Dynamic Patient Scheduling and Approximate Dynamic Programming

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In this talk I will review a series of papers which use approximate dynamic programming methods to assign patients to appointment dates to meet wait time targets. This research arose from applications in diagnostic imaging and cancer treatment. I will motivate this research by describing an online version of a simple instructional game (asg.sauder.ubc.ca) I have used when teaching health care operations to students and health care executives. Next I will formulate the simplest instance of the problem as a Markov decision process, show how we used linear programming based ADP methods to solve it and describe some surprising results. Following a discussion of the limitations of using affine value function approximations, I will describe recent work on using non-linear value function approximations and simulation based ADP to obtain better approximations. The talk will conclude with a discussion of applications to multi-appointment scheduling and scheduling with time windows.

References


