CIDSE Faculty Talk

Dimitri Bertsekas

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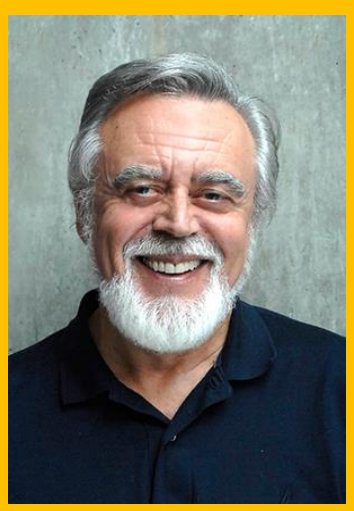
Ten Key Ideas for Reinforcement Learning



Friday, November 22, 2019
2:10 PM
Brickyard Artisan Court - BYAC 110

Abstract:

We will give a selective high level overview of the ideas underlying the approximate dynamic programming/reinforcement learning methodology, as presented in the recent book D. P. Bertsekas, “Reinforcement Learning and Optimal Control,” Athena Scientific, July, 2019 which was developed while teaching a course at ASU/CIDSE last semester. Slides and videolectures from the course can be found at http://web.mit.edu/dimitrib/www/RLbook.html

The course, expanded with new research material, will also be given in the Spring 2020 semester at ASU/CIDSE.

The methodology aims to address large and challenging multistage decision problems, which can be solved in principle by dynamic programming, but their exact solution is computationally intractable. It consists of methods that rely on approximations to produce suboptimal policies with adequate performance.

An expanded version of the slides for the present lecture can found at
http://web.mit.edu/dimitrib/www/Slides_Extended_RL_Lecture.pdf

BIO

Dimitri Bertsekas studied engineering at the National Technical University of Athens, Greece. He obtained his MS at the George Washington University, Wash. DC in 1969, and his Ph.D. in system science in 1971 at the Massachusetts Institute of Technology. Dr. Bertsekas has held faculty positions with the Engineering-Economic Systems Dept. of Stanford University (1971-1974), the Electrical Engineering Dept. of the University of Illinois, Urbana (1974-1979), and the Electrical Engineering and Computer Science Dept. of the Massachusetts Institute of Technology (1979-2019). He recently joined the department of Computer, Information, and Decision Systems Engineering at Arizona State University, Tempe. His research spans several fields, including optimization, control, large-scale computation, and data communication networks, and is closely tied to his teaching and book authoring activities. He has written numerous research papers, and seventeen books and research monographs, several of which have been used as textbooks in many universities, and have been translated in several languages.

Professor Bertsekas was awarded the INFORMS 1997 Prize for Research Excellence in the Interface Between Operations Research and Computer Science for his book "Neuro-Dynamic Programming", the 2000 Greek National Award for Operations Research, the 2001 ACC John R. Ragazzini Education Award, the 2009 INFORMS Expository Writing Award, the 2014 ACC Richard E. Bellman Control Heritage Award for "contributions to the foundations of deterministic and stochastic optimization-based methods in systems and control," the 2014 Khachiyan Prize for Life-Time Accomplishments in Optimization, and the SIAM/MOS 2015 George B. Dantzig Prize. In 2018, he was awarded, jointly with his coauthor John Tsitsiklis, the INFORMS John von Neumann Theory Prize, for the contributions of the research monographs "Parallel and Distributed Computation" and "Neuro-Dynamic Programming". In 2001, he was elected to the United States National Academy of Engineering for "pioneering contributions to fundamental research, practice and education of optimization/control theory, and especially its application to data communication networks."

Dr. Bertsekas' recent books are "Introduction to Probability: 2nd Edition" (2008), "Convex Optimization Theory" (2009), "Dynamic Programming and Optimal Control," Vol. I, (2017), and Vol. II: (2012), "Abstract Dynamic Programming" (2018), "Convex Optimization Algorithms" (2015), and "Reinforcement Learning and Optimal Control" (2019), all published by Athena Scientific.

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