Room:
April 2: 304 Lecture Room, #2 Building
April 3: 304 Lecture Room, #2 Building
April 4: 305 Lecture Room, #2 Building

Special intensive course

``Dynamic programming for path planning and related problems''

at Hino Campus, Tokyo Metropolitan University
for April 2 – April 4, 2024.

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

Course Description:

This special short course begins with shortest-path problems in a general graph; if the graph includes any cycles, then unknown quantities typically appear on both sides of Bellman's optimality equation. To resolve this issue, **successive-approximation** procedures must be employed; e.g., a **relaxation** operator for the well-known Bellman-Ford algorithms and Dijkstra's method. We then describe how the concept of relaxations is related to the **temporal-difference (TD) reinforcement learning**, as an *iterative approximate policy evaluation scheme*.

We also consider a path-planning problem for point-to-point robot control in a two-dimensional map. In particular, we show how a special *two-job* **job-shop scheduling** algorithm can be adapted as a quick path-finding procedure in comparison with Dijkstra and A* search algorithms.

We plan to proceed as follows:

Day 1 (April 2) The **dynamic programing principle** and shortest-path problems.
Day 2 (April 3) Basic concepts of temporal-difference (TD) reinforcement learning.
Day 3 (April 4) Path-planning problems.

During the week, several in-class exercises and quizzes will be given. Before the first lecture, the students are encouraged to read the handout (to be distributed via email).