CHANGE of VENUE

Special one-week intensive course

``**Dynamic Programming and Neural Network Learning**''

Dept. of System Design, Tokyo Metropolitan University
organized by Professor Naoyuki Kubota
~~*Lecture Room 401, Building 2, Hino Campus*~~ 302
9:30am - 12:30pm.
August 22 – 26, 2022

Instructor:

國立台灣科技大學助教授 水谷英二 先生 (Prof. Eiji Mizutani)

Textbook (draft):

The Art of Computational Dynamic Programming
Eiji Mizutani and Stuart Dreyfus (to be published by Academic Press).

Course description:

The art of formulation illustrated by Dynamic Programming is useful in learning creative thoughts rather than rote repetition of formulas and proofs. It stimulates thought rather than memory.

This short course is designed to introduce dynamic programming principles and formulations through selected fundamental topics; such as, shortest-path problems (including dynamic time warping for pattern recognition); warehouse management (in relation to inventory control); and discrete time optimal control problems (leading to artificial neural network learning).

For the last topic on *optimal control,* we shall focus on the Kelley-Bryson optimal-control gradient procedure; it is essentially equivalent to the *widely employed* backpropagation (BP) in deep neural-network learning. In particular, we show how to employ a *nominal cost-to-go state-action value function* for deriving various forms of BP (including *BP through time* for recurrent network learning) in the spirit of dynamic programming. Computer simulations will be demonstrated for attacking several intriguing neural-network learning problems found in the literature.