learning
6月23日（水）
Second-order optimal control methods for learning with function approximators

講演概要：
In the three-day series of tutorial lectures, I describe ``learning with function approximators'' in the context of neural-network (NN) supervised learning and reinforcement learning (also known as neuro-dynamic programming). I begin with fundamental concepts of classical dynamic programming (DP), and then derive the well-known backpropagation [for multilayer-perceptron (MLP) learning] from the so-called Kelley-Bryson optimal-control gradient formula. Here, I shall demonstrate the use of a non-optimal value function in the spirit of DP. In optimal-control theory, it also plays an important role in developing a class of second-order methods that start with a given nominal non-optimal state trajectory; in particular, I spotlight stagewise Newton and differential dynamic programming (DDP). Such second-order optimal-control methods can be employed for accelerating supervised NN-learning as well as reinforcement learning with function approximators. For optimization purpose, I emphasize that it is very important to pursue a good compromise between the steepest-descent method and a Newton-type method. Besides the theoretical aspects of the posed methods, I shall illustrate in detail small-scale longest path problems in non-Markovian settings to give a clear idea on reinforcement learning approaches as well as a classical DP algorithm.
This series of talks is largely based on joint work with Stuart Dreyfus, UC Berkeley.

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